INTERNATIONAL SOCIETY OF

LYMPHOLOGY

LYMPHATICS • LYMPH • LYMPHOCYTES • LYMPH NODES

24th ISL Congress

With the support of the President of the Italian Republic on. Giorgio Napolitano

Rome, Italy • 16-20 September 2013

ABSTRACT BOOK

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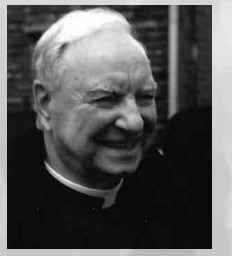
Dedicated to:

- All Scientists, inside the ISL and outside It, who have preceded us with their studies and opened to us the way that today allows us to confront about the problems that we will discuss in these days.
- Monsignor Azelio Manzetti, *Apostolic Protonotary* of the Order of Malta, who died recently, powerful spiritual Leader and great Supporter of Scientific Research as a means to improve the conditions of life, both material and moral, of the people.



Monday, 16th September 2013

H. 8.00 - 10.30 a.m.

Session 1
Genetics and Lymphangiogenesis

Aula Magna

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SPORADIC AND FAMILIAL PRIMARY LYMPHEDEMA AND LYMPHANGIOGENESIS: MOLECULES, MODELS, METRICS, AND MAN

WITTE M.
University of Arizona, Department of Surgery, Tucson, USA

Since the dawning of "molecular lymphology" at the turn of this new millennium in the wake of tools and insights from the Human Genome Project, there has been an explosion of discoveries and information about the genetic basis of hereditary lymphedema-angiodyplasia (LE-AD) syndromes. Using forward and reverse genetic approaches and progressively more refined, efficient, and revealing technologies, 10 human LE-AD syndromes and many more mouse syndromes, some delineated by ISL members and their teams, have been linked to specific mutations or other spontaneous or engineered alterations abnormalities involving loci on nearly all the human chromosomes. Genotype-phenotype correlations have been explored including through lymphatic system imaging, and specific proteins (proteomes) and signaling pathways have been linked to abnormal lymphvasculogenes/ lymphangiogenesis not uncommonly associated with corresponding abnormalities in hemvasculogenesis/hemangiogenesis (systemomes). At this point, the diagnostic and evaluative value of this basic and clinical research is entering the clinical arena in practical testing and genetic counseling for a few of the many LE-AD syndromes, but "genes to man" translation into preventive/therapeutic strategies remain a formidable challenge as fundamental unanswered questions and complex, poorly understood interactions of genome with the personal "inome" persist and accumulate.

THE GENETICS OF PRIMARY LYMPHŒDEMA, THE STORY SO FAR

MANSOUR S., OSTERGAARD P. CONNELL F., GORDON K., JEFFERY S., BRICE G., MORTIMER P.
St. George's University of London, UK

Primary lymphoedema results from an underlying abnormality of the lymphatic system. Primary lymphoedema is a heterogenous condition and often genetic in origin.
It may present in utero as a cause of hydrops fetalis, at birth with swelling of limbs, or later in childhood or adulthood. There may be systemic involvement e.g. intestinal lymphangiectasia, pulmonary lymphangiectasia, pericardial or pleural effusions.
We have been running a specialist joint Dermatology and Genetics clinic at St George's Hospital, London for the past 12 years. Our experience has led to an improved classification of the primary lymphatic disorders [Connell, Gordon *et al.*, 2013].
For some time it has been known that mutations in *FLT4*, coding for Vascular Endothelial Growth Factor Receptor 3, are associated with Milroy Disease and mutations in *FOXC2* with Lymphoedema-Distichiasis syndrome.
Recently, with the advent of Next Generation Sequencing, rigorous phenotyping has led to the discovery of four new genes associated with lymphatic development:

CCBE1	Generalised lymphatic dysplasia (Hennekam syndrome)
GJC2	Late onset four limb lymphoedema
GATA2	Lymphoedema associated with acute myeloid leukaemia
KIF11	Microcephaly with or without Lymphoedema, Chorioretinopathy and Mental Retardation (MLCMR)

Identification of these genes will lead to increased understanding of the development and maintenance of the lymphatic system, improved understanding of the natural history and the complications of these conditions and eventually to targeted treatment. The progress so far in these areas will be discussed.

Reference:
Connell F., Gordon K., Brice G., Keeley V., Jeffery S., Mortimer P., Mansour S., Ostergaard P.: *The classification and diagnostic algorithm for primary lymphatic dysplasia: an update from 2010 to include molecular findings.* Clin. Genet., 2013 Apr 26.

MOLECULAR CLASSIFICATION OF PRIMARY LYMPHŒDEMA

OSTERGAARD P., MANSOUR S., CONNELL F., GORDON K., JEFFERY S., BRICE G., MORTIMER P.
St. George's University of London, UK

We have demonstrated that stringent phenotyping can be helpful in gene identification. Building on 12 years of experience in our Primary Lymphoedema Clinic at St George's Hospital, London, an updated classification of this condition has been proposed. This new tool has been useful in our research department and we have had success in identifying genes for Primary Lymphoedema using this rigorous phenotyping combined with linkage analysis, Sanger sequencing and/or Whole Exome Sequencing. In this talk, examples of how these different molecular biology platforms have been used to help us discover genes such as *CCBE1*, *GJC2*, *GATA2* and *KIF11* will be presented together with an overview of the function of these genes in the lymphatics.

INTRAVASATION "MODE" OF THE TUMORAL CELL (TC) INTO THE LYMPHATIC AND BLOOD VESSEL DUE TO THE LYMPHO-ANGIOGENIC PROCESS IN THE MAMMARY GLAND NEOPLASIA INDUCED BY THE VEGF-D 293 EBNA CELL LINE

CORRADI A., ARCARI M.L.[1], FERRARI M.[2], CANTONI A., GABBI C., AZZALI G.[1]
Dpt Veterinary Science - University of Parma, Italy; [1] Dpt Biomedicine, Biotechnology and Traslational Sciences; [2] IZSLER, Brescia, Italy
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The study addresses the distribution and fine structure of the tumor-associated blood and lymphatic vessel of the mammary tumor mass induced by inoculation, in the mammary line, of the VEGF-D (growth factor sustaining the tumoral angiogenesis) 293 EBNA cell in SCID/Nod [Stacker *et al.*, 2001] and in nude mice. The transendothelial migratory "mode" of the invasive tumoral cell (TCi) into the tumor-associated lymphatic and blood vessel was investigated. Lyve-1+ immunopositive lymphatic vessels were absent in the core of the tumoral mass while were detected in periphery as well as in peritumoral connective tissue. This vascular arrangement was similar as described in other experimentally-induced tumors [Azzali, 2006, 2007]. CD31+ and Lyve-1− blood vessels are morphologically characterized by a thin endothelial wall without continuous basal membrane and wide fenestrated areas alternated with pore lacking areas. CD31+ and Lyve-1− blood vessels show the TCi during the tran sendothelial migration. This event is connected after the detachment of the TC from the tumoral mass. The neoplastic cells modify their shape, from rounded to elongated. Modify neoplastic cells are arranged in parallel lines to the abluminal wall: a cytoplasmic protrusion follow the directional transendothelial feature. The intravasation occurs via an intraendothelial space (diameter 1.8-2.7 μm) between adjacent endothelial cells and do not compromise the interendothelial junctions. The ultrastructural pictures from ultrathin serial sections describe the dynamic of cytoplasmic protrusion. TCi transendothelial migration are characterized by different moments and intraendothelial space appear determinant (transient morphological area) in the intravasation processes during metastasis. The remodelling of the cytoskeletal actin supports the cell motility. F-actin microfilaments and microtubules polimerization and depolimerazation generate movement in neoplastic cells. Such inn ovative migratory mode of the TC underlines an active role of the endothelium of angiogenic blood vessels which may compensate for the peculiar lack of the tumor-associated adsorbing lymphatic vessels. These data support new anti-cancer therapeutical strategies by the blocking of the molecular mechanism inducing the intraendothelial space as already suggested for the tumor-associated lymphatic vessel.

FAMILIAL, SPORADIC AND SYNDROMIC LYMPHŒDEMA: GENETICS ASPECTS

MICHELINI S.[1], CARDONE M.[1], CECCHIN S.[2], ZUNTINI M.[2], SIROCCO F.[2], SAINATO V.[1], FIORENTINO A.[1], BERTELLI M.[2]
[1] San Giovanni Battista Hospital - ACISMOM, Rome, Italy; [2] Magi's Lab, Rovereto, Italy

Primary lymphedema develops clinically in different moments of life with the appearance of an edema affecting the limbs or external genitalia which tends to progress, as a malformation developing in the later stage of lymphangiogenesis. We know familial forms (2-2,5% of cases), sporadic (93-94% of cases) and syndromic kind (2,5-4,5% of cases related to other genetic malformations, like Prader Willi syndrom, Klippel Trenaunay, Noonan and so on).
The familial forms usually are inherited as an autosomal dominant disease linked to heterozygous mutations in genes involved in lymphangiogenesis, including *VEGFR3* and *FOXC2* genes. Taking into account these familiar forms, lymphoscintigraphy studies have never been performed on subjects with inherited mutations but without clinical presentationin a exhaustive genotype-phenotype.
We already reported a clinical and genetic analysis of 52 Italian probands screened for *VEGFR3* and *FOXC2* mutations [Michelini S. *et al.*, 2012], where we focused nine familial cases with positive molecular diagnosis (6 with mutations in *VEGFR3*; 3 in *FOXC2*). These patients and their relatives also underwent lymphoscintigraphy. In one of the nine families we identified a subject carrying a *FOXC2* heterozygous mutation, not affected by lymphedema. The same variant was detected in his daughter, who has an overt phenotype.
The lymphoscintigraphic patterns of affected patients in the same family proved to be very similar, with bilateral delay in lymphatic drainage through inguinal nodes in *FOXC2* patient without clinical manifestations. Age of onset, clinically involved limbs and evolution were considered and a genotype-phenotype correlation was observed in patients carrying the same mutations from this and previous case studies.
Lymphoscintigraphic of the normal patient with *FOXC2* mutation, but not affected by lymphedema, indicate that subjects without manifestations but carrying mutations may have silent lymphatic insufficiencies, suggesting that in late forms, subclinical disease is already present at birth and manifests only after a triggering event. Primary lymphedema should therefore be regarded as having variable clinical expression and not, as currently considered, incomplete penetrance.
Others genes are plausibly involved as major genes in the primary lymphedema phenotype and hence an experimental strategy is necessary for identify these causative genes.

THE EFFECTS OF INTERLEUKIN-1β AND STROMAL CELL-DERIVED FACTOR-1α ON ENDOTHELIAL CELLS EXPRESSING THE LYMPHATIC PHENOTYPE

NING S.
Institute of Anatomy & Histology and Embryology, Department of Medical School of Shandong University, Jinian, China

Recent studies have indicated that many inflammatory mediators, such as interleukin-1 and tumor necrosis factor-α, were associated with lymphatic markers expression and lymphangiogenesis.
In our previous studies we occasionally found that stromal cell-derived factor-1α (SDF-1α) maybe exert the same effect. Therefore, we raise a hypothesis that interleukin-1β (IL-1β) or SDF-1α could induce blood endothelial cells (BECs) expressing lymphatic endothelial phenotype, and even induce BECs transdifferentiating into lymphatic endothelial cells (LECs).
Our data demonstrated that the endothelial cell lines HUVEC and CRL-1730 stimulated by IL-1β or SDF-1α presented morphology changes from "cobblestone-like" to spindle. The migration ability of the cells was increased.
Using real-time PCR, immunocytochemistry and western blot techniques, we found that the expression of lymphatic markers was up-regulated in line with the dosage increase. Furthermore, blockade o f SDF-1/CXCR4 signal path could inhibit the morphology changes, decrease the migration ability and down-regulated the expression of lymphatic markers.
We conclude that IL-1β or SDF-1α could induce BECs expressing lymphatic endothelial phenotype, and partly induce BECs transdifferentiating into lymphatic endothelial cells.

EUROPEAN PROJECT TO PROMOTE THE USE OF GENE TESTS FOR PRIMARY LYMPHEDEMA AND HEREDITARY VASCULAR MALFORMATIONS

BERTELLI M.[1], CARDONE M.[2], CECCHIN S.[1], ZUNTINI M.[1], SIROCCO F.[1], MALACARNE D.[1], SAINATO V.[2], FIORENTINO A.[2], CAPPELLINO F.[2], MICHELINI S.[2]

[1] MAGI non-profit Human Medical Genetics Institute. Pilot centre for research, diagnosis and care of rare genetic diseases, Rovereto, Italy
[2] San Giovanni Battista Hospital - ACISMOM, Degenza e Day Hospital Vascolare, Rome, Italy

Primary lymphedema (PL) is characterised by altered development and function of lymphatic vessels, leading to accumulation of fluid in interstitial spaces. It mostly affects the lower limbs and may be associated with distichiasis (two rows of eyelashes).
The genes prevalently involved are *VEGFR3 (FLT4)*, associated with Milroy syndrome or primary congenital lymphedema, and *FOXC2*, associated with lymphedema-distichiasis syndrome. Although the gene test is useful for clinical assessment and patient management, the Orphanet database indicates that only the Italian Laboratory MAGI and three laboratories in England, France and Belgium perform the test on the two genes. With the new European health card and health plan, patients may travel and have samples sent for analysis in the different countries of Europe, making collaboration easier. Our aim is to promote a network of clinicians who can request genetic testing on behalf of their national health services (free of charge for patients) in order to use the results to care for patients locally. The network could also identify the specific qualifications and examinations or surgery that could be conducted in those few European centres, keeping patients in contact with their national reference centres.

ADENOVIRAL VEGF-C GROWTH FACTOR THERAPY IN LYMPHŒDEMA TREATMENT

ALITALO KARI

Monday, 16th September 2013

H. 10.45 a.m. - 1.00 p.m.

Session 2
Anatomy

Aula Magna

President

Pissas A. (France)

Chairmen

Amore M. (Argentina) - Eliska O. (Czech Rep.) - Ciucci J.L. (Argentina)

ANATOMICAL DISCOVERED OF LYMPHATIC SYSTEM AND HISTORY

AZZALI G.
Professor Emeritus of Human Anatomy, Department of Biomedical, Biotechnological and Traslational Sciences, University of Parma, Parma, Italy

The history of the lymphatic vascular system represents the result of a long work lasted several centuries in which many researchers participated. The knowledge acquired during these centuries can be divided into three big periods: the first two provided a relatively scarce scientific contribution, whereas the third period, rather short (5 centuries), is rich of scientific knowledge. This knowledge in the first period are influenced by the old origins of the medical knowledge (IV century a.D. – first half of the Middle Ages); the lymphatic system casually detected is reported as venous vessel with light or latescent content, different from that in the blood or as collector or trunk which drains in groups of lymphocenters. In the second period included between 1400 and the end of 1500, despite the tendency of following what performed and stated in the previous centuries (Hippocrates, Herophilos, Galenos, Aristoteles), the lymphatic system is further investigated supported by the observation and description of lymphatic vessels in the kidney parenchyma and basinet (Nicolas Massa), liver lymphatic vessels (Fallopio) or as "vena alba thoracica" full of "humeur aqueuse" (Bartolomeo Eustachio). In the third period (1500 - 1800), the approach shifted from a static cadaveric anatomy to an animated anatomy, and "work and science" are in relationship, fused in a harmonious and balanced synthesis. Starting from Aselli (1622), the presence of the lacteals was scientifically demonstrated in the dog and described graphically in four colour-printed Tables, opposed by Riolano and Harvey, and confirmed by Peiresc, Vesling and Giovanni Guglielmo Riva also in the human intestine. Rudbeck and Bartolino demonstrated the relationship and differences between lacteals and "vasa linfatica" (lymphatic vessels) since these latter are totally different from those in the intestine. In "Vasorum Lymphaticorum Corporis Humani. Historia et Ichnographia" by Mascagni (1755) the human lymphatic vascular system was firstly and fully described and illustrated, then made by Susini using wax preparations and statues, preserved at the "La Specola" Museum in Firenze. Thanks to the improvement of the injection technique (microinfusion) and the use of low viscosity reagents (15 centipoise) such as the metilmetacrilate (Murakami, Othani, etc.) and the Neoprene latex (colloidal polycloroprene dispersion), excellent for its ability to adhere to the endothelial surface and for the rapid polimerization inside the vessel compared to the Gerota mass, relevant and invaluably refined 3D plastic images of the relationship between lymphatic and blood vessels have been obtained (Ottaviani 1950-1970). From 1950 onward, thanks to the use of innovative methodologies of investigation such as SEM and TEM, the in vivo recordings of the prelymphnodal collectors and their valve system (Ottaviani), in vitro cultures of endothelial cells, the gradients of hydrostatic and oncotic pressure in lymph formation (Casley-Smith, Castenholtz, Witte, O'Morchoe) allowed obtaining not only morphological but also physiological knowledge on the adsorbing capability of endothelial wall of the very peripheral lymphatic vessel already hypothesized in 1796 by Monro, Hunter and Cruikshank. Moreover, lymphoscintigraphy, lymphoangioresonance and lymphosurgery have contributed to understand the importance of the lymphatic vascular system related to human pathology and disease of the lymphatic system itself (Foldi), rehabilitative treatment of the lymphatic drenage (Leduc, Pissas, Campisi). During the last two decades, the in-depth knowledge of the delicate and complex molecular mechanism that induce and sustain the transendothelial migration of immune cells (homing lymphocyte) and invasive tumoral cells during the metastatic dissemination to the satellite lymphnode as well as the role of growth factors (e.g. VEGF-C and VEGF-D) in lymphoangiogenesis and angiogenesis.

PATHOLOGICAL STEPS OF CANCER-RELATED LYMPHEDEMA: HISTOLOGICAL CHANGES IN THE COLLECTING LYMPHATIC VESSELS AFTER LYMPHADENECTOMY

TANGE SHUICHI
University of Tokyo, Department of Plastic and Reconstructive Surgery, Tokyo, Japan

Introduction: To date, an electron microscopy study of the collecting lymphatic vessels has not been conducted to examine the early stages of lymphedema. However, such histological studies could be useful for elucidating the mechanism of lymphedema onset. The aim of this study was to clarify the changes occurring in collecting lymphatic vessels after lymphadenectomy.

Methods: The study was conducted on 114 specimens from 37 patients who developed lymphedema of the lower limbs after receiving surgical treatment for gynecologic cancers and who consulted the University of Tokyo Hospital and affiliated hospitals from April 2009 to March 2011. Lymphatic vessels that were not needed for lymphatico venous anastomosis surgery were trimmed and subsequently examined using electron microscopy and light microscopy.

Results: Based on macroscopic findings, the histochemical changes in the collecting lymphatic vessels were defined as follows: normal, ectasis, contraction, and sclerosis type (NECST). In the ectasis type, an increase in endolymphatic pressure was accompanied by a flattening of the lymphatic vessel endothelial cells. In the contraction type, smooth muscle cells were transformed into synthetic cells and promoted the growth of collagen fibers. In the sclerosis type, fibrous elements accounted for the majority of the components, the lymphatic vessels lost their transport and concentrating abilities, and the lumen was either narrowed or completely obstructed.

Conclusions: The increase in pressure inside the collecting lymphatic vessels after lymphadenectomy was accompanied by histological changes that began before the onset of lymphedema.

PLANTAR LYMPHATIC NETWORK. ANATOMICAL PRELIMINARY STUDY

AMORE M., CIUCCI J.L., MARCOVECCHIO L., TAPIA L., MERCADO D., PATARONE G.

Laboratorio de Procesamiento Cadavérico, Centro de Disección e Investigaciones Anatómicas (CeDIA); III Cátedra de Anatomía, Facultad de Medicina, Universidad de Buenos Aires, Argentina; Servicio de Flebología y Linfología. Hospital Militar Central, Buenos Aires, Argentina

Background: Through history, the anatomical descriptions of the plantar lymphatic network were schematics. After investigating the plantar venous network and demonstrate the importance into the venous drainage of the lower limbs, behaving as a true venous pump powered by walk ; we decided to investigate the lymphatic system of the foot.

Objectives: To carry out a detailed description of the plantar lymphatic network remarking the importance of these superficial lymphatic pump into lymphatic system of the lower limbs. Translating these anatomical findings into current clinical practice.

Methods: In this study, 20 feet of deceased fetuses and of 5 adults were injected. The injection had been performed with the modified Gerota's mass. Dissection had been carried out after appropriate fixation of the specimens in 40% formaldehyde for 6 days, and then immersed in a 100-volume hydrogen peroxide solution for 24 hours. In 6 fetus specimens we used the Spalteholz technique for diafanization.

Results: We show, after anatomical dissection and its interpretation, that the superficial lymphatic network of the foot, has a distribution consists of three plexus: anterior, middle and posterior. As the medium, which has greater difference relative to the other two. We did a description of each of them, their relationships and connections among them and with saphenous lymphatic flows.

LOCAL AND GENERAL LYMPHŒDEMA INCIDENCE IN SEVERE LEG TRAUMA WITH EXTENSIVE SOFT TISSUE LOSS. MEASUREMENT OF LYMPHATIC REPAIR

VAN ZANTEN M.[1], CAPLASH Y.[2], CAMPBELL-LLOYD A.[3], FINKEMEYER J.[4], PILLER N.[5]

[1] Lymphoedema Research Unit, Flinders Medical Centre, Flinders University of South Australia, School of Medicine, Department of Surgery, Adelaide, Australia; [2] Head of Department of Plastic and Reconstructive Surgery, Royal Adelaide Hospital, Adelaide, Australia; [3] Plastic and Reconstructive Surgery, Royal Adelaide Hospital, Adelaide, Australia; [4] Plastic and Reconstructive Surgery, Western Health, Melbourne, Australia; [5] Director Lymphoedema Research Unit, Flinders Medical Centre, Flinders University of South Australia, School of Medicine, Department of Surgery, Adelaide, Australia

Lymphoedema can occur secondary due to high energy trauma with extensive soft tissue loss. Lymphoedema is the accumulation of fluid in the tissues. Higher cytokine levels within this fluid can cause chronic inflammation which leads to poor tissue health and repair. Severe open fractures require soft tissue reconstruction with local, regional or free tissue in addition to the fixation of bone. Oedema, both within and surrounding this reconstructed site can present acutely in the post-surgery setting but in some patients the swelling fails to resolve and the patient develops chronic (lymph) oedema. The lymphatic system is in failure, either due to its inability to regenerate within or across the wounded area or its inability to handle the increased load imposed on it during the post-traumatic period. There is no current best practice protocol available to manage any lower limb lymphoedema following trauma. Further there is poor long term follow up for these post trauma patients and lymphoedema is not currently a parameter of interest in any outcome studies. Lymph vessel regeneration in these reconstruction flaps has been reported but not measured accurately.

New functional lymphatic imaging techniques involving the use of fluorescence contrast agent Indocyanine Green (ICG). This contrast agent binds to proteins and therefore can give detailed pattern of superficial lymphatic vessels. Of interest are those vessels within the reconstructed areas and across scar tissue borders to normal tissue.

I will present the preliminary results on the use of this technique in two cohorts of patients who have had traumatic soft tissue injury and subsequent reconstructive surgery, one retrospective cohort of up to six years and one a prospective cohort following them for two years. Lymphatic vessel functioning will be measured using intra-dermal injection with ICG on the dorsal side of the foot. Laser Diode excitation light activates the fluorescence of the ICG. This real life image will then be captured by a custom made near infrared imaging camera. The presence of local oedema and lymphoedema will be detected using Bio-Impedance Spectroscopy, fluid at specific depths to the deep fascia using Di-electric Constants and tissue induration using Indurometry. Limb circumferences will be gained using standardised tape measure and truncated cone calculations used to determine limb sectional volumes

This study will enhance our understanding of lymphatic repair after severe soft tissue trauma and create better awareness of the risk of lymphoedema in this population, lead to earlier detection and improved treatment outcomes.

ANATOMICAL DEFORMATION OF TISSUE IN LYMPHEDEMA. FLUID CHANNEL FORMATION, EFFECT OF INTERMITTENT PNEUMATIC COMPRESSION

ZALESKA M.
Medical Research Center, Department of Surgery, Warsaw, Poland

Objectives: We observed formation of tissue channels in advanced obstructive lymphedema increasing in density during high pressure intermittent pneumatic (IPC) therapy.

Methods: Twenty patients with patients with lymphedema stage II/III of lower limbs were investigated. Tissue morphology was evaluated before and after 1 year of intermittent pneumatic compression.The parameters of compression were: inflation pressure 120-100mHg, sequentially from chamber 1 to 8, inflation time of each chamber 50'', daily for 1 h. Lymphoscintigraphy with Nanocoll was performed before, after 6 and 12 months of treatment. Skin and subcutaneous tissue biopsies were taken before and after treatment. Specimens were injected with Paris Blue in chloroform and made translucent to visualize spaces filled with mobile tissue fluid.

Results: Lymphoscintigraphic imaging. Multiple wide irregular spaces filled with tracer could be seen in the subcutis on the internal aspect of thigh and along large blood vessels running to the groin. There were no such structures around the hip, in hypogastrium and buttocks. Immunohistochemistry of biopsies revealed presence in subcutis and around veins open spaces negative on staining with LYVE1. These spaces were then stained with Paris Blue and presented irregular interconnected spaces. Their density was measured using computer planimetry (Microimage, Olympus). After 1 year of IPC the total area occupied by depicted channels was found slightly increased in calfs but evidently more in thighs.

Conclusions: Increase in stagnant tissue fluid in lymphedematous subcutis is followed by formation of irregular tissue channels. Their density increases after IPC. These channels substitute obliterated lymphatic collectors. Flow in these channels requires active external compression.

INTEREST OF ONE ADDITIONAL INJECTION FOR THE LYMPHOSCINTIGRAPHIC EVALUATION OF PRIMARY LOWER LIMB LYMPHEDEMAS (LLLE) AND TO DEMONSTRATE THE LYMPHATIC COLLATERALIZATION PATHWAYS IN THESE PATIENTS

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Introduction: In the framework of the classical lymphoscintigraphic investigations of primary LLLE, lymph nodes (LN) at the root of the limb and/or in the abdomen can not be demonstrated (due to the physiological limits of the methodological protocol and/or to the disease itself). The aim of our presentation is to report the results of the additional intradermal injection of 0.4 ml of 99m-Tc labeled nanosized HSA colloids in front of the great trochanter of the edematous limb(s) (the phase 4 of our protocol) performed in order to «force» the visualisation of the LN and/or to demonstrate the lymphatic collateralization pathways.

Material and methods: This injection has been performed (rigth limb in 16, left limb in 23, both limbs in 4: 47 limbs investigated) in 43 patients (36 women and 7 men: age ranging from 12 to 80) with primary LLLE («praecox» in 24, «tarda» in 19, familial in 5: left-sided in 20, right-sided in 13, Right > Left in 2, Left > Right in 5, Right = Left in 3). Spontaneous drainage(s) of the tracer has(have) been imaged as well as after massagings «pushing» it in all directions and up to the visualisation of LN.

Results: In 17 (30%) of the 47 limbs, no LN (inguinal and intra-abdominal) were seen after our first 3 phases. After our additional injection : – (anterior and/or lateral and/or deep and/or posterior) lymphatic drainage-s toward ipsilateral LN (inguinal and/or inguino-crural and/or external iliac and/or common iliac and/or lumbo-aortic and/or para-renal) could be demonstrated in 14 cases; – isolated anterior pre-pubic drainage toward contralateral inguinal LN was observed in one case, isolated lateral drainage toward the ipsilateral axillary LN in another case and isolated posterior drainage crossing the mid line toward the contralateral inguinal LN in one.
In other 30 investigated limbs where LN were visualised after our first 3 phases, lymphatic drainages toward the « same » LN (and/or additonal LN) could be observed in all but anterior prepubic drainage toward contralateral inguinal LN was also observed in 5 and posterior drainage toward ipsilateral lumbo-aortic LN in one and contralateral lumbo-aortic LN in one.

Conclusions: Our phase 4 allowed us to precise the lymphatic status of these patients with primary LLLE and to demonstrate their lymphatic collateralisation pathways, what is of the utmost importance for their managements.

ROLE OF SENTINEL LYMPH NODE IN THE LYMPHATIC SPREAD OF CANCER

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Nodal metastasis is a poor prognosticator for solid cancer. In general, cancer cells spread to the sentinel lymph nodes (SLNs) in the regional nodal basin based on their lymphatic drainage systems. The concept that cancer cells from a certain anatomical site spread to the SLNs in the regional nodal basin has been well validated in melanoma and breast cancer. Patients with a positive SLN biopsy for micrometastasis have a much worse prognosis that those with negative SLNs. Based on the melanoma and breast cancer models, tumor cells tend to spread from the primary site to the SLN, which serves as an incubator and then to the non-SLNs prior to distant spread.

This orderly spread is consistent with the spectrum theory that cancer metastasis is progressive. On the other hand, in about 20% of the time, tumor cells may spread through the lymphatic and vascular system simultaneously (marker hypothesis) or separately to the distant sites through the vascular channels.

For breast cancer, removal of SLNs with micrometastasis may be effective during the ‘‘incubator’’ phase, but adjuvant therapy is appropriate for such patients.

For penile carcinoma, SLN mapping and a negative SLN biopsy may avoid a morbid bilateral radical ilioinguinal lymph node dissection. The lymphatic pathways are more complicated and unpredictable for head and neck, colorectal, upper GI, genitourinary and gynecological cancers.

For head and neck, genitourinary and gynecological cancers, the goal is to develop a reliable SLN mapping technique to minimize the extent of lymph node dissection. Since the number of lymph nodes being removed for colorectal and gastroesophageal cancer has been found to be a significant prognosticator for survival, the identification of SLNs may increase the accuracy of staging the nodal basins. However, the extent of lymph node dissection remains the same.

In conclusion, the role of SLN serves as the gateway for cancer metastasis from the primary site in most of the time. In the future, molecular and genomic studies of the metastatic pathways through the lymphovascular system may define the mechanisms of metastasis more accurately. Such information may allow us to develop more rational therapy to target against relevant molecules and pathways of metastasis.


Trevi Fountain

Monday, 16th September 2013

H. 2.00 - 5.00 p.m.

Session 3
Pathophysiology

Aula Magna

President

Olszewski W. (Poland)

Chairmen

Eliska O. (Czech Rep.) - Piller N. (AUS) - Boccardo F. (Italy)

PATHOPHYSIOLOGY OF LYMPHATIC SYSTEM

FÖLDI E.
Medical Director Földiklinik, Center for Lymphologie, Hinterzarten, Germany

Physiology and pathophysiology of the lymph drainage system start with lymph formation, that mean the process in which the interstitial fluid entered in the lymph capillaries and become lymph fluid. Diseases of the microcirculation influence the level and the composite of the lymph fluid. Large numbers of pathological processes lead to increase permeability of the wall of the blood capillaries and elevate the amount of the tissue fluid. Diseases of the interstitium such inflammatory processes hampered the fluid movement along prelymphatic channels. Increased hyaluronic acid binds water with the consequences of tissue swelling. The transport of the intravasal lymph fluid from the initial lymphatics (lymph capillaries) through the lymph collectors, lymph nodes and lymph trunks until the large vein demand energy. The pulsation of the lymphangions and the valves ensured the lymph flow from the periphery to the central region and protect the backflow of the fluid. The pulsation of the lymphangions depend on intrinsic and extrinsic factors. Due the efficiency of the pulsation of the lymphangions wide range of pathological processes influence the level of lymph flow: diseases of the wall of the lymph vessels and valves itself; diseases of the connective tissue and surrounding area of the vessels; insufficiency of the muscle joint pump, etc. The role of the lymph nodes as a part of the lymph flow plays an important role, too. In the treatment of malignancy lymphonodectomy can be necessary. In rare cases the sinus of the lymph nodes is transformed into endothelium lined, capillary like channels and hinder the lymph flow. Lymph trunks can be constricted due to malignancy or high venous pressure, especial in congestive cardiac failure can hampere the inflow of the lymph fluid into the large veins.
Pathological processes of each segment of the lymph drainage system lead to disturbances of the homeostasis of the interstitium. The main tasks of the lymph drainage system are: regulation of interstitial water volume, stabilization and regulation of protein concentration, removal of waste products, to keep the recirculation of lymphocytes, uphold the migration of tissue macrophage dendritic cells, etc., eliminates cellular debrides including chemical components from injured tissue. Depending on the anatomical localization of the disturbances of the lymph drainage system has different consequences: for instance diseases of the lymphatics in small intestinum and/or in mesenterium due to malformation or based on inflammatory processes protein loosing enteropathy or chylous effusion can occur. The most common lymphatic disease is the lymphedema its self by persistent swelling caused on various etiologies. Lymphedema is a chronic disorder and is characterized besides swelling due to fibrosis, inflammation and deposition of adipose tissue. Lymphedema can be present without and with accompanying diseases which there part influence the clinical picture further. A better understanding of the pathophysiology of the lymph drainage system could provide the basis for the development of better diagnostic and therapeutic modalities.

PHYSIOLOGY OF LYMPHATICS UNDER THE RESTFUL SITUATION AND DURING THE MANUAL LYMPHODRAINAGE. EXPERIMENTAL STUDY

ELISKA O., ELISKOVA M.
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The “lymph pumping” is realized by extrinsic and intrinsic forces. The extrinsic pumping relies on the cyclical regular or irregular compression-expansion of the lymph vessels by the activity of the surrounding tissue skeletal muscle, smooth musle of the gastrointestinal organs, cyclic compression of concomitant arteries and by breathing. Intrinsic pumping is realized by the contractions and relaxation of smooth muscle layer in the wall of lymphatics: spontaneous contraction and pacemaker cells. Goal of our study was to map the different type of curves of waves of contractions, the flow of lymph, content proteins in lymph under the restful conditions and during and after the manual lymphodrainage.

Material and methods: On the leg lymphatics of the 25 dogs we measured 1/ lateral lymphatic pressure during the spontaneous activity of lymhatics, 2/ the lymph flow, 3/ a content of lymph proteins in quiet situation and after the application of manual lymphodrainage. In the group of 10 dogs with arteficial lymphedema of the leg the content of proteins was measured before and after manual lymphodrainage. The lateral lymphatic pressure was registered by polygraph Chiracard 602. The lymph flow was measured by calibrated pipes. The total amount of lymph proteins was measured by Lowry method.

Results: The different types of spontaneus contraction waves-lymphatic pressure pulsations were founded and demonstrated.
Different level of suction effect of spontaneous contractions is demonstrated in the different types of contractions.
During the manual lymphodrainage action effect of pressure stroke evocated by the hand on lymph flow was very prominent efficiency of lymphodrainage
Efficiency of manual lymphodrainage for expelling of proteins from lymph vessels and surrounding tissue was demonstrated but this phenomenon is transient.

LEG DERMAL BACKFLOW (LDB) STAGE: INDOCYANINE GREEN LYMPHOGRAPHY FOR PATHOPHYSIOLOGICAL EVALUATION OF LEG LYMPHEDEMA

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Background: Management of leg lymphedema following cancer treatment is challenging, and emphasis should be put on early diagnosis and prevention of secondary lymphedema. Indocyanine green (ICG) lymphography is becoming a method of choice for evaluation of lymphedema. This study aimed to demonstrate characteristic findings of ICG leg lymphography.

Methods: Forty five patients with leg lymphedema underwent ICG lymphography. All lymphography images were recorded in photographs and movies. Based on changes in ICG lymphography findings with progression of lymphedema, a new severity stage, leg dermal backflow (LDB) stage was developed and compared with clinical stages.

Results: The ICG lymphography findings were classified into two large groups: linear pattern (LP) and dermal backflow (DB) patterns. The DB patterns could be subdivided into splash, stardust, and diffuse patterns. The DB patterns were found more frequently than the LP in the proximal lower extremity. The DB patterns also increased significantly in prevalence overall as the duration of lymphedema increased. The LDB stage was linearly correlated with clinical stage.

Conclusions: ICG lymphography is a safe and convenient evaluation method for lymphedema, which allows pathophysiological assessment of lymphedema. The LDB stage is a simple severity staging system which demonstrates a significant correlation with clinical stage. ICG lymphography may come to play an important role in early diagnosis of leg lymphedema.

UP REGULATION OF CCL21/CCR7 AXIS ACCOMPANIED WITH EPITHELIAL-MESENCHYMAL TRANSITION IN HUMAN BREAST CARCINOMA METASTASIS

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Background: Secondary lymphoid tissue chemokine(SLC/CCL21) and its receptor CCR7 have been implicated directly in the lymph node metastasis invasion migration and TNM staging of breast carcinoma gastric cancer Esophageal carcinoma and thyroid papillary carcinoma. However the relationship of CCL21/CCR7 axis and EMT in carcinoma remains unclear.
Objective: To explore the relationship of the CCL21/CCR7 axis and epithelial mesenchymal transition (EMT) in breast carcinoma.
Method: (1) In vivo study, the primary breast cancer tissue samples of invasive nonspecific carcinoma with or without lymph node metastasis were obtained from 50 patients undergoing radical mastectomy from the Department of Surgery, Qilu hospital, Shandong university. CCR7 and EMT associated markers including N-cadherin, E-cadherin ect. were detected in paraffin sections by immunohistochemical technique. (2) In vitro study, the breast carcinoma cell line 1428 were induced respectively by CCL21 and TGF-β1 for different times. CCR7 and EMT associated markers including N-cadherin, vimentin and E-cadherin were detected by Western-blotting and Real-time RT-PCR respectively. (3) Wound healing assay and Boyden chamber invasion assay were also employed to investigate the role of CCL21/CCR7 signal in the tumor cell migrating and invading process respectively. (4) CCR7 siRNA was used to further confirm the role of CCL21/CCR7 axis at the EMT process of breast cancer.
Results: (1) In human breast carcinoma tissue, CCR7 expression was higher in primary breast cancer in company with lymph node metastasis than that in without lymph node metastasis ($p<0.01$). (2) In vitro study, the levels of CCR7, N-cadherin, vimentin, E-cadherin were up-regulated by treatment with CCL21and TGF-β1 respectively at both mRNA and protein expression. (3) Tumor cell migration and invasion were also up-regulated by treatment with CCL21. (4) The levels of CCR7 at both mRNA and protein expression in 1428 cells were further up-regulated by treatment with TGF-β1. (5) We found that the increased migration and invasion of breast cancer in the presence of CCL21 was significantly abolished in the condition of the CCR7 knockdown. Additionally, the expression of N-cadherin and vimentin at mRNA and protein levels significantly decreased.
Conclusions: These results indicated that CCL21/CCR7 axis were up-regulated in conjunction with increased activities of migration by EMT in breast carcinoma cells. CCL21/CCR7 axis might play an important role in the genesis of EMT in breast carcinoma. Therefore, strategies targeting the CCL21/CCR7 axis may have important clinic application in the suppression of breast carcinoma metastasis.
Keywords: breast carcinoma; epithelial mesenchymal transition; CCL21; CCR7; lymph node metastasis

A NOVEL MODEL OF SECONDARY LYMPHEDEMA IN RAT HIND LIMBS

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Secondary lymphedema arises as a consequence of lymphatic disruption due to surgery, trauma, or radiation. However, the pathophysiology of lymphedema remains unclear, because progress in lymphedema research has been hampered by the lack of an animal model for secondary lymphedema similar to humans.

Objective: The purpose of this study was to develop a more suitable model of secondary lymphedema in rat hind limbs.

Methods: A circumferential incision was made in the right groin of 12-week-old, male, Sprague-Dawley rats. The right lumbar, inguinal, and popliteal lymph nodes were dissected, and lymphatics in the right groin were ligated. Inverting sutures were used to draw skin edges together and prevent superficial lymphatic flow; furthermore, no radiation was performed after the surgical procedures. On day 3, 7, 14, 28, 56, 84, 112, 140, and 168, lymphatic accumulation was evaluated using several techniques. The water displacement test and fluorescence lymphography with indocyanine green were performed to evaluate the volume of limbs and the accumulation of lymphatic fluid. Quantum dot 800 ITK (Qdot) were injected into right foot pads, the thigh tissues were resected, and fluorescence microscopy of Qdot probes was performed to evaluate lymphatic fluid accumulation microscopically. Additionally, azan and immunohistochemical staining were performed to evaluate collagen fibers and lymphat ics. Ultrasonic microscopy was also performed to evaluate the elasticity of skin tissues.

Results: Swelling was apparent on days 3 and 7. The swelling decreased from day 7 to day 28 and then gradually increased again until day 168. Accumulation of lymphatic fluid in subcutaneous tissues was observed from day 3 to day 84. The presence of collagen fibers and adipocytes also increased on days 28 and 56, respectively. Ultrasonic microscopy showed that the elasticity of subcutaneus tissues gradually increased after day 14.

Discussion: Secondary lymphedema models in rodent hind limbs have been previously reported. However, in these models, incised skin edges was sutured to underlying muscles, leaving a gap between the skin edges, and limbs were irradiated to prevent the development of collateral superficial lymphatic flow. The use of these procedures may increase infection and radiodermatitis; thus, postoperative edema due to lymphedema cannot be distinguished from these other sources. We have developed a novel model of secondary lymphedema in rat hind limbs, which more accurately represents the pathophysiology of secondary lymphedema in humans.

EFFECT OF HIGH-FAT DIET AND ITS REVERSAL ON THE THORACIC DUCT LYMPH COMPOSITION IN PIGS

SZUBA A., GOMUŁKIEWICZ A., JANCZAK D., GRZEGOREK I., JABŁOŃSKA K., DROŻDŻ K., CHMIELEWSKA M., PIOTROWSKA A., PASŁAWSKI R., PASŁAWSKA U., JANISZEWSKI A., DZIĘGIEL P., VERNY A.-M., MAZUR A.
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Backgrounds: High-fat, carbohydrate and low fiber diet is linked to increased CV risk as demonstrated in both experimental animals and epidemiological studies. Reversal to the healthy diet is known to decrease CV risk. Lymph transports both lipids absorbed in intestine and cholesterol from tissues (reverse cholesterol transport). Lipid composition of both post-nodal and pre-nodal lymph are affected by several pathophysiological conditions.
Thus, the aim of the presents study was to evaluate how long-term changes in dietary fat intake in pigs alter the lymph lipid and lipoproteins.

Materials and methods: Thirty-two female pigs were divided into three experimental groups:

Group 1 – control: regular diet (RD – low fat – 3%) 3-4 kg/day for 12 months;

Group 2 – metabolic syndrome: increased fat diet ad libitum (HFD) for 12 months (first 6 months – high-carbohydrate (60%), moderate-fat (7.5%) diet and following 6 months high-fat diet (16% fat);

Group 3 – Reversal diet (HRD): increased fat diet for 9 months followed by low-fat regular diet for 3 months.

Pigs were examined every 3 months for: body weight, blood pressure, lipidemia, arterial stiffness and elasticity, intima-media complex (IMC) measured by ultrasound. After 12 months on the respective diets, all animals were killed after 24 hours fasting and thoracic duct lymph was collected. Samples from eight animals from each group were used for lymph lipid and lipoprotein distribution analysis by sequential density gradient ultracentrifugation.

Results: Lipid lymph analysis revealed significantly higher total cholesterol concentration in HFD fed animals than in these on the control diet. Lymph lipoprotein distribution showed that HFD caused an increase in chylomicron and HDL cholesterol levels, but did not affected VLDL and LDL cholesterol. The return from the HFD to the RD partly restored lymph cholesterol levels to values found in the control group.

Conclusions: Our findings support that the level of dietary fat affects lymphatic reverse cholesterol transport.

COMPARING EFFECTS OF COLLAGEN SPONGE AND GELATIN SPONGE ON LYMPHATIC VESSELS REGENERATION MEDIATED BY MACROPHAGE

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According to previous reports, about 30% of the patients will suffered a complication of upper limb lymphedema after breast cancer radical surgery.
For oppression hemostasis, collagen sponge or gelatin sponge were usually filled after the axillary lymph node dissection. Collagen has good biological activities, while gelatin does not have.
The effects of collagen sponge and gelatin sponge on local lymph circulation reconstruction were investigated in our study. Our data demonstrated that collagen solution would induce more macrophages than gelatin solution after injected into abdominal cavities of mice respectively.
Moreover, collagen sponge would also induce more macrophages than gelatin sponge under subcutaneous injection respectively.
Macrophages can form tubule-like structures which express lymphatic endothelial markers. In addition, macrophages could produce a variety of cytokines, such as vascular endothelial growth factor-C (VEGF-C) and platelet derived growth factor (PDGF), which would induce the proliferation of lymphatic endothelial cells.
Taken together, collagen sponge would do better than gelatin sponge in promoting lymphangiogenesis after axillary lymph node dissection.
Our findings will offer guidance for surgeons to make correct options in different surgeries.

HIGH LEVELS OF SKIN INTERCELLULAR FLUID CYTOKINES AND CHEMOKINES MAY BE RESPONSIBLE FOR HYPERKERATOSIS AND FIBROSIS IN LYMPHEDEMA

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Background: Tissue cell metabolic processes, proliferation, differentiation, senescence and apoptosis are regulated by a plethora of cytokines, chemokines, growth factors, enzymes and neurotransmitters present in tissue fluid and lymph. Knowledge of their concentration and activity can give insight into cellular and interstitial processes of the tissue.
METHODS: Twenty randomly selected healthy individuals (ages 24–46 years) without any history of systemic or local disease of lower limbs undergoing voluntary studies of lymph lipids or antibiotic penetration were selected. A leg lymphatic lying on the fascia was exposed under the operating microscope and was cannulated in a retrograde manner. Lymph samples were taken at 12-hour intervals. Concentrations of cytokines and chemokines were measured by enzyme immunometric assays (Quantikine; R&D Systems, Abingdon, UK).

Results: Total protein concentration was in lymph and serum 1.66 ± 0.14 g/dl and 7.30 ± 0.1 g/dl, respectively (L:S ratio 0.22 ± 0.1). The cytokine lymph to serum ratio (L/S) was for IL1β 3.1, IL6 3.9, TNFα 1.9, IL15 5.0, IL8 10.0 and 1.1 for IL1Rα, but only 0.29 for IL12, 0.4 for IL10 and 0.004 for TGF ($p<0.05$). The chemokine and matrix enzyme L/S was 3.4 for MIP 1α, 3.0 for CCL21, 2.5 for TIMP1, 3.5 for TIMP2 and 1.0 for MCP1 and below 1 for MMP9 (0.33) and CCL27 (0.28) ($p<0.05$).

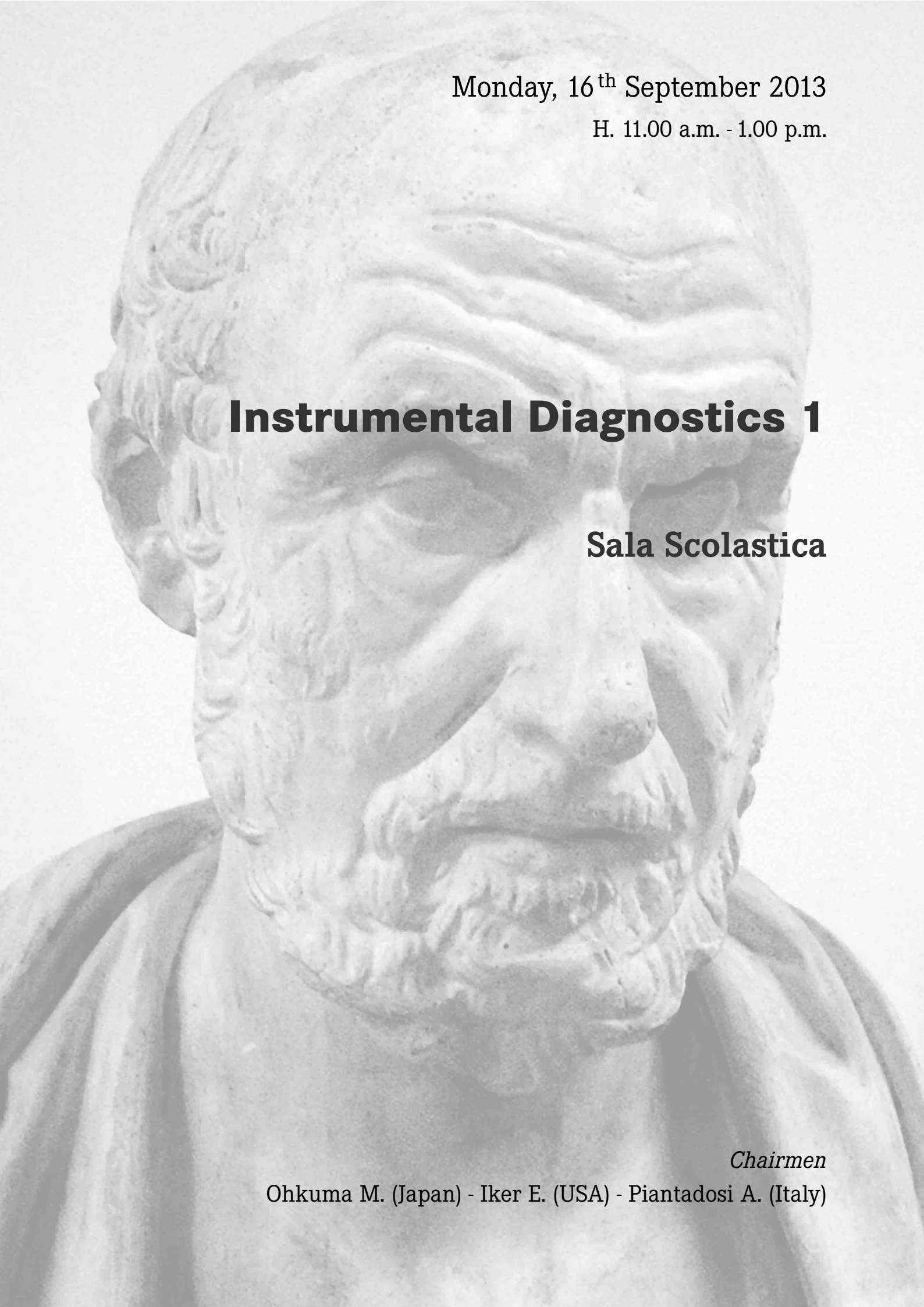
Conclusions: High lymph concentrations cannot be explained by filtration from blood and should be attributed to local production by keratinocytes, blood and lymphatic endothelial and Langerhans' cells, fibroblasts and recirculating lymphocytes, serving tissue homeostasis. These are the first data on human tissue fluid regulatory proteins. Their effect on tissues deprived of lymphatic outflow remains largely unknown and it is the subject of our further studies.

PHYSIOLOGICAL PRINCIPLES IN MODERN DIAGNOSTICS AND THERAPY OF LIMB LYMPHEDEMA

OLSZEWSKI W.L.
Medical Research Center, Department of Surgery, Warsaw, Poland

Lymphology is a fast developing scientific and clinical discipline. Over 400 years it accumulated a lot of anecdotal science. Modernization requires evidence based contributions. They should replace the generally accepted but false notions and views, often useless or even harmful in clinical lymphology. Some examples: Stemmer sign in differentiation between lymphedema and venous insufficiency, fluorescent green near infrared visualization of obstructed lymphatics, MLD pushing tissue fluid into obliterated lymphatics, low pressure manual massage stimulating obstructed lymph collectors, stimulation of lymph nodes, pre-emptying of non-edematous tissues of hypogastrium or thorax facilitating tissue fluid inflow from lymphedematous regions, high protein concentration lymphedema, filariasis as the main cause of lymphedema in tropical countries, erysipelas complicating lymphedema and others. All the listed notions have not found confirmation in random double-blind clinical studie s. Moreover, there is lack among the therapists of knowledge of the hydromechanics of tissue fluid and lymph, location sites of edema fluid in skin, subcutis and muscles, and bacteriology of human deep tissues. Extrapolation of lymphangiogenesis process observations from mouse to man and spread the information by media created false perspectives for sick people.
The lecture will be devoted to challenging of many still circulating views and presentation of objective data on the present understanding of the function of the lymphatic system, pathomechanism of obstruction of lymph flow in lymphatics and lymph nodes, visualization of location sites of edema fluid and tissue histological changes, anatomical barriers of edema fluid flow, hydromechanics of tissue fluid flow without and during compression therapeutic procedures, biochemistry of tissue fluid and lymph, lymphangio-vasculo-genesis in adult humans, bacteriology of tissues and interstitial fluid in lymphedema, etc. Knowledge based on objective observations should result in accurate evaluation of patients and recommendations for use of effective therapeutic methods.


St. Peter's Basilica



Monday, 16th September 2013

H. 11.00 a.m. - 1.00 p.m.

Instrumental Diagnostics 1

Sala Scolastica

Chairmen

Ohkuma M. (Japan) - Iker E. (USA) - Piantadosi A. (Italy)

LEL INDEX: BODY TYPE-CORRECTED LYMPHEDEMATOUS LEG VOLUME EVALUATION

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Background: Measurement of the circumference is the most commonly employed method for evaluating leg lymphedema. However, comparison between different patients is difficult with this measurement. To overcome this problem, we have formulated new index, lower extremity lymphedema (LEL) index, which can be easily obtained from measurements of the body.

Methods: LEL index was calculated; A summation of squares of circumferences (cm) at 5 points in a limb divided by body mass index (kg/m^2) is defined as the LEL index. Circumferences were measured at the superior edge of the patella, 10-cm above and below the patella, the lateral malleolus, and the foot. We evaluated correlation between LEL index and clinical stage in 17 secondary leg lymphedema patients.

Results: The average LEL index in clinical stage 1 is 210 ± 11, 242 ± 8 in stage 2, 293 ± 29 in stage 3, and 336 ± 14 in stage 4. The LEL index was significantly correlated with clinical stages and could be used as a severity scale.

Conclusions: The LEL index makes objective assessment of the severity of lymphedema through a numerical rating, regardless of the body type. This numerical rating makes the index useful for evaluation of peripheral lymphedema severities between different cases.

WANTED: EXPERTS IN LYMPHEDEMA

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The International Classification of Functioning, Disability and Health (ICF) offers a system to describe the functioning of the patient. Since the ICF is too comprehensive for daily practice, Core Sets can be composed for easier use.

Aim of the study: To explore the expert perspective on relevant problems of individuals with lymphedema. The specific aims are (1) to identify problems in functioning important to patients with lymphedema and (2) to quantify these problems using the ICF.

Methods: Since the ICF was developed to facilitate communication between different groups of people and to be used globally, the aim is to include experts from the following WHO regions: Eastern Mediterranean, South-East Asia, Western Pacific, The Americas, Africa and Europe. It is planned to perform an expert survey with flebologists, dermatologists, physical therapists, nurses, skin therapists. While including a wide range of participants, quality has to be ensured by selecting only p articipants with a proven expertise and experience in the research field.

Results ans Conclusions: Since the research has not been started yet, the presentation will only inform and trigger colleagues that they could be contacted in the near future.

UEL INDEX: BODY TYPE-CORRECTED LYMPHEDEMATOUS ARM VOLUME EVALUATION

YOSHIMATSU H., NUMAHATA T.
University of Tokyo, Department of Plastic and Reconstructive Surgery, Tokyo, Japan

Background: Measurement of the circumference is the most commonly employed method for evaluating arm lymphedema. However, comparison between different patients is difficult with this measurement. To overcome this problem, we have formulated new index, upper extremity lymphedema (UEL) index, which can be easily obtained from measurements of the body.

Methods: UEL index was calculated; A summation of squares of circumferences (cm) at 5 points in a limb divided by body mass index (kg/m^2) is defined as the UEL index. Circumferences were measured at the olecranon, 5-cm above and below the olecranon, the wrist, and the dorsum of the hand. We evaluated correlation between UEL index and clinical stage in 21 breast-cancer related arm lymphedema patients.

Results: The mean UEL index of 21 unaffected limbs of 21 UEL patients was 102 ± 7. The mean UEL indices of 21 affected limbs of the patients were 110 ± 8 in stage 1 (n = 4), 125 ± 15 in stage 2, 150 ± 11 in stage 3, and 169 ± 9 in stage 4. The UEL indices increased with progression of lymphedema ($P < 0.001$).

Conclusions: The UEL index makes objective assessment of the severity of lymphedema through a numerical rating, regardless of the body type. This numerical rating makes the index useful for evaluation of peripheral lymphedema severities between different cases.

DYE METHOD TO EVALUATE THE DEGREE OF INFLAMMATION. A CORRECT METHOD?

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Introduction: Many physiologists and pathologists use dye method to express the degree of inflammation by injecting dye into the circulating blood of the animal with inflammation in the tissue or organ. They have neglected the influence of lymphatic transport of the injected dye.

Materials and Methods:

1) Human skin after local injection of anesthetic.
2) Mouse kidney after local injection of saline followed by intraaortal fixation.
3) Dry ice application to the black mouse's scrotum.
4) Human skins and lymph nodes biopsied.
5) Mouse diaphragm and mediastinal lymph node after i.p. injection of prepared melanosomes.
6) Carbon injected into the rat kidney.
7) Human lymphnagioma with erythrocytes in the lumen.
8) Dye injected into the human skin or mucosa.

Results: All specimens show injected dye, melanin, melanosomes, blood components, destroyed cells, etc. in the lymphatic lumina.

Conclusion: Intravascularly injected dye is transported away by the lymphatics and the conventional dye method to evaluate the degree of inflammation is not correct.

TISSUE DIELECTRIC CONSTANT (TDC) MEASUREMENTS AT 300 MHZ AS A METHOD TO CHARACTERIZE LOCALIZED TISSUE WATER IN ARMS OF WOMEN WITH AND WITHOUT BREAST CANCER RELATED LYMPHEDEMA

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[3] *Cancer Center, Kuopio University Hospital, Kuopio, Finland*

Background: Quantitative measurements to detect lymphedema early in persons at-risk for breast cancer (BC) treatment-related lymphedema (BCRL) can aid clinical evaluations. Since BCRL is initially manifest in skin and subcutis, the earliest changes may best be detected via estimates of local tissue water changes. Although such estimates are achievable via tissue dielectric constant (TDC) measurements when measurements are made at 300 MHz, the quantitative differences between TDC values assessed in lymphedematous and non-lymphedematous tissue has not been fully characterized.

Methods: TDC measurements were made to an effective depth of 2.5 mm in both forearms of three groups of women with 80 subjects per group. The groups consisted of 1) healthy women with no BC (NOBC), 2) women with BC but with TDC measurements made prior to their surgery and 3) women with unilateral lymphedema (LE).

Results: Except for affected arms of the LE group, measured TDC values for all other arms were on average close to each other, ranging (mean ± SD) between 24.8 ± 3.3 to 26.8 ± 4.9. Contrastingly, TDC values for the LE affected arms were 42.9 ± 8.2 which was significantly greater than for all other arm TDC values (p

RESPONSE OF LYMPHŒDEMA TREATMENT ASSESSED BY QUANTITATIVE MEASURES OF ULTRASOUNDS

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The objective of this study was to assess the response to treatment of lymphedema using quantitative measurements with ultrasound.

Methods: The study included 19 patients with lymphedema of the lower extremities: 11 with primary lymphedema and 7 with secondary lymphedema. 28 edematous lower limbs were evaluated. Epifascial thickness (skin to fascia) was measured with ultrasound prior to treatment at the ankle, calf and distal thigh in each edematous leg. Measurements were repeated at identical locations after 30 minutes of manual lymph drainage (MLD) and again after an additional 30 minutes of the pump treatment.

Results: Mean reduction of epifascial space thickness of the lymphedema limbs after just one session of MLD was 15.75%, (ankle site 16.20%, calf 15.33% and thigh 15.84%). After additional pump treatment the mean reduction compared to baseline was 24.95%, (ankle 25.01%, calf 24.64% and thigh 25.19%).
Ultrasound is easily performed and provides quantitative measurements of volume and thickness of epifascial space.
It allows objective measurements of the severity of disease and response to treatment in patients with lymphedema.

HEAD & NECK CANCER RELATED LIMPHŒDEMA AND QUALITY OF LIFE: AN OBSERVATIONAL STUDY

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Introduction: Lymphoedema is a frequent complication of Head & Neck Cancer (H&NC) and it could occur following treatment (surgery, radiation, and/or chemioteraphy) or because locally advanced cancer. Head & Neck Cancer Related Lymphoedema is still underestimated despite being due to pain, limitation of activities (such as speaking, eating, drinking, seeing, sometimes even breathing) and changes in body image: all these conditions could negatively affect patients' Quality of Life (1). Therefore, we carried out an observational study to evaluate secondary lymphoedema incidence and features and the perceived Health Related Quality of Life (HRQoL) in a H&NC population underwent surgery and postoperative radiotherapy.

Materials and Methods: From 01.01.13 to 30.05.13 we enrolled in our study 17 patients with H&NC. All patients gave their written and informed consent to the study. Patients were enrolled after having been undergone radical surgery, before discharge from the surgical ward and before starting the planned radiation therapy. All patients received instructions for the prevention of lymphoedema before discharge. The inclusion criteria were: age 18-85 years, absence of severe cardiopulmonary/metabolic/hepatorenal/ neurological/rheumatic disease as possible causes of peripheral edema,absence of metastasis or other cancer in active phase, absence of acute infective severe diseases. Recorded patients data were : age, BMI, comorbidities, type of surgery and of neck dissection. Furthermore we evaluated at T0 (7-15 days after surgery,before discharge) and at T1 (3 months after surgery): perceived HRQoL with SF12 (2), ECOG score, secondary neck lymphoedema occurrence and features. All patients who developed lymphoedema underwent classification and treatment according to the International Society of Lymphology (3).

Results: The median age of our patients was 67 (min 21,max 82), the median BMI was 24.15 (min 17.5,max 26.5); smoking habits were present in 47% of patients and alcohol habits in 11.76%, diabetes type II in 17.64% and hypertension in 41.17%. The cancer types were oral cavity carcinoma in the 58.8% of cases, squamous cell carcinoma of the face in 11.76%, parotid gland adenocarcinoma in 11.76%, nasopharyngeal carcinoma in 5.88%, laryngeal carcinoma in 5,88%, unrecognizes in 5.88%. The neck dissection was unilateral in 94.12% of cases and bilateral only in 5.88%, modified radical dissection/selective dissection in 94.12% of cases and radical in 5.88%. At T0 we recorded: SF12 PCS average 40.35 (SD 10.04) and MCS average 52.9 (SD 6.86), ECOG score 1 in 17.64% of patients and score 2 in 82.35%, lymphoedema Stage I in 47.05% (both internal and external in all these patients). At T1 the results were : SF12 PCS average 46.02 (SD 7.79) and MCS average 56.47 (SD 7.56), ECOG score 1 in 70.58% of patients and 2 in 29.41%, lymphoedema Stage I in 23.53% of cases (both internal and external in all these patients) and Stage II in 17.65% (11.76% external, 5.88% internal and external).

Conclusions: Lymphoedema is a relevant complication of H&NC and of cancer treatment, but early diagnosis and effective treatment could improve patient's activities and Quality of Life and avoid social disadvantages.

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ALOHA - ASSESSMENT OF LYMPHŒDEMA OF HEAD AND NECK

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Purpose: Head and Neck Lymphoedema (HNL) is a troubling and persistent symptom for many patients following treatment of head and neck cancer. Accurate diagnosis and management of this condition is limited by the absence of a clinically accessible, valid and reliable assessment tool. A previous pilot study by this research group showed sound inter-rater reliability and construct validity for a tape measurement system for HNL. The ALOHA study further develops this assessment with the novel addition of the Delfin MoistureMeter D for HNL assessment. This study presents the preliminary findings of a trial of these two assessments in a group of patients and community controls.

Methodology: This study uses a single centre case control design study conducted at a single timepoint with three independent assessors. The study recruited participants (n=40) into two groups. Group 1 consists of participants diagnosed with HNL using the MD Anderson Head and Neck Lymphoedema Rating Scale. Group 2 consists of healthy controls matched on body mass index, age and sex. The study aims to determine if the MoistureMeter D and the tape measure system are reliable and valid objective measuring systems for the management of HNL.

Results: The inter-rater reliability of the tape measurement system and MoistureMeter D were strong (ICC>0.95) for all except at one point (lip to lower neck measurement) which showed poor reliability (ICC=0.42). When paired t tests were used to examine the discriminant validity of the measures in distinguishing between the HNL and control groups, the MoistureMeter D showed a significant difference ($p<0.01$) between the groups however the tape measurement system approached but did not reach significance.

Conclusion: The ALOHA shows some promise as an assessment for measuring HNL, particularly the MoistureMeter D component. This assessment requires further testing to determine its sensitivity to detect change over time in a prospective trial.

INTEREST OF THE VOLUMETRIC FOLLOW-UP IN THE LYMPHŒDEMA

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During the diagnosis and the monitoring of patients with primary or secondary lymphedema, evaluation of the volume of the affected segment is a major clinical component.
It helps guide management and objectively assess its impact (orthosis, drainage, bandage), especially for intensive reduction hospital treatment.
Indeed, it will only be realized in case of failure of measures taken ambulatory and / or if the excess limb volume is greater than or equal to 20% of the volume of the contralateral leg. For volumetric estimation, the recommendations advocate the use of the water's boot which measures water displacement volume corresponding to the segment considered.
This technique seems simple at first sight but is rarely used in daily practice (availability of the boot, maintenance, measurement time, difficult use for the upper limb).
This technique has been replaced in daily practice by measurements of perimetry every 10 cm from the elbow to the upper limb or from the edge of the patella to the lower limb (5 cm for children).
From these measurements, the volume can only be approximately calculated using the formula of truncated cones because it does not know the volume of the extremities (hands, feet).
This technique is used daily during consultations and cares by the unity of lymphology of Vascular Medicine of the Montpellier University Hospital. But other methods must be developed to assess the full volume of lymphedema.
This can be measured after image reconstruction CT or MRI of the lower limbs, but these tests can not be used to estimate the daily volume in lymphedema.
The solution is probably in the development of new technologies. The use of a handheld and self-positionning camera with real-time 3D reconstruction, already used in some industrial and medical fields (surgery, orthopedic sole), provides quick and completed calculation of the volume of the lower limb studied.
This examination is safe and may be repeated and allows to evalua te the different treatments in place.
The preliminary results shows a good intra and inter reproducibility observer and a good concordance with water displacement.

ANOGENITAL GRANULOMATOSIS AS A CAUSE OF GENITAL ŒDEMA

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The Lymphedema is a chronic condition that evolves and frequently determines the appearance of serious physical disabilities and psychological difficulties. The most important pathophysiological feature is its upgradeability: lymphedema is characterized by a high protein content; interstitial protein concentration results in a chronic inflammation that causes the development of progressive tissue fibrosis.
This rapid development should be opposed and it must be considered as the endpoint of therapeutic strategy. The physical treatment decongestive uses: manual lymphatic drainage, pressure pneumatics and multi-layer bandage containing, associated with a second integrated scheme called CPT (combined physical therapy), physical therapy combined.
The combination of these methods has been defined by the International Society of Lymphology that set international guidelines. The guidelines from the Italian S.I.L. (Italian Society of Lymphology) are based on those of the ISL.
The decongestive treatment will be associated with: low-calorie diet, exercise, isotonic, muscle toning, joint mobilization and debridement, hydrotherapy treatments, and instrumental (ultrasound, etc.).
On these lines is set to the treatment of primary and secondary lymphedema in our structure, performing on patients the method LEDUC.
The result is recorded on a personal evaluation sheets. In these tabs shows the patient demographics, the centimeter measurements and photographs of the affected segment before and after treatment with single or double multilayer bandage.
To make a real and reproducible photos without risk of distorting the volume of the segment, we use a method based on the Golden Ratio and Fibonacci numbers.
The results obtained with twice daily bandage (7/10 days) proposed by Dr. J.P. Belgrado are excellent.
International studies have also shown that a therapeutic approach to lymphedema, in case of brief hospitalization and intensive protocol, is able to provide better results than outpatient management of the disease itself.
Our treatment plan is designed to minimize, maximize and improve the appropriateness of therapeutic intervention to improve long-term results.

PHOTOGRAPHIC METHOD OF COMPARISON IN THE CONSERVATIVE TREATMENT OF LYMPHEDEMA

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The Lymphedema is a chronic condition that evolves and frequently determines the appearance of serious physical disabilities and psychological difficulties. The most important pathophysiological feature is its upgradeability: lymphedema is characterized by a high protein content; interstitial protein concentration results in a chronic inflammation that causes the development of progressive tissue fibrosis.
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On these lines is set to the treatment of primary and secondary lymphedema in our structure, performing on patients the method LEDUC.
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Our treatment plan is designed to minimize, maximize and improve the appropriateness of therapeutic intervention to improve long-term results.

LYMPHEDEMA AND BIOIMPEDANCE SPECTROSCOPY: INNOVATIVE DATA

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Aims: To assess by means of bioimpedance spectroscopy (BIS) the following quantitative parameters in patients affected by lymphedema: a) L-dex (an index between the impedance of the two limbs), b) resistance (which is related to extracellular fluid content) and c) reactance (a parameter which is partly related to tissue composition).
Patients and methods: 218 patients with edema of the lower limbs were investigated by means of BIS; 42 patients (10 male and 32 females, mean age 58,8) were affected by primary or secondary lymphedema. Out of this cohort, 11 patients were submitted to intensive decongestive treatment and followed up at short-term. U-400 machine (Impedimed ®) was used to measure quantitative parameters in each limb. L-dex, resistance and reactance were extrapolated through raw data analysis and Impsoft ® dedicated software. Absolute mean values and standard deviation for each parameter were calculated.
Results: Mean absolute figures and SD of L-Dex in the examined lymphedematous limbs were 12,5 (SD +/- 8,6). Mean absolute figures and SD of resistance in the examined limbs were 249,9 +/-48,1. Absolute figures and SD of reactance in the examined limbs were 10,7 (SD+/-4,6). Comparison of resistance and reactance between limbs with vs. without lymphedema resulted in the following data about percentage difference: 22,4% (resistance) 46,4% (reactance). According to age stratification resistance and reactance figures were respectively: 268,8/13,9 for 20-40 years old patients, 234,1/11,6 for 41-65 and 201/9,1 for over 65 patients.
The limbs which underwent intensive decongestive treatment showed an average L-dex of 58,7 (SD +/- 29,9) at day 0 and 36,1 (+/- 24,1) at the end of the treatment (-38%). Resistance and reactance figures followed a similar decrease trend in all the treated limbs.
Conclusions: Notwithstanding the objective variability of BIS data (age, BMI, gender, etc.), BIS assessment of limbs with lymphatic diseases proved to be of help to assess fluid content and tissue composition, as well as to compare limbs with and without lymphedema. Finally L-dex, resistance and reactance decreased throughout the intensive treatment days, in agreement with the clinical improvement of the treated limbs.


Sant'Angelo Bridge

Monday, 16th September 2013

H. 2.00 - 5.00 p.m.

Diagnostics 2
(Clinical and strumental)

Sala Scolastica

Chairmen

Lievens P. (Belgium) - Mander A. (Italy) - Yamamoto T. (Japan)

MULTIDISCIPLINARY MANAGEMENT OF ADVANCED LYMPHŒDEMA AT MACQUARIE UNIVERSITY. THE FIRST 12 MONTHS

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Introduction: The Macquarie University Cancer Institute established Australia's first multidisciplinary Advanced Lymphoedema Assessment Clinic (ALAC) in May 2012 and has embedded translational multidisciplinary clinical care and research into its surgical liposuction program. The outcomes of the first years' experience of liposuction for advanced lymphoedema will be outlined.

Patients and Method: Eligibility criteria for liposuction surgery consisted of unilateral limb lymphoedema patients with longstanding advanced (The International Society of Lymphology stage ll or lll) non-pitting primary or secondary lymphoedema, who had a limb volume difference of at least 750 ml, and for whom conservative therapies were ineffective. As long-term compliance to wearing compression garments was an essential component of effective post-operative management, patients were required to demonstrate this commitment prior to program acceptance. Seventy-seven people were screened by telephone to assess their eligibility to attend ALAC. Sixty patients were eligible to attend the multidisciplinary ALAC for their assessment by specialists in rehabilitation, plastic surgery, imaging, oncology and allied health, of whom 33% travelled from interstate. Following surgery, patients were monitored at 2 and 6 weeks, and then 3, 6, 9 and 12 months post-operatively. Assessments included history and clinical examination, bioimpedance spectroscopy (L-Dex), volume differences using circumferential measurements, Magnetic Resonance Imaging (MRI), functional assessments, and garment measurements.

Results: Between May 2012 and April 2013, 60 patients attended ALAC. Thirty five patients (58.3%) aged 57 ± 11.8 years were eligible for liposuction surgery. To date, twenty patients (33.3%) (14 arm and 6 leg) have undergone or have surgery planned. Ten of 11 patients who have undergone surgery have completed a post-operative assessment. With a mean follow up of 4.5 months (range, 1.5-12), they had a mean pre-surgical percentage limb difference of 57% (range, 22-66). At six-weeks post-operatively, the mean percentage limb difference reduced to 16% (range, 2-23), equating to a mean percentage excess volume reduction of 68% ($p = .0002$).

Conclusion: A translational multidisciplinary clinic for managing patients with advanced lymphoedema with the option of liposuction has been implemented and well received and has the potential to relieve suffering for advanced lymphoedema patients. Currently this surgery is offered to private or self-funded patients. Strategies to minimise cost and increase access are needed.

INDOCYANINE GREEN LYMPHOGRAPHY FOR NAVIGATION LYMPHATIC SUPERMICROSURGERY

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Background: Lymphaticovenular anastomosis (LVA), or lymphatic supermicrosurgery, is becoming the treatment of choice for compression-refractory lymphedema with its less invasiveness and treatment efficacy. To perform LVA safely and more efficiently, we introduced ICG lymphography as a preoperative assessment and intraoperative navigation.

Methods: Secondary lower extremity lymphedema (LEL) patients underwent ICG lymphography and LVA. Lymphography findings were classified into linear pattern and dermal backflow (DB) patterns (splash, stardust, and diffuse), and severity staging was made according to leg DB (LDB) stage. Intraoperative findings, such as detection rate and diameter of lymphatic vessels, were recorded and analyzed according to each lymphography pattern. LEL index was used as pre- & post-operative assessments of edematous limbs.

Results: LEL index was reduced (improved) significantly after LVA, and reduction of LEL index correlated with the number of LVAs. On linear pattern, lymphatic vessels were easily detected via small (1-20 mm) skin incision, whereas longer skin incision was required for detecting lymphatic vessels on stardust or diffuse pattern. Lymphatic vessels were becoming smaller and more sclerotic, as lymphography patterns changed from linear, stardust, to diffuse pattern.

Conclusions: LVA is a minimally invasive and effective treatment for refractory lymphedema. Difference of ICG lymphography patterns indicates different characteristics of lymph vessels. As ICG lymphography findings change from linear to stardust and diffuse pattern, detection of lymphatic vessels becomes more difficult, and lymphatic vessels becomes smaller and more sclerotic. ICG lymphography allows easier LVA by guiding lymph vessel location and condition; LVA on linear or stardust pattern is preferable, whereas LVA on diffuse pattern is not a good indication.

COMPARING LIMB-VOLUME MEASUREMENT TECHNIQUES: 3D MODELS FROM AN INFRARED DEPTH SENSOR VERSUS WATER DISPLACEMENT

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Here, a new method for measuring limb volume based on infrared depth sensors is introduced. The system can be operated by professionals and non-professionals, as it requires no special training – making it possible to use the system in the comfort of the patients' homes or at remote locations.
This high availability of the system allows for the early detection of swelling associated with lymphedema – a chronic disease caused by failure in the lymphatic system. Early detection and management can significantly reduce the potential for symptoms and complications; however, many patients fail to seek medical assistance at the first sign of the disease. So, the proposed system can potentially affect the lives of nearly 500,000 people in the U.S. who suffer from lymphedema and over 2.4 million breast cancer survivors who are at-risk for developing this disease at some point in their life.
In this paper, an explanation of the system and its operation is presented. The goal is to demonstrate the complete automation of the process of 3D imaging the arms. The proposed volume-measurement method takes just a couple of minutes to acquire the images. It has low cost, high accuracy and virtually no cleanup. It is also capable of capturing local swelling sites (an indicative symptom of the early stages of lymphedema). Further, because patients can perform the measurements at home, those measurements can be taken at much more frequent intervals.
The main objectives of this study were to: 1) exam the relationship between commonly used water displacement limb measurement and the proposed technique using 3D depth sensors; and 2) determine the reliability of the proposed method. A comparison of the proposed method with the perometry scanner was also carried out with the same objectives. Being an ongoing research, the results presented here are limited to 14 arms of mainly healthy volunteers. In the future, test will include a larger number of limbs of healthy as well as cancer patients.

SPECTROPHOTOMETRIC DETERMINATION OF LYMPH NODES DYE ACCUMULATION AFTER SHORT EXPOSURE TO MULTIDIRECTIONAL VIBRATIONS (ANDULLATION®) OR MANUAL MASSAGE, IN MICE

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Background: Whole Body Vibration is frequently used in sports, wellbeing, and medical fields. Their physiological effects are intensively studied.

Objective: To examine the short time effects of multidirectional vibrations (delivered in horizontal position) or manual massage, on the lymph nodes dye accumulation in mice.

METHODS: Local vibrations (30 Hz frequency, 3 minutes), or manual massage (3 minutes) were delivered after 20 ∝l bilateral injections (footpad) of Evans blue dye (EBD) in 2 randomised groups of mice (total N= 15 animals). A randomised control group with only dye injected animals (N=10 mice) was also used and compared to the other groups. The determination of dye quantity (∝g of EBD) in the lymph nodes (popliteal and sacral nodes) was carry out by spectrophotometric technique (wavelenght: 620 nm), after animal euthanasia, lymph nodes removing and blue dye extracting from the dye-stained nodes.

Results: After vibrations, the quantities (∝l) of EBD in popliteal lymph nodes are higher than in the control group (respectively, 0.56±0.26 and 0.14±0.17, mean and sd, $p<0.05$), and they are also a statistical different than after massage (respectively, 0.56 ±0.26 and 0.22±0.16, mean and sd, $p<0.05$).

Exactly the same results are found about the quantities of EBD in sacral lymph nodes.

Conclusion: In our experimental conditions and according to our results, it seems that dye tracer accumulation in lymph nodes is better after a short exposure to multidirectional vibrations (30Hz) than without intervention on the lymph drainage or with massage on injection site in mice. The specific tracer accumulation in lymh node is an important lymph function parameter, depending on the quality of the lymph flow, but not only. In fact, it is also depending on the phagocytosis of Blue dye bound to endogenous proteins by the RES Cells like macrophages present in the node.

Keywords: Andullation, Manual massage, Horizontal vibrations, Lymph nodes dye accumulation, Microciruculation, Spectrophotometric analysis.

LYMPHEDEMA SELF-MONITORING WITH BIOELECTRICAL IMPEDANCE

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Background: Chronic breast cancer treatment-related lymphedema requires life-long self-care. Less than half of breast cancer survivors with lymphedema (BCSLE) conduct self-care as directed. Perceived lack of results is a known reason for lack of adherence. There is no objective measurement technique used to self-monitor lymphedema. Those with lymphedema rely on visual recognition of increasing volume to determine self-care effectiveness and to decide when to seek professional treatment.

Aims: We tested bioelectrical impedance as an arm self-monitoring method and compared 1) daily self-care activities (garment use, skin care, simple-MLD) and 2) health & economic outcomes (symptoms, productivity/activity, self-management/self-efficacy, QOL, treatment days, number of arm infections, and number of antibiotic prescriptions) between BCSLE who self-monitored for 3 months and BCSLE who did not self-monitor.

Design & Methods: A pilot randomized clinical trial with data collection at baseline, months 1, 2, 3, & 4 was undertaken. Data were reviewed monthly and per IRB protocol participants were contacted if infection appeared to be present and therapeutic referrals were made.

Results: Eighty-six women were screened: 62 were eligible, 50 enrolled, 10 withdrew (6 "too busy" and 4 "health or family problems"), and 1 had incomplete data, thus N=39. No between group differences were noted in participant characteristics. There was an increase in median # of days of simple MLD in the intervention group, (p=0.001), over the course of the study from a median of 0 days to 1.5 days during week 12. There was a downward trend after self-monitoring ceased. The control group had a slight downturn in simple MLD throughout the study. The intervention group had increased days of garment use, (p=0.003), from a median of 2 days per week to 4 days per week. This remained stable after discontinuation of self-monitoring. The control group's use of compression garments was stable. Both groups had decreased distress over time. Improvement in "Other Health" affecting non-work activity, (p=0.025), in favor of the intervention group was also noted.

Conclusions: Objective feedback via self-monitoring of limb may positively impact lymphedema self-care adherence. The study, regardless of group assignment, provided 4 months of lymphedema oversight by a health professional, something not typically available, and thus, may have provided emotional support to participants that accounts for the improvement in distress across both groups. The mechanism for improvement in "Other Health" impacting non-work activities in the intervention group is unclear. These findings warrant further exploration in a larger longitudinal study.

ROLE OF HIGH RESOLUTION ULTRASOUND IN THE THERAPEUTIC STRATEGY OF SECONDARY LYMPHŒDEMA OF THE LIMBS

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High resolution ultrasonography is the most widely used non-invasive diagnostic method in the study of the superficial tissues in lymphedema of the limbs. The evaluation parameters are not well codified and standardized as well as the implications for the medical treatment, physical therapy and surgery.
We report our experience with the High-resolution ultrasonography in patients with secondary lymphedema of the limbs. The main sonographic findings of lymphedema in its early stages of evolution will be reported and related to the clinical evaluation. You will learn and discussed therapeutic strategies arising from this instrumental examination in particular on the choice of the type and bandaging technique and elastic stockings and pneumatic compression therapy indication.
Will be discussed the role of ultrasound evaluation in the choice of surgical strategy in the interventions of lympho-venous anastomosis device in microsurgical technique

LOWER LIMB LYMPHEDEMA ASSOCIATED SYMPTOMS

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Individuals experience secondary lower-limb lymphedema related to cancer treatment, and/or lower-limb lymphedema from primary and other secondary causes. Little is known about symptoms associated with lower-limb lymphedema. The purposes of this study were to: 1) identify symptoms associated with lower-limb lymphedema, and, 2) compare symptom intensity and distress across lymphedemas types.
An on-line, cross-sectional, descriptive study was conducted over 6 weeks. Demographic information was obtained. Participants completed a 36-item symptom survey that included a 1-10 rating of both symptom intensity and distress. The survey was a modified version of a valid and reliable upper-limb lymphedema survey. Analyses were conducted using Chi-Square and Kruskal-Wallis Tests.
320 were screened, 287 enrolled, and 213 completed the study (primary lymphedema n=96, non-cancer secondary n=45, cancer secondary n=37, unknown cause n=35). Participants were primarily Caucasian females. 39% lived in rural areas. Six symptoms occurred in ≥66% participants in all groups: appearance concerns, decreased physical activities, fatigue, swelling, heaviness, & tightness. Additionally, ≥66% of the unknown group experienced sadness, feeling less sexually attractive, pain, numbness, and achiness; and ≥66% of the non-cancer secondary group had loss of body confidence and inability to complete hobbies. Statistically significant group differences were coldness, less sexually attractive, and lack of self-confidence. Highest intensity symptoms included; insurance frustration, lack of confidence in insurance, appearance concerns, personal and partner lack of interest in sex, and inability to complete hobbies. The cancer and unknown groups had higher intensit y scores for lack of interest in sex. The secondary non-cancer group had more intense numbness and sadness. The unknown group had more intense achiness. Most distressful symptoms were: insurance frustration, lack of confidence in insurance, and appearance concerns. Statistically significant differences were noted in heaviness, the cancer group having lower distress scores. The 6 common symptoms are similar to known upper-limb lymphedema symptoms; however, intensity and distress scores were higher in these participants.
Regardless of type of lymphedema, patients experience problematic symptoms that require multidisciplinary interventions, as traditional limb volume reduction therapies focus primarily on volume reduction and thus may have little impact on some of the identified symptoms. Health care providers, regardless of professional specialty, should access patients with lymphedema for associated symptoms and initiate a tailored treatment plan.

PILOT STUDY OF INVESTIGATION OF CORRELATION BETWEEN THE LYMPHATIC SYSTEMS OF UPPER EXTREMITY AND BREAST USING 3D CT IN A CADAVER MODEL

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Background: Little is known about the pathophysiology of postsurgical lymphedema, and there is no complete cure. A recent study estimated the incidence of lymphedema at around 5% in patients who underwent sentinel lymph node biopsy and 16% in those who underwent axillary lymph node dissection. Estimated 400,000–600,000 breast cancer survivors are affected by this devastating problem in the United States alone. Recently, axillary reverse mapping (ARM) technique has been used to preserve the upper extremity lymphatic drainage during axillary lymph node dissection for breast cancer therapy. The assumption is that lymphatic pathways draining the upper extremity and the breast are independent, and that the upper arm lymphatic drainage is not involved with metastatic disease arising from the breast. The gap exists in our knowledge about the exact relationship between the breast and upper limb lymphatic channels and nodes.

Methods: We have developed a novel protocol for conducting radiographic study of the lymphatic system in fresh human cadavers. Our novel protocol enables us to map the entire superficial lymphatic channels and to record it on radiographs. To define the lymphatic pathways in cadaver specimens, lymphatic channels inflated with oxygen bubbles from hydrogen peroxide are cannulated with a fine glass cannula or a 30G needle under a microscope. Those channels were injected with a radio-opaque medium by intermittent manual pressure. Barium sulfate mixture was used as a radio contrast medium. We applied our protocol for a fresh forequarter cadaver specimen model that involves the upper extremity and hemi chest wall. After completing injection of the lymphatic system, the cadaver specimen was examined by high-resolution 3 dimensional computed tomography (3D CT).

Results and Conclusions: According to our results in the first specimen, some of upper extremity lymphatic pathways were independent from the breast lymphatic pathways. Our pilot results suggest that ARM may be a feasible option to prevent postsurgical lymphedema without compromising breast cancer treatment. Our long-term goals of this project are to develop a new surgical procedure and diagnostic imaging protocol for breast cancer to remove cancer-related lymph nodes without compromising lymphatic drainage in the upper extremity.

SUBCELLULAR LOCALIZATION AND SIGNIFICANCE OF NUCLEOLIN IN PAPILLARY THYROID CARCINOMA

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Papillary thyroid carcinoma (PTC) is the most common in thyroid cancers. The development of PTC is associated with genetic mutation, chemical factors, such as CCR7, MMP9 and VEGF. Nucleolin is a multifunctional nuclear protein involved in gene transcription, ribosomal maturation, and highly expressed in proliferative and neoplastic cells. Despite that nucleolin is localized commonly in the nucleolus, it has also been found on the cell surface in some conditions. Ergo, the multiple-functional nucleolin exhibiting different subcellular localizations in terms of different conditions arouse a great attention. However, distribution and function of nucleolin in PTC is not clear.
In this work, we aimed to compare the expression of nucleolin, CCR7, MMP9 with clinical parameters and investigate the discrepancy in subcellular localization, specificity and clinical significance. Tissues from 60 cases were examined by immunohistochemistry. We found the expression of nucleolin in all cases of PTC with metastasis (100%) was not only located in nucleus, but also in cytoplasm and cell membrane, while the expression of nucleolin without metastasis was only limited to nucleus.
Nuclear nucleolin staining was scarcely seen in normal tissues. Expression of CCR7 and MMP9 was also higher in PTC with lymph node involvement (76.9%, 97.4%) compared with those without involvement (28.6%, 52.4%). No significant correlation was found between nucleolin expression and age, gender or tumor size ($P>0.05$). Nucleolin expression specificity for evaluating with or without metastasis of PTC was significantly superior to CCR7 and MMP9.
This study suggests that subcellular localization of nucleolin can be used as a marker to clinically determine tumor with or without metastasis in PTC, and antagonist of nucleolin may play a great role in treatment of PTC.

PATIENT-REPORTED OUTCOMES IN WOMEN WITH AND WITHOUT SUBCLINICAL AND CLINICAL LYMPHEDEMA

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Lymphedema is a frequent physical impairment related to breast cancer (BC) and its treatment. We are unaware of any published peer-reviewed studies examining upper limb (UL) function, quality of life (QOL) and physical activity (PA) in women with subclinical lymphedema (SLE). This study examines UL function, QOL and PA in women diagnosed with SLE, clinical lymphedema (CLE) or no lymphedema (NLE) as a result of BC.
SLE is a limb volume 3-5% greater than baseline. CLE is a limb volume 5-8% greater than baseline. One hundred sixty-six women diagnosed with BC: 104 NL (age = 52.39 ± 12.63 years, body mass index (BMI) = 25.55 ± 5.976 kg/m^3), 41 SLE (age = 55.41 ± 12.10 years, BMI = 27.15 ± 4.724 kg/m^3), and 21 CLE (age = 54.14 ± 8.918 years, BMI = 30.69 ± 9.172 kg/m^3) were assessed prior to surgery (BL) and at 12+ months post-surgery (12+).
UL volume was taken in standard position with a Perometer (Pero-System Messgerate, Wuppertal, Germany). Height and weight assessed at BL and at 12+, cancer characteristics, treatment related factors, and subject demographics were recorded. The Upper Limb Disability Questionnaire, Short-Form Health Survey™ and Harvard Alumni Study PA. Questionnaire were administered at 12+. Analysis of variance and post hoc Bonferonni test, Pearson chi-square or Kendall's tau-b compared groups (p

LICHEN PLANUS AND PRIMARY LYMPHEDEMA, A CASE REPORT

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This is a 28 years old woman. She was a case of primary lymphedema in lower extremity since 8 years before. Five years later, Lichen planus lesions appeared in her legs, forearm and mouth.
Topical treatment was prescribed for Lichenified lesions about one year. There was very weak response to medical treatment and her edema progressed severely. She was referred to lymphedema clinic 2 years ago.
Complete Decongestive Therapy (CDT) was achieved in 25 sessions. Maintenance phase care was advised and she was observed every three months.
During this time she had about 70% edema volume reduction. Surprisingly, Lichen planus disease was subsided completely during these two years. At present there are only brown inactive macular lesions in her legs and she uses no medical treatment for them. Lymphedema maintenance phase care is done by patient regularly.

FLUORESCENT LYMPHOGRAPHY IN THE DIAGNOSIS OF LYMPHEDEMA

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Introduction: According to WHO, lymphedema of the lower extremities affects about 10% of the population, or more than 700 million people, mostly young and middle-aged women. With the progression of the disease the efficiency correction percentage of lymphedema is significantly reduced. Thus, the use of timely diagnosis allows to diagnose and treat appropriatly in the early stages of the disease. The methods currently in use for the diagnosis of lymphedema are available only in specialized centers, as well as costly. In this regard, it is evident to use early diagnosis of lymphedema, which combines minimally invasion, ease of performing, the lack of a significant investment of money and, as a consequence, the possibility of application in clinical practice.
Objective: To determine the possibility of fluorescence lymphography use with sodium fluorescein for the diagnosis of lymphedema.

Materials and Methods: We applied a little-studied method of fluorescence lymphography, which allows visualization of lymphatic vessels. Since May 2010 47 patients were examined. Technique: in the test position on the back without using anesthetics it was administered 0.5 ml of a 10% solution of the first interdigital Flyurenata interval dorsalis pedis. Fluorescence was observed using a lamp with a light source wavelength of 480 nm. Documentation of the resulting images was recorded with a digital camera.

Results: In carrying out the study, we observed in most patients, a fairly clear picture of lymphatic vessels, their straight-line speed and uniform diameter at certain levels of lymphatic vessel. However, some patients identified expansion or contraction, crimp lymphatics and poor contrasting latter. It turned out that these events were reported primarily in patients who had a variety of violations of lymph flow, documented or defined by a characteristic clinical picture. There remains a small number of patients, who also appear the above-described conditions, but there are no manifestations during the study. This gave reason to suppose that in these cases there is a pre-clinical stage of the disease.
Because fluorescent lymphography is relatively new and unexplored procedure, and we have only the first experience for the diagnosis of lymphedema, we plan to conduct further studies in patients with pathology of the lymphatic system.

INDUROMETER VS TONOMETER WHICH IS BEST; DO INDUROMETER READINGS CORRELATE WITH THE ISL STAGING OF LYMPHŒDEMA

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Introduction: The Indurometer is a new tool that measures tissue resistance to indentation to quantify the amount of fibrosis present within the epifascial compartment in individuals with lymphoedema. This tool was invented by Flinders Biomedical Engineering to replace the Tissue Tonometer which is currently used by healthcare professionals. The Indurometer has many advantages over the Tonometer, but a comparison of the repeatability between these two devices has yet to be documented in literature. The correlation between the values obtained using the Indurometer and the ISL classification assigned to a limb is also currently unknown. By exploring whether such a correlation exists, it may be possible to determine whether Indurometer values could assist with more accurate early staging and diagnosis of patients leading to earlier targeted treatment and better outcomes for those with lymphoedema.

Study Aims: Firstly, to evaluate the repeatability of the Indurometer compared to the Tonometer in order to determine if the Indurometer is a suitable replacement for the Tonometer. Secondly, to determine how the Indurometer readings at each specific lymphatic territory site correlate with the ISL staging classifications.

Subjects and Methods: Six centers gathered data on a total of 182 subjects with unilateral arm lymphoedema. The following measurements were obtained: three repeat measures with the Indurometer and Tonometer on the anterior mid-forearm, anterior mid-upper arm and anterior chest on both sides of the body. The ISL staging for each subject was assigned based on the expert knowledge of the healthcare professional at each site. The measures from the unaffected arm of each subject will be used as controls.

Anticipated Outcomes: The results of the full analysis will be presented at the meeting. The Indurometer is expected to have greater repeatability compared to that of the Tonometer based on the results of a primary analysis completed on a subset of the subjects. A correlation is expected between the Indurometer measurements and the ISL staging classifications because by definition the staging of lymphoedema is dependent not only on the tissue fluids but also on the amount of fibrosis found within the superficial tissues. Establishing this relationship could provide evidence that can be used to assist health professionals in the accurate objective staging of lymphoedema and promote earlier, targeted treatment and better outcomes.

INDOCYANINE GREEN LYMPHOGRAPHY IS SUPERIOR TO LYMPHOSCINTIGRAPHY IN IMAGING DIAGNOSIS OF SECONDARY LYMPHEDEMA

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Objective: Lymphedema is commonly viewed as difficult to treat, but lymphaticovenous anastomosis applied early after onset can be curative in some cases. Therefore, early diagnosis of cancer-related lymphedema is important. Lymphoscintigraphy is currently the most common method used for imaging diagnosis of lymphedema, but indocyanine green fluorescence lymphangiography (ICG lymphography) is also increasingly used for this purpose. The goal of this study was to compare the accuracy of these methods for diagnosis of lymphedema.

Methods: This was a prospective comparative study, conducted at a general hospital in Japan. The subjects were 29 consecutive patients (all female; age range, 32-79 years) with lymphedema (58 limbs, including healthy ones) after gynecologic cancer care who underwent lymphedema treatment at The University of Tokyo and Saiseikai Kawaguchi General Hospital between April 2011 and December 2011. All subjects were referred to our department for lower extremity lymphoscintigraphy and ICG lymphography. The sensitivity and specificity of lymphoscintigraphy and ICG lymphography were calculated for all limbs and for diagnosis of early lymphedema in affected limbs (International Society of Lymphology stages 0 and I). In each analysis, receiver-operating characteristic curves were prepared to compare the accuracy of the two methods. Histopathological analysis was also performed.

Results: In receiver-operating characteristic analysis of 58 limbs, the area under the curve was 0.72642 for lymphoscintigraphy and 0.90943 for ICG lymphography. In 34 limbs with early lymphedema, the area under the curve was 0.55882 for lymphoscintigraphy and 0.81471 for ICG lymphography.

Conclusions: ICG lymphography was more accurate than lymphoscintigraphy for detecting lymphedema and was particularly useful for diagnosis of early lymphedema. This is clinically important since early diagnosis may permit curative treatment of lymphedema.

IDENTIFICATION OF DIAGNOSTIC BIOMARKERS IN PATIENTS WITH LYMPHEDEMA: MODELING MEDICINE WORK PROJECT

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Swellings of the extremities are often observed in routine practice and are initially seen as a symptom; therefore, it is extremely important to find the cause and often produces differential diagnostic problems. As the diagnosis of lymphedema is mostly a clinical one it is especially necessary to thoroughly investigate an exact anamnesis and clinical examination which should be combined with as little technical equipment as possible. Implementation of the correct and consistent therapy of this chronic disease and continuous surveillance represents a special challenge for physicians and therapists. Operative solutions represent the last resort and often end in unsure results. The remarkable structural and functional similarities between the mouse experimental model and the human disease suggest that application of a parallel approach (genome-wide transcriptional profiling of circulating blood cells) should facilitate the development of focused and pragmatic cellular and molecular insights into the biology of human lymphedema.
Aim of the project: *Identify a rapid and accurate diagnostic system, combining specific molecular analysis and artificial intelligence methods.* In recent years, microarray technologies have generated new perspectives for the analysis of biological systems, with the possibility to monitor thousands of genes in a single experiment. Therefore, the Gene Expression Profiling (GEP), molecular technology combined with clinical measurements can allow for a more precise characterization of the phenotype of the patient.
We propose a work project in order:

a) to develop a multi-analyte biomarker panel that sensitively discriminates human lymphedema (unilateral or bilateral) from normals patients. We rely on macroarray-based transcriptomic technology of pheriperal blood cells to prospectively identify molecular target (potential biomarkers);
b) to achieve this end, it will be followed the classic paradigm of implementation of any information system, bio-informatics: *Data collection:* collecting samples (sample) and their biological processing; *Data analysis, the feature size reduction and eventual:* definition of what features are most important and therefore should be used when you create a model for a particular problem; *Modelling of the problem:* definition of input, output and model type, model training, statistical verification; *Verification of knowledge discovery,* in vitro and in vivo biological experiments in the laboratory and in real life to confirm the acquired knowledge.

AXILLARY VEIN COMPRESSION TEST

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Background: The total adenectomy of the axilla has important consequences on the lymph flow capacity for several reasons. On one hand the partial ablation of the lymphatic network, and on the other hand the ablation of surrounding tissues. As a result, the hemodynamic of the axillary vein might be perturbed. Nowadays, echodoppler is the gold standard examination, but it is time consuming and requires a specific protocol to confirm the orthostatic intermittent stenosis of the vein. We have developed a fast and specific provocation test in order to highlight a possible participation of the vein in the genesis of oedema.

Method: The provocation test has been realized on 42 patients affected by unilateral secondary breast cancer lymphoedema stage I, II. And on 10 healthy and voluntary subject. During the execution of the test, the patient stands in front of a mirror, the examiner is behind him; the concerned upper limb is hold passively in antepulsion of 90°(reference position); the color of the dorsum of the hand is memorized; then, the arm is placed by the examiner vertically along the trunk, adding manually a sagittal and medial compression on the root of the limb during 15 seconds. If the hand really reddens, the test is positive. Qualitative and semi-quantitative observations have been realized.
For the qualitative part, we asked an innocent bystander to appraise the change of the hand's color during the test on both arms. For the semi-quantitative part, pictures of the hand have taken in standardized conditions at both steps (reference position and vertical position).
Then an RGB colors analysis has been processed in order to compare the red component in area of interest (a finger and a the dorsum part of the hand).

Results: For patients suffering from lymphoedema with a venous component, the prolonged compression of the axillary vein generates an increase of the pressure in the distal microcirculation inducing skin redness.
The axillary vein provocation test is fast and easy: 30 seconds, with only one examiner in a clinic routine. The correlation between the qualitative and semi-quantitative test is significant ($r=0.92$, $p<0.001$).
Studies to determine the sensitivity, reproducibility, specificity and PPV are in progress.

Monday, 16th September 2013

H. 2.00 - 5.00 p.m.

Poster Discussion 1

Sala Timoteo

Chairmen

Leduc O. (Belgium), Forner-Cordero I. (Spain), Cardone M. (Italy)

SYNERGISTIC EFFECT OF ADJUSTMENT OF LOW-STRETCH COMPRESSION AND EXERCISING IN THE TREATMENT OF LYMPHEDEMA

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The aim of this study was to evaluate the effect of adjustments to a compression stocking on reductions in volume of leg lymphedema during walking.
Fourteen women and 3 men suffering from leg lymphedema with ages between 21 and 68 years old (mean 45.68 years) were randomly enrolled in this study.
Evaluations were made by volumetry before and after each session of controlled walking.
Patients were subjected to three one-hour sessions of walking slowly on flat ground monitored by a professional.
For one session the patients used a well-adjusted cotton-polyester compression stocking, for a second they used a badly-adjusted compression stocking made of the same fabric and for the third no compression mechanism was used.
The Kruskal-Wallis was used for statistical analysis.
On comparing the volume before and after walking for one hour with the well-adjusted cotton-polyester compression stocking, there was a mean reduction of 46.2 mL (± 66.95 mL; p-value < 0.02) in the lymphedema volume.
In the one-hour session of walking without any compression, the volume of the leg increased by 74.4 mL (± 99.75; p-value < 0.007). On walking with the compression stocking badly adjusted, there was a mean increase in volume of 31.6 mL (± mL; p-value < 0.14).
In conclusion, constant adjustment of low-stretch compression mechanisms has a synergistic effect to reduce the volume of limbs in the treatment of lymphedema.

EFFECT OF GARMENT ON GAIT PATTERN IN PATIENT WITH BILATERAL PRIMER LYMPHŒDEMA AND CEREBRAL PALSY - A CASE REPORT

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Background and Purpose: The aim of this case report is to evaluate the effect on application of garment on gait pattern in patient with bilateral primer lymphedema and cerebral palsy. Data obtained from a gait analysis application. Lymphedema therapy includes garments. This case report describes the differences of gait patterns with garments.

Case Description: The patient was a 14-years-old child with bilateral lower limb primer lymphedema and cerebral palsy. For both lower extremities class two socks were applied. The socks were used for eight weeks. And the evaluations were repeated. Patients were assessed at three dimensional gait data were collected with the ELITE motion analysis system (BTS S.p.a, Milan, Italy) and two force plates. Eight cameras recorded the three-dimensional spatial location of each marker as the subject walked.

Outcomes: Lymphedema and cerebral palsy are chronic diseases. The patient has to use the garment during their life. Mean velocity increased (from 0.56m/sec to 0.64m/sec) and step width decreased (from 213mm to 173mm) by application of elastic sock which means stability on stance phase increased by sock application. Double bump pattern on anterior pelvic tilt and increased ankle dorsiflexion remained between the first and the second evaluation.

Discussion: An application of pressure is a technique that used for reducing a spasticity. Thus the use of garment has a positive effect of the gait pattern. Mean velocity and decreased step width are the positive signs for increasing stability in stance with sock application increased. We need more clinical researches with more patient outside of only one case report

Keywords: Lymphedema, cerebral palsy, gait analysis.

THE GODOY & GODOY EXPERIENCE WITH COMPRESSION STOCKINGS IN THE TREATMENT OF LYMPHEDEMA

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Compression mechanisms constitute the main form of treatment of lymphedema. However the correct usage and the best ways to use compression, the adaptation of new materials for compression and an evaluation of the synergistic effect when this treatment is associated with other techniques are fundamental for the therapeutic evolution of the patient. This presentation aims to show the research conducted in the Clinica Godoy on the new materials used to make non-elastic compression garments and the use of elastic stockings in the treatment of lymphedema. The synergetic effect of using elastic stockings with Mechanical Lymphatic Therapy in the reduction and maintenance of edema was evaluated. Moreover, the use of grosgrain non-elastic stockings as monotherapy in the total reduction of lymphedema will be described together with the necessary precautions in its use. The effectiveness in the treatment of grosgrain sleeves in breast cancer-related lymphedema will be di scussed. In conclusion, compression mechanisms, when well adapted, can be used as monotherapy to treat lymphedema and maintain the results but an association with myolymphokinetic activities and exercises may provide a synergistic effect in reducing the swelling.

MOBILIZATION OF FLUIDS IN LARGE VOLUMETRIC REDUCTIONS DURING INTENSIVE TREATMENT OF LEG LYMPHEDEMA

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The aim of the current study was to evaluate fluid mobilization during the intensive treatment of leg lymphedema. The mobilization of intracellular and extracellular fluids in the lower and upper extremities and trunk was evaluated with the intensive treatment of leg lymphedema in a prospective study. Mobilization of fluids was assessed by bioelectrical impedance using the inBody S10 device in ten patients with leg lymphedema, regardless of the cause. Treatment consisted of six to eight hours per day of Manual Lymphatic Therapy (Godoy & Godoy technique), Mechanical Lymphatic Therapy (RAGodoy device) and a non-elastic cotton-polyester stocking. A significant reduction in total water was observed for the lymphedematous limb, but with an increase in intracellular water of from 59% to 61%. Additionally, total water increases were observed in the limbs without lymphedema and in the trunk. There was an increase in total intracellular water of the extremities an d trunk, but without any change in the extracellular water. In high-volume reductions during lymphedema treatment, fluids are displaced from the lymphedematous limb to extremities without lymphedema and to the trunk.

INTENSIVE TREATMENT STRATEGIES FOR SEVERE CONGENITAL LYMPHEDEMA OF A CHILD

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There are a lot of difficulties to treat congenital lymphedema due to the lack of specialized professionals. The objective of the current study is to describe the strategies used in the intensive treatment of a child with congenital lymphedema. This paper describes the case of a 3.9 year-old patient with lymphedema of all four extremities (arms and legs) that had been worsening over the years. The patient had difficulties to bend the leg which limited mobility. Intensive treatment was chosen with 6 to 8 hour daily sessions of the legs. It was decided to treat the arms at a later date due to the difficulty of putting compression mechanisms on both arms and legs. The intensive treatment consisted of Mechanical Lymphatic Therapy (RAGodoy®), Manual Lymphatic Therapy (Godoy & Godoy) and compression garments (grosgrain stockings adapted for children). The length of treatment sessions was adapted on a daily basis to the child's ability to tolerate treatme nt, but with the objective of between 6 and 8 hours per day.

CONTROL OF PRIMARY CONGENITAL LYMPHEDEMA OF THE FOUR LIMBS USING MANUAL CERVICAL STIMULATION THERAPY (CERVICAL STIMULATION)

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Families with children who suffer from primary congenital lymphedema have a number of difficulties in treatment due to the lack of specialized professionals. Over the last few years, a new approach initially called cervical stimulation but today renamed to Manual Cervical Stimulation Therapy, has provided a new therapeutic option for these families. The aim of this study is to report on the evolution in the treatment of two children with congenital lymphedema of all four limbs (arms and legs) who were treated with Manual Cervical Stimulation Therapy alone. They started treatment when they were 1 year and 1 year and two months old and are being treated for more than 4 years with reductions and control of the edema of all four limbs. Cervical therapy is a 20-minute daily physical therapy session that with just one finger causes a slight movement of the skin in the cervical supraclavicular region. Mothers who are able to learn this stimulation technique are train ed to participate in the treatment. Parents are told to allow their children to have normal lives without restrictions however they are also warned about the necessary of care to avoid potential infections. It is possible to associate this therapy with compression mechanisms such as stockings and bandages, and Manual and Mechanical Lymphatic Therapy but these techniques are reserved for situations where the limb begins to swell again. In these two cases there was no need for any associated therapy. Manual Cervical Stimulation Therapy, as a monotherapy, is capable to maintain the size of the limbs within normality in children with congenital lymphedema.

NEW MATERIAL FOR COMPRESSION GARMENTS IN THE REDUCTION OF LYMPHEDEMA OF THE SCROTUM AND FORESKIN AND MAINTENANCE OF THE REDUCTION

LIBANORE ZUCCHI D., PEREIRA DE GODOY J.M., BRIGIDIO AMADOR FRANCO P., BUZATO SILVA E., GUERREIRO GODOY M. de F.
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The basis of the clinical treatment of lymphedema of the scrotum and foreskin is compression similar to lymphedema of other body regions. The objective of the current study is to describe a material used to make a new type of compression garment to treat scrotal and foreskin lymphedema. This material, grosgrain, has been used to make inelastic compression stockings and sleeves. It has the advantages of being cheap and simple to use. This report illustrates the evolution of the treatment of penis foreskin lymphedema (three cases) and the association of foreskin with scrotal lymphedema (two cases). In two cases of penile foreskin lymphedema the swelling was reduced to near normal within one week. Other patients became impotent and required the implantation of penile prostheses. One of the cases was after surgical resection which resulted in fibrosis; a second surgery was unsuccessful. This approach reduced the edema and fibrosis and allowed a return to sexual ac tivity. After the implantation of penile prosthesis, this patient has continued to use a grosgrain compression garment. This material is effective in reducing swelling when the compression garment is well adapted and easy to use.

GROSGRAIN STOCKING IN THE TREATMENT OF LEG LYMPHEDEMA AS A MONOTHERAPY

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The aim of the current study was to evaluate the use of grosgrain stockings as a monotherapy in the treatment of leg lymphedema. In 2012, 13 consecutive patients, 5 male and 8 female, treated in the Clinica Godoy for lower limb lymphedema were prospectively assessed. Their ages ranged from 17 to 72 years with a mean of 42.5 years. All patients with leg lymphedema were included regardless of the causes of the disease. Patients with a history of allergies or intolerance to compression mechanisms, those with active infectious processes, joint immobility or other complications that could interfere in the treatment were excluded. The patients were treated using grosgrain stockings alone. At return appointments a seamstress adjusted the size of the stockings as warranted. An assessment of the edema of the limb was made by bioimpedance using the InBody S10 Body Composition Analyzer (BioSpace, Seoul, Korea). The two-tailed paired t-test was used for statistical analys is with an alpha error of 5% (p-value < 0.05) being considered significant. Significant reductions were detected in all patients (paired t-test: p-value < 0.0001). Grosgrain stockings, used in isolation, are a method to reduce edema in patients with leg lymphedema.

SYNERGISTIC EFFECT TO REDUCE EDEMA BY FREQUENTLY ADJUSTING NON-ELASTIC STOCKINGS

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The objective of the current study was to evaluate the importance of frequent adjustments of grosgrain (non-elastic) stockings for constant reductions in the volume of lymphedematous limbs. Five male and ten female patients with lower limb lymphedema of any etiology treated in the Clinica Godoy were enrolled in this study. The ages of the participants ranged from 16 to 69 years (mean: 42.5 years). Changes in edema were assessed by bioelectrical impedance. Patients were randomly allocated to one of three groups: the compression stocking was checked and adjusted every week (Group I), every fortnight (Group II) or every month (Group III). Patients with infections, limited joint mobility or allergies to the stockings were excluded. The paired t-test and one way analysis of variance with Tukey-Kramer multiple comparisons were used for statistical analysis with an alpha error of 5% (p-value < 0.05) being considered acceptable. The study was approved by the local Res earch Ethics Committee. A significant volume reduction was detected with weekly and fortnightly adjustments (p-value = 0.01 and 0.02, respectively) but not with monthly adjustments. Although, there was no significant difference on comparing sequential mean reductions between the three groups (the first measurement for each group), on comparing the treatment time, the reduction was greater over one month with weekly adjustments than with monthly reductions. More frequent adjustments of the stockings increases their synergistic effect in reducing edema, but stockings are more comfortable with less frequent adjustments.

LYMPHATIC FILARIASIS RELATED LYMPHEDEMA: A SYSTEMATIC REVIEW OF INTERVENTIONS TO PREVENT OR REDUCE MORBIDITY

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Morbidity arising from infection with filariasis is a major cause of disability globally, second only to mental illness. Filariasis is still endemic in 73 countries where an estimated 1.2 million people are at risk of infection, 200 million are known to be infected and 40 million have chronic disease which is strongly associated with poverty. Chronic disease may manifest as lymphoedema (elephantiasis) or hydrocele and be associated with acute dermatolymphangioadenitis (ADLA) episodes. The current WHO guidelines for basic filarial lymphoedema management prescribe a home-based self-care routine including foot and leg hygiene, topical treatment of entry wounds, the use of footwear, limb elevation and exercises. ADLA is commonly treated with anti-inflammatories and/or antibiotics.
This review examines the evidence for the effectiveness of interventions intended to; 1) manage lymphoedema and 2) ADLA episodes, after filariasis in undeveloped countries.
The full text of 48 articles were accessed and assessed by two blinded reviewers. Articles were grouped according to the NHMRC hierarchy of evidence and level III-2 or above were included in the review. Each paper was then appraised using the appropriate CASP tool and ranked as high, moderate or low quality.
Only 8 papers were ranked as either moderate or high methodological quality. Overall there was mixed evidence for the effectiveness of; a variety of drug interventions either alone or combined with self-care, or for basic self-care alone. The evidence for basic self-care alone is not strong but when combined with antibiotic and anti-inflammatory medications effectiveness in managing lymphoedema symptoms and the adverse impacts of repeated episodes of ADLA increased. This review highlights the need for further studies of the efficacy of individual components of basic self-care in relation to specific grades of lymphoedema and this will require appropriate blinding of assessors and monitoring of compliance. Based on this review, the current best recommendations for management of lymphoedema after filariasis is community based home care as described by the WHO.

FOOD-RELATED CUTANEOUS MANIFESTATIONS/COMPLICATIONS IN LYMPHEDEMA: SEGMENT SPECIFIC I, CRUSTACEAN FINGERS AND CRUSTACEAN TOES

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Background: From time to time patients who visited Lymphology Institute of Thailand came for a localized swelling in one or two fingers/toes, or both. More often they came for an enlargement of a lymph node or a limb or, but was found to bear certain pathology concomitantly in the finger(s) and/or toe(s), either known or unknowingly. While most patients regard the finger/toe problem as irrelevant to the lymphedema, occasionally some individuals remember episode of abrupt changes in the hand/foot after certain meals enriched with seafood.

Materials and Methods: We reviewed the *Slaengh* Repository that classifies food preference for animal products in association with pathological patterns identified in lymphedema patients.

Results and Discussion: Interestingly, prawn/shrimp- and crab-lovers were found to have high incidence of lesions in second and third finger/toe(s), respectively. The relationship was so intrigue that we come to refer to the phenomenon as "crustacean fingers" or "crustacean toes" which was of referential value in diagnosing a *slaengh* or food aggravation as an underlying factor for the chronicity. A seafood-lover patient experienced an isolated swelling of index finger on right hand and swollen middle finger on left hand for several months, having seen many physicians and orthopedics, before she came across with our Institute. Typically, itching papules containing clear fluid erupted as cluster in the fingers and/or palm, or the toes and/or sole repeatedly. Healed lesions were left with plaque of incomplete desquamation, rough skin, or erosive surface. Arthritis in situ caused erythema, tenderness, swelling, local heat, and itch with cracks. In lymphedema of lower limb, the second and third toes were specifically involved with lymphorrea, hyperpigmentation, hyperkeratosis, papillomatosis, or verrucosis, while the big, fourth, and fifth toe were amazingly unaffected. An unfortunate male underwent an amputation at distal interphalangeal joint of right middle finger 12 years ago, and at proximal interphalangeal joint 3 months later, given with an uncertain prognosis from biopsy result. As swelling waxed and waned, a third surgery was scheduled to remove the remaining stump. He aborted the plan and adopted our recommendation with vegan diet, quitting all his favorite crab delicacy. A young mother lived with hemodialysis for renal failure after a complication Steven-Johnson syndrome that resulted from aggressive medication to treat recurrent aching right middle toe; the latter was suspected elsewhere as an SLE or rheumatoid arthritis. During the course treatment at our Institute, she disclosed of her most favorite dish, crabs!

FOOD-RELATED CUTANEOUS MANIFESTATIONS/COMPLICATIONS IN LYMPHEDEMA: SEGMENT SPECIFIC II, GLUTEAL CHICKEN RASH VERSUS PORK RASH

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Background: Lymphedema comes with many types of skin changes, of which some emerge as eruptive disorders. The cutaneous manifestation may express in the limb affected, and not uncommonly, in the remote areas as well. Among them, the gluteal regions are of particular interest, as they represent the lowest part of the torso while seated, and therefore tend to pool more lymph by gravity, and hence depositing more fat.

Materials and Methods: At Lymphology Institute of Thailand we have recognized that foods of animal origin can aggravate certain pathology in a specific fashion, the phenomenon referred to as *slaengh*. In the buttock skin we observed cutaneous rash of two distinct patterns in two groups of patients who had food preference for chicken and for pork.

Results and Discussion: Gluteal rash in the chicken group was characterized by the small size papules no larger than 1 mm in diameter; they usually emerged numerously, but could be sparse, or rarely solitary. At peak eruption, the papules appeared with a white head on erythematous rim; patients often scratched during nighttime. The resolved lesions remained with spotty pigmentation. Repetition of eruptions was common, so that the entire buttock skin could be covered by old maculopapules. In primary lymphedema and lymphedema profunda, rash distribution could spread down over posterior aspect of thigh, or up to cover part of back, or laterally to cover lateral hip region. On the other hand, gluteal rash in the pork group was characterized by a single solitary papule of 2~3 mm or larger; occasionally the papules emerged in small number of 2~4, distributed widely apart. Obviously pork rash was not itching, except for cases contaminated with consumption of chicken, egg, or milk. At peak eruption, the papule was elevated with erythematous swelling; secondary infection might result in suppurative boil formation or abscess. After repetition, resolved lesions remained as prominent scarring with pigmentation. The rash could spread over the medial aspect of thigh, perineal, and inguinal region. Although skin biopsy was not conducted, we observed that the rash of both groups co-localized with the hair follicles, suggesting that sebaceous glands were affected. This interpretation is compatible with the folliculitis observed in patients with primary or secondary lymphedema complicated by cellulitis, and with the pustule propensity observed in bad-lymph sickness children with primary lymphedema praecox (see the abstract entitled Lymphedema and pruritus, by Ekataksin and Chanwimalueang, in this meeting).

DESIGNING AN AIR-COMPRESSION GLOVE FOR TREATING LYMPHEDEMA IN FINGERS AND HAND

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Background: Compression therapy is considered a gold standard in management of lymphedema. However when the disease involves fingers and dorsum of hand, or toes and dorsum of foot, the treatment is not always as effective. This is due not only to the complexity of the segments involved, but also to the process of appropriate compressing during the reduction phase and the maintenance phase. Having experienced with thousands of lymphedema cases, we have been tempted to develop a self-manageable device simple enough and safe as well for home use. In the present study, we focused on engineering the structure and design of an air-compression glove that would most fit clinical purposes.

Materials and Methods: Using several types of materials, including cloth, nylon fabrics, synthetic leather, polyurethane, polyester, and polypropylene, we tailor-made a variety of double-layered gloves, some of which were added with a gusset to accommodate the thickness of swollen fingers. In between the two layers were placed an inflatable air sac(s) shaped to cover the dorsum/palm and each finger individually. The inlet/outlet of air chamber was located at the wrist, either on the dorsum or on the radial side. The finished product measured approximately 20~25 cm long, 15~18 cm wide, and 2~4 cm thick. Inflation was accomplished by a hand-held pump as that used to inflate beachballs. Inflating the glove was more conveniently done by an assistant, but could also be done by the unaffected/contralateral arm/hand of the patient.

Results and Discussion: Five designs of air-compression gloved have been produced, and eights patients, primary and secondary lymphedema of upper extremity(s), tested so far with improved results. Optimal pressures pleasantly tolerated, varied from patient to patient, between 20~30 mmHg, with tendency of less pressure in finger chambers. Users applied the air-compression glove for 2~5 minutes, attained a rapid reduction in swelling of fingers and dorsum of hand, and could easily wear the compression garment(s), armsleeve and/or glove (Medicks and Y-20). Some patients wrapped their fingers and hand with conforming bandage of 2.5-cm width and 5-m length. Ten more patients are being tested and monitored on follow-up. It is anticipated that with this assist device, complications of chronic swelling in hand/fingers, such as hyperkeratosis, verrucosis, web lymphorrhea, numbness, and deformity, could be avoided and eliminated. Adding more ease of use, durability, and esthetic elements, we hope to manufacture the device and supply to the society of lymphology and people with lymphedema.

LYMPHOSCINTIGRAPHIC DEMONSTRATION OF "SPONTANEOUSLY-PHYSIOLOGICALLY OPENED" LYMPH TO NODE TO VEIN SHUNTING: REPORT OF 3 CASES

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Lymph to node to vein shuntings have been described now more than 40 years ago but these shuntings were observed ("forced") in the framework of radiological lymphographies. We report here 3 cases where the intradermal injection of 99m-Tc labaled nanosized HSA colloids in the external part of the edematous limb (0.4 ml in front of the great trochanter: the phase 4 of our protocol) performed (another day than our first 3 phases) in order to «force» the visualisation of the LN and/or to demonstrate the lymphatic collateralization pathways showed one "physiological" lymphatic drainage of the radio-colloids toward lymph nodes and from these lymph nodes, the transit of the radiocolloids in veins, their clearance from these veins followed by their accumulation in the liver.

REPRODUCTION OF RESULTS IN THE USA OF THE INTENSIVE TREATMENT OF LYMPHEDEMA USING THE GODOY & GODOY LYMPHATIC THERAPY TECHNIQUE

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This is the case of a 21-year-old male patient with congenital primary lymphedema. The patient had stage III lymphedema of the right leg, stage II lymphedema of the arms, scrotum and left hemiface with drooping of the corner of the mouth and breathing difficulties. He was invited to participate in a program of semi-intensive lymphedema treatment using the Godoy & Godoy technique in the Institute of Lymphatic Therapy, Sandy, Utah. The patient was assessed by perimetry and weight. The largest difference in perimetry between the affected leg (104 cm) and normal leg (38 cm) was 66 cm. The proposed treatment program included semi-intensive treatment of the leg, around 4 hours/day for ten days (excluding weekends. In the first 3 days, compression therapy was carried out using a knee-length stocking made of grosgrain. The aim was to reduce the volume of the calf muscle to first normalize this region, and thereafter, the entire leg. Lymphatic therapy was performed using an electromechanical device that performs plantar flexion and extension (RAGodoy®) combined with Cervical Stimulation Therapy. There was a reduction of the swelling of the face with improvements in breathing. The drooping of the corner of the mouth also showed improvement by the second day. Additionally there was a reduction in the leg perimetry within the first week, with the greatest circumference being 70 cm – a reduction of more than 50%, and a loss of 8 kg. In the second week, the greatest circumference was 58 cm (a reduction of more than 70%) and 16 kg. Although much retraction of the skin was evidenced, skin folds did form as illustrated Figures 1 and 2. The treatment program was continued at Thomas Allied Physical Therapy, an outpatient rehabilitation clinic in the City of Duarte, Los Angeles County, California. At this stage, the intensive treatment was reduced to a once weekly session with continuous assessments of the retraction of the skin until the limb was almost totally normalized.

Keywords: Lymphedema, lymph drainage, compression therapy, exercises.

ADAPTATIONS IN THE TREATMENT OF CONGENITAL LYMPHEDEMA CENTERED ON THE QUALITY OF LIFE

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Description case: This report describes the evolution, necessary adaptations and complications in the treatment of a 7-year-old child with primary congenital lymphedema. Description intervention: The clinical treatment of lymphedema was started in the first year of the patient's life and for five years she was only treated using the Godoy & Godoy technique of cervical stimulation. One year ago the patient was prescribed a compression stocking made from a cotton-polyester fabric because of a sudden increase in the lymphedema after she started to take growth hormone. Outcome and conclusion: The combination of cervical stimulation and a compression stocking were effective to keep the child's life relatively normal and performing all day-to-day and recreational activities.

PHYSICAL LIMITATIONS IN RESPECT TO DAILY ROUTINE ACTIVITIES AFTER THE SURGICAL TREATMENT OF BREAST CANCER

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Aim: The objective of this study was to evaluate physical limitations of patients with lymphedema after the surgical treatment of breast cancer to do daily routine activities.

Method: A group of 46 women in rehabilitation for lymphedema after the surgical treatment of breast cancer were evaluated in a randomized, cross-sectional, quantitative descriptive study in the Clinica Godoy, São José do Rio Preto. The mean age was 61.5 years. The types of surgeries performed and the numbers of chemotherapy and radiotherapy sessions were noted as were limitations in respect to dressing, eating and personal care and hygiene using a questionnaire with closed questions. Percentages were used for statistical analysis.

Results: A total of 52.1% of the participants had been submitted to modified radical surgeries with 91.3% being unilateral; 82.6% of the women did not reconstruct the breasts. Six to 10 sessions of chemotherapy were performed in 63.04% of the cases and over thirty sessions of radiotherapy in 71.3%. Most participants (60.86%) had difficulties to dress, 23.91% had difficulties to feed and 43.47% had difficulties for hygiene but none reported receiving guidance by professionals to carry out daily routine activities.

Conclusion: Lymphedema after the surgical treatment for breast cancer causes physical limitations to perform daily routine activities.

GODOY & GODOY COMPRESSION SLEEVE IN THE TREATMENT OF ARM LYMPHEDEMA: NEW CONCEPTS OF MATERIAL

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The aim of this study is to report on a new low-elastic textile that fulfils the criteria of fabrics for the manufacture of compression garments used in the treatment of lymphedema. A quasi randomized prospective study was performed to evaluate the evolution of Godoy & Godoy compression sleeves during the follow up of patients treated for arm lymphedema. Sixty-six patients with ages ranging from 35 to 83 years old and a mean of 58.8 years were included in the study. Diagnosis was by clinical evaluation and confirmed by volumetry defined as a difference of > 200 mL between arms. All the participants were submitted to treatment sessions once or twice weekly in an outpatients program. The material used for the compression sleeve is commercialized in Brazil under the name Gorgurão®. The evolution of the designs of sleeves was evaluated during the follow up of these patients. When great alterations in the pattern of sleeves were made, the patients were monit ored by weekly volumetric measurements. The criterion to maintain modifications in the design was that the hand did not present with edema. By the end of the study, the design of the sleeve was changed so as not to use compression therapy of the hands in 81.8% of the cases; 12.2% continued with compression of the hand, 3.03% stopped using compression completely and 3.03% used only a glove. Godoy & Godoy compression sleeves are an efficient option for compression in the treatment of arm lymphedema as they provide greater independence in respect to day-to-day activities.

EFFECTIVENESS OF NEURO-MUSCULAR TAPING (NMT) APPLICATION IN A CASE OF LYMPHEDEMA ASSOCIATED WITH RHEUMATOID ARTHRITIS

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Introduction: Extra articular features are usually found in rheumatological diseases sometimes with no correlation with the disease's activity in that moment. Lymphedema is one of these manifestations and it's defined as a tissue fluid accumulation with gradual onset of swelling of a limb. Because it is an unusual finding, the physiopatological explanation of this feature is still difficult to understand. A case using Punch Tape and Cure Tape to treat a lymphedema on upper arm that persists for 3 months, in a patient with systemic rheumatoid arthritis, with no identified cause and no associated systemic signs or symptoms. Both (Punch Tape and Cure Tape) tapes when applied correctly stimulate the superficial fascia and the neuro-lymphatic system, while stimulating lymphatic draining of haematomas and edemas.

Objectives: To assess the effectiveness neuro-muscular taping (NMT) treatment in lymphedema associated with rheumatoid arthritis.

Method: A 42 years old woman, with lymphedema on the superior right arm. Before applying the Cure Tape we realized the perimetry of both superior limbs. The same procedure was performed after 2 hours of application and after 4, 8, 12, 16 and 20 days after the first application. In the arm and forearm we applied "Punch Tape" from proximal of the ganglion zone to distal on the arm, and a second application from the lateral side of the elbow to the hand, both putted in a spiral way. In the hand we used "Cure Tape" in a fan shape way from distal to proximal of the wrist join. Both were applied without tension of the tape but with stretching of the skin.

Results: Eight data points were measured over the 20 day period. After one month, there was no difference in size between both superior limbs. When applied properly the tapes allow for 24 hours of lymphatic drainage system.

Conclusion: In a case of chronic lymphedema in rheumatoid arthritis that persists for three months, the application of Cure Tape and Punch Tape was effective in the reduction of the lymphedema within four weeks.

Keywords: Lymphedema, Rheumatoid arthritis, NMT , Cure Tape, Punch-Tape, Physiotherapy.

ADJUSTABLE COMPRESSION WRAP THERAPY: CASE REPORT

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Background: Inelastic multicomponent compression (ICM) bandages applied by specialized medical staff are standard of care for compression therapy of lymphedema of the extremities. Despite their efficacy, some traditional bandaging materials have disadvantages because they are bulky and must be applied by professional health care workers. New adjustable compression wraps (ACWs), which can be applied by patients themselves and, up to now, have been mainly recommended for the maintenance treatment phase of lymphedema, may be an important step toward the self-management of the initial treatment phase.

Patient: this is a case report concerning a 57 year old male patient with a recently new Total Hip Prothesis, post-traumatic lymhedema of the right leg and foot and severe arthrosis in both ankles and knees, suffering from cardial hypertension and cured from bladdercarcinoma after chemotherapy and surgery 5 years ago. Inguinal lymphnodes in the right groin were partly taken away.

Bandaging material and technique: 1 day of ICM gave impossibility of mobilisation of the leg (bulky and not fitting in a shoe), pain in the joints (restrictive feeling) in the right leg and itchy skin. He was not happy and would not go on with compression this way. Therefore we started ACWs, so that he could adjust and apply himself, fit in his shoe, start the mobilisation and revalidation of the THP and treat the lymphedema.

Measurement: we used the Kuhnke centimeter methode every 4 cm. (next time we can use the perometer or waterdisplacement methode, but we didn't have it up to now at OOFU.)

Leg volume reduction: see figure 1

Discussion: selfmanagement to apply a bandage, was for this patient not possible with ICM but was possible with ACW. He was very happy with the leg volume reduction which was probably succesfull with both techniques both not without professional help. The possibility of mobilisation and selfmanagement to adjust the ACWs was very helpfull for this patient.

Conclusion: This patient with moderate lymphedema of the right leg and foot and severe arthrosis and a Total Hip Prothesis , using ACWs, achieved a significantly more pronounced volume reduction after 24 hours than using IMC bandages. Patient is able to apply and adjust the device after being instructed in its use and wear. Autonomous handling of ACW seems to improve the clinical outcome and is a promising step toward the selfmanagement of the initial treatment phase.

EFFECTIVENESS OF AN ELECTRO-MEDICAL INSTRUMENT FOR LYMPHEDEMA

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Introduction: Lymphedema is an accumulation of fluid, rich in protein, in the interstitial spaces that produces swelling. Finally, lymphedema leads to increased risk of infection and decreased mobility.
The lymphedema may be primary or secondary. In the first case is due to a genetic anomaly of lymphatic system. Secondary lymphedema often is produced after surgery or radiation or trauma or infection. The main treatment for lymphedema is: complete decongestive physical therapy (CDP). That consists of: meticulous skin care, manual lymph drainage, compression therapy (multilayer bandaging, compression garments).

Aim: Aim of the study was to verify the effectiveness of a new system (Flowave) for the treatment of lymphedema of the lower limb.
It is based on electric microcurrents and vacuum mechanism, wich produces mechanical waves wich are able to interfere in the biological processes of the organism tissue.

Materials and Methods: We performed an observational study on 12 patients with primary or secondary lymphedema, average age of 59 (± 19), wich 11 female (91%). Average BMI was 29.5 (± 8.5). We treated patients with new electro-sound-vacuum device for 3 days a week for 2 week. The treatment included temporary compression garments. Circunference tape measurement were calculated before and after the treatment.

Results: Before treatment, the ankle circumference (AC) of symptomatic leg was (mean ± standard deviation) 16.3 ± 15.9% (4.7 ± 5.6 cm) greater than those of unaffected leg (30.6 ± 8.6 vs 26.9 ± 3.5 cm) of unaffected leg (p = 0,23).

Conclusion: Preliminary data of the study shows that the new electro-medical device, that produces sound waves which have the ability to put into resonance the molecules composing the lymph, to break up them and move them along physiological canals towards minor resistance way, is effective to reduce lymphatic edema of the leg, is also and may reduce the time of treatment. Obviously the number of patients in this study is too small and are need other study to prove these results.

INTENSIVE TREATMENT OF BREAST CANCER-RELATED LYMPHEDEMA IN PATIENTS WITH NEUROLOGICAL INJURIES

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The aim of this study is to report on the intensive treatment of lymphedema resulting from breast cancer therapy in a 51-year-old patient who experienced loss of muscle strength of the arm. This patient developed lymphedema after a mastectomy, axillary resection, chemotherapy and radiation therapy to treat breast cancer. When the patient arrived at the Clinica Godoy for treatment in August 2012, she was evaluated using bioimpedance and volumetry before and then every day during treatment. Intensive treatment was carried out for six hours per day on three consecutive days employing Manual Lymphatic Therapy, Mechanic Lymphatic therapy (RA Godoy®) and a grosgrain compression sleeve with daily adjustments to the size. In the initial physical examination the patient reported a score for the intensity of pain of 10 (Pain Scale), paresthesia in the entire arm and there was a 577-mL difference in volume due to edema compared to the contralateral limb. On Treatment D ay 1 the paresthesia was reduced using the grosgrain sleeve and Mechanical Lymphatic Therapy; on Treatment Day 2, the pain had dropped to an intensity of 7 (Pain Scale); on Treatment Day 3, the pain decreased to an intensity of 5 (Pain Scale) and the difference in the volume of edema was only 193 mL. The patient returned home but followed the recommendations and treatment program used at the clinic. Monitoring was by routine assessments and guidance on the importance of using the grosgrain sleeve and Mechanical Lymphatic Therapy to maintain the results and prevent neurological damage.

SYNERGISTIC EFFECT OF ELASTIC STOCKINGS TO MAINTAIN VOLUME LOSSES AFTER MECHANICAL LYMPHATIC THERAPY

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The objective of the current study was to assess whether Venosan® elastic stockings have a synergistic effect in the maintenance of results after Mechanical Lymphatic Therapy. Eleven patients with grade II lymphedema of the legs, regardless of cause, were evaluated in the Clinica Godoy between September and November 2012. The participants' ages ranged from 53 to 83 years old with a mean of 65.1 years. Two groups were formed with Group I using Venosan® elastic stockings and Group II not using any type of compression therapy. Evaluations of the lymphedematous legs were performed before and after each drainage session using bioimpedance. Patients who wore elastic stockings had a greater volume reduction than those who did not wear stockings (unpaired t-test: p-value < 0.001). Elastic stockings have a synergistic effect to maintain volume reductions achieved with lymph drainage.

INTERFERENCE OF MASTECTOMY ON THE QUALITY OF LIFE

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The aim of the current work was to evaluate the influence of total mastectomy on the quality of life. Thirty-two patients submitted to mastectomy associated with axillary lymph node dissection were evaluated. The patients were allocated to two groups: 17 patients underwent quadrantectomy and 15 underwent total mastectomy. All participants signed written consent forms after being informed about the nature of the work. Subsequently, they were requested to complete the SF 36 questionnaire that evaluates physical capacity, physical aspect, general health state, pain, vitality, social aspect, emotional aspect and mental health. Quality of life was evaluated and the influence of mastectomy on the two groups was compared. For statistical evaluation the non-paired t test was utilized for items with normal distributions on the Gauss curve and the Mann-Whitney test for items with non-normal distributions. An alpha error of 5% was considered acceptable (p-value < 0.05). Patients' ages varied between 29 and 73 years with a mean 58.3 years. The quality of life was affected in respect to vitality in the group of patients submitted to total mastectomy, as identified using the Mann-Whitney test (p-value = 0.04). A surgical approach to breast cancer treatment interferes in the quality of life of patients.

RAPID REDUCTION OF ELEPHANTIASIS IN AN ADOLESCENT WITH INTENSIVE TREATMENT

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The treatment of congenital lymphedema in children is similar to treating lymphedema in adults; the technique must be adapted to the reality of each case and at each stage of the individual's life. Lymphedema in teenagers brings a series of physical and psychological disorders that can affect the quality of life. Intensive treatment has been proposed by Godoy & Godoy as the routine therapy for grade III lymphedema but this approach can be used for other grades of lymphedema. The use of intensive treatment for grade III lymphedema in a teenager has not been described in the literature before. The aim of this study is to report on the evolution and the difficulties of this approach in young people. Intensive treatment consisting of 8-hour daily sessions was proposed including Manual Lymphatic Therapy (Godoy & Godoy) Mechanical Lymphatic Therapy (RAGodoy®) and a compression mechanism (an inelastic grosgrain stocking developed by Godoy & Godoy). The volume of the edema was reduced by 60% in the first week with further reductions in following weeks. The limiting factor in this approach is the excess of skin but this retracts with time. The intensity of treatment must be adapted to cater for the excess of skin.

ELEPHANTIASIS NOSTRAS VERRUCOSA IN A PATIENT WITH AND LIPEDEMA AND LIPOLYMPHEDEMA

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Elephantiasis nostras verrucosa is a rare group of cutaneous changes comprising dermal fibrosis, hyperkeratotic, and verrucous and papillomatous lesions secondary to chronic non-filarial lymphedema. The aim of this study is to report the case with association of lipedema with elephantiasis nostras verrucosa.

LYMPHOSCINTIGRAPHIC EVALUATION OF MANUAL LYMPHATIC THERAPY: THE GODOY & GODOY TECHNIQUE

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The objective of this study was to evaluate the transport of radiotracers in lymph collectors during Manual Lymphatic Therapy. Five locations on the thigh along the path of lymph collectors were assessed in four male and two female patients with leg lymphedema by using lymphoscintigraphy before and after Manual Lymphatic Therapy. The ages of the patients, treated in Hospital de Base in Sao Jose do Rio Preto, ranged from 42 to 64 years old with a mean age of 51.2 years. Consecutive patients with grade II leg lymphedema, regardless of etiology, were enrolled in the study. Patients with active infection and weight greater than 130 kg were excluded. Patients were submitted to Manual Lymphatic Therapy, which consists of manual compression which is slid along the skin in the same direction as the lymphatic vessels. Two dynamic studies were performed; the first was over 40 minutes (3 images per 10 minutes) which was immediately followed by an entire body scan. A seco nd dynamic evaluation was performed taking images at 10-second intervals over two minutes during Manual Lymphatic Therapy. The number of particles was quantified at each of the points. The paired t-test was used for statistical analysis with an alpha error of 5% (p-value < 0.05) being considered statistically relevant. The results show a statistically significant difference in the deposition of particles in the areas before and after treatment (two-tail paired t-test: p-value < 0.0001). Manual Lymphatic Therapy improves the transport of radiotracers in lymph collectors.

LYMPHEDEMA POST-BREAST CANCER SURGERY: A POPULATIONAL STUDY

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Aim: The aim of this study was to evaluate lymphedema post-breast cancer surgery in a small town in Brazil.

Design: Study census-type populational of the town of Palmares Paulista, Brazil in the period from September 2008 to May 2009.

Method: The prevalence of lymphedema post-breast cancer surgery was evaluated in 1583 women. Home visits were made on Saturdays and Sundays by a physician, physiotherapists and an occupational therapist. In a single visit, female residents were questioned about surgical treatment of breast cancer, time of surgery, outbreaks of erysipelas and the presence of edema after the surgery. A diagnosis of edema was reached from the patients' personal feeling that the arm became swollen after treatment.

Results: Of the 1583 women who participated in the study, 32 had been submitted to the surgical treatment of breast cancer with axillary dissection, with 12 (37.5%) reporting subsequent edema of the arm. Only one episode of erysipelas or cellulitis was reported. The time from surgery varied between 2 and 12 years with a mean of 7 years.

Conclusion: Patients submitted to breast cancer surgery suffer a high rate of lymphedema but a low incidence of arm infections.

VOLUME VARIATIONS AND EVOLUTION OF EDEMA DURING LYMPHEDEMA TREATMENT ASSOCIATING ELASTIC STOCKINGS AND MECHANICAL LYMPHATIC THERAPY (RAGODOY)

PEREIRA DE GODOY J.M., LOPES PINTO R., LIBANORE ZUCCHI D., BUZATO SILVA E., GUERREIRO GODOY M. de F.
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Compression mechanisms are essential in the treatment of lymphovenous diseases as they help to reduce the swelling and to maintain the results. The objective of the current study was to evaluate Volume variations and evolution of edema during lymphedema treatment associating elastic stockings and Mechanical Lymphatic Therapy (RAGodoy®). The daily evolution of treatment for grade II lymphedema was evaluated in a prospective clinical study. The 14 legs of seven women with bilateral edema of whatever cause were treated using the RAGodoy® Mechanical Lymphatic Therapy device and Venosan® 20/30 knee-length elastic compression stockings for two weeks. The volume of each leg was evaluated before and after each daily treatment session by bioimpedance. The study was approved by the Research Ethics Committee of the Medicine School in São José do Rio Preto (FAMERP). The paired t-test was used for statistical analysis, with an alpha error of 5% (p-value < 0.05) being considered significant. Positive and negative variations in the volume of the legs were detected compared to the previous day, but overall the treatment still reduced the volume.

SURGICAL PROCEDURES DURING HOSPITALIZATION FOR ERYSIPELAS

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Medicine School of São José do Rio Preto-FAMERP, Department of Cardiology and Cardiovascular Surgery, São José do Rio Preto, Brazil

The aim of the current study was to evaluate the relationship between surgical procedures and patient characteristics of individuals hospitalized with a diagnosis of erysipelas. The surgical procedures performed on patients hospitalized with erysipelas and the association with gender, diabetes mellitus, hypertension, and chronic venous insufficiency were retrospectively evaluated in a quantitative cross-sectional study. The Fisher exact test and logistic regression were utilized for statistical analysis with an alpha error of 5% (p-value < 0.05) being considered acceptable. In this period 428 patients were hospitalized with erysipelas with 39 (9.1%) being submitted to surgical procedures. In total 51 procedures were performed including 7 major amputations and 11 minor amputations and 15 debridements. Eighteen patients were submitted to more than one procedure (debridements) .Logistic regression demonstrated an association between surgical procedures and diabet es (p = 0.002), venous insufficiency (p = 0.02) and leg ulcers (p = 0.007). The comorbidities such as diabetes, leg ulcers and chronic venous insufficiency are factors predictive of surgical procedures in patients hospitalized with erysipelas.

FACTITIOUS LYMPHEDEMA OF THE ARM: CASE REPORT AND REVIEW OF PUBLICATIONS

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The aim of this study is to report a case of factitious lymphedema of the arm and related lymphoscintigraphic aspects. The case of a 36-year-old patient is reported who started to present with pain, in the 3rd finger of the right hand three years prior to this report, which she associated with her work. Joint effusion was identified and treated using a splint that restricted blood flow leading to edema of the distal third of the forearm. Since then the patient was treated however her condition worsened resulting in edema of the entire arm. Subsequently she was referred to our service. A physical examination identified a restrictive band in the axillary region of the arm that delimited the edema. Volumetry and lymphoscintigraphic examinations of the limb were performed. The lymphoscintigraphy demonstrated acceleration of the flow in the affected limb and dermal reflux. Clinical treatment with removal of the restriction allowed a rapid reduction in the volume of the limb.

CONSIDERING THE HYPOTHESIS OF THE PATHOPHYSIOLOGY OF CELLULITE IN ITS TREATMENT PEREIRA DE GODOY

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Aim: The aim of this study was to evaluate perimetric reductions in the clinical treatment of cellulite (aesthetics) using the Godoy method in a randomized retrospective clinical trial.

Method: The medical records of 150 patients treated for cellulite in the period from 2006 to 2011 in the Clinica Godoy were revisited. Treatment comprised manual and mechanical lymph drainage and cervical stimulation for one hour per day over 10 days. The paired t-test was used for statistical analysis, with an alpha error of 5% (p-value < 0.05) being considered acceptable. This study was started after being approved by the Research Ethics Committee of the Medicine School in São José do Rio Preto (FAMERP – n° 395-2010), Brazil and after being registered as a clinical trial.

Results: The mean reduction of the 150 patients was 3.81 ± 2.76 grams (p-value < 0.0001; 95% confidence interval: 3.408-4.223).

Conclusion: A significant reduction in size was seen with the clinical treatment of cellulite giving an improvement in the physical appearance. Pathophysiological mechanisms such as regional skin lymphostasis seem to be involved in the formation of cellulite.

CONTROL OF IDIOPATHIC CYCLIC EDEMA IN LYMPHEDEMA

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Idiopathic cyclic edema is common in women and may be an aggravating factor in lymphedema. It makes treatment of lymphedema more difficult due to changes in capillary permeability that may overload the lymphatic system. Here we report on five female patients, aged 29 to 52 years, with idiopathic cyclic edema. Two had lymphedema and three had primary grade II lipo-lymphedema. The diagnosis of cyclic edema was based on physical aspects of the patients including a change in weight of over 800 grams during the day and swelling of fingers only in the morning characterized by difficulty in removing rings. The patients were requested to weigh themselves between 7:00 and 8:00 a.m. and again at 6:00 to 8:00 p.m. under similar conditions such as wearing the same clothes and emptying their bladder before weighing. Idiopathic cyclic edema was defined in patients with variations of greater than 800 grams. A therapeutic trial was conducted using 75 mg of aminaphtone 3 times daily. The patients were asked to drink water only when they were really thirsty and so not to force water ingestion. There was a reduction in edema in all five cases and weight variations over the day dropped to less than 300 grams. The diagnosis of cyclic edema had not been made before the beginning of lymphedema treatment in two of the cases and there had been difficulties to reduce the edema and maintain the results in these patients. In conclusion, the control of idiopathic cyclic edema is of fundamental importance in the treatment and control of lymphedema and aminaphtone is effective in these patients.

PREVALENCE OF ANXIETY IN WOMEN UNDER TREATMENT FOR BREAST CANCER-RELATED LYMPHEDEMA

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Patients with breast cancer-related lymphedema face a series of psychological and physical difficulties that can lead to depression. The objective of the current study was to evaluate, using the Beck depression scale, the prevalence of depression in women under treatment for lymphedema. In 2012, 32 consecutive patients with breast cancer-related lymphedema from the Clinica Godoy were enrolled in this study. Their ages were between 45 to 76 years with a mean of 60.5 years. The inclusion criterion was breast cancer-related lymphedema with other types of lymphedema being excluded. The Beck depression questionnaire was applied. This test classifies depression as minimal, mild, moderate and severe. Descriptive analysis of the data was used in respect to the prevalence of depression. Minimal depression was detected in 43.7%, mild in 28.0%, moderate-to-severe in 15.6% and severe in 12.5% of the patients. In conclusion, severe depression may be present in these patien ts which may hinder the patient's ability to cope with the disease.

Tuesday, 17th September 2013

H. 8.00 - 11.00 a.m.

Session 4
Lymphatic malformations

Aula Magna

President

Papendieck C. (Argentina)

Chairmen

Mattassi R. (Italy) - Lee B.B. (USA) - Forner-Cordero I. (Spain)

TRUNCULAR AND EXTRA-TRUNCULAR MALFORMATIONS

LEE B.B.
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Lymphatic malformation (LM) is one of the congenital vascular malformations (CVMs) as the outcome of the developmental arrest during two different stages of lymphangiogenesis: extratrucular lesions from the "earlier" stage of lymphangiogenesis and truncular lesions from the "later" stage. When we include both truncular (lymphedema) and extratruncular (lymphangioma) lesions in one category of the LM, LM becomes the most common form of CVMs. Nevertheless, the LM is the most neglected form of CVM, either as independent (predominant) form or as combined form. The majority of LM exists as an independent form of CVM, either as primary lymphedema representing "truncular" LM lesion or cystic/cavernous lymphangima representing "extratruncular" LM lesion. But, by the nature of vascular malformation, not only both LM lesions can develop together but also develop with other kinds of CVM: capillary malformation , venous malformation, or AV malformation (e.g. Klippel-Trenaunay Syndrome; Parkes-Weber Syndrome). Therefore, the LM is a very confusing condition of the CVM, when truncular lesion (primary lymphedema) and extratruncular lesion (cystic/cavernous lymphangioma) should exist together. Hence, a proper knowledge on the embryological subclassification of the CVM by Hamburg Classification is mandated for the contemporary management of the LM. A group of the CVMs originated from the "earlier" stage of embryogenesis was designated to the "extratruncular" type based on their unique characteristic originated from the mesenchymal cells/ angioblasts. This group maintains such unique embryological property of "evolutional potential" that it would grow when the condition is met with adequate stimulations (e.g. menarche, female hormones, pregnancy, surgery, trauma). But another group of the CVMs as the outcome of defective development along the "later" stage of the embryogenesis was designated to the "truncular" type since they no longer possess this power of natural progress/growth when stimulated on contrary to the "extratruncular" type. Another words, the extratruncular lesions represent "premature" embryonic tissue remnant which is supposed to be involuted before reaching to the second stage to form the vascular trunk but remained through the rest of life. Therefore, the extratruncular LM lesions remain as an diffuse infiltrating lesion known as "cystic/cavernous lymphangioma" while clinically normal lymphatic system provides normal to adequate function in general. The truncular LM lesions are the outcome of the defective development of new axial/truncal lymphatic vessel so that they remain as a form of aplasia, hypoplasia, and/or hyperplasia resulting in the condition of obstruction or dilatation of lymphatic vessels and/or lymph nodes, causing various conditions of primary lymphedema: congenital, precox or tarda. Hence, "primary lymphedema" and "lymphangioma" are both sides of the same coin with inseparable relationship, sharing same background of common inheritance of embryologic defects and subsequently new genetic information for the foreseeable gene therapy in near future (e.g. gene mutations: *FLT4, FOXC2,* and *GJC*).
The prospect for the gene therapy based on the gene alterations is now brighter than ever:
- Approach to localize and characterize the responsible mutations or regions of chromosomal imbalance in the human genome.
- Cloning of the gene responsible for the "lymphangiogenesis" and identification of the defective genes involved in abnormal lymphangiogenesis.
  - Prenatal diagnosis of the affected child
  - Mutational screening of population at risk
- Therapeutic implementation to embryonic development and also abnormal function in adult through the modification of gene.

Conclusion: "Primary lymphedema" by truncular LM and "lymphangioma" by exratruncular LM are both sides of the same coin. They are inseparable with common inheritance to share same prospect of genetic approach for the future management.

LYMPHATIC MALFORMATIONS COMBINED WITH OTHER VASCULAR DEFECTS: HOW TO MANAGE THEM

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Vascular malformations are classified in venous, arteriovenous, lymphatic, capillary and combined defects. Lymphatic malfomations may combine more often with venous defects and lesser frequently with arteriovenous malformations. Venous defects may be areas of dysplastic vessels infiltrating tissues, called extra truncular forms or defects of the main veins, the so called truncular defects. Arteriovenous malformations are areas of a-v fistulas infiltrating tissues. Diagnostic procedures are decisive to recognize the combined forms and should be complete including evaluation of lymphatic, venous and arterial systems. After clinical examination diagnostic should proceed step by step. First examination is duplex scan which should give data about morphology, extension and hemodynamic of the defct; it should be performed by an expert in vascular malformations. According to duplex data, next examination could be MR, CT, lymphoscintigraphy and others. After diagnosis is completed, first defect to treat should be the most discomfortable for the patient. Most common are pain due to venous extratruncular defects (because of in site thrombosis) or to lymphatic extratruncular malformations due to inflammation. Surgical resection, occlusion by alcohol or other sclerosing methods and laser procedures are available. Avm May b treated by embolization or surgical al resection. Combination of the procedures are possible.

NEW DIAGNOSTIC AND TREATMENT APPROACHES FOR NEONATAL IDIOPATHIC LYMPH-RELATED ASCITES AND PLEURAL EFFUSION

HARA HISAKO
The University of Tokyo Hospital, Department of Plastic and Reconstructive Surgery, Tokyo, Japan

Introduction: Neonatal idiopathic chylous ascites or pleural effusion are rare diseases. Patients lead to death because of respiration failure, bad nutrition, or infection, when the effusion continues. No established diagnostic or treatment method is available for these diseases. We tried to elucidate their pathology using indocyanine green (ICG) lymphography. Subsequent application of lymphaticovenous anastomosis (LVA) in their limbs achieved a favorable outcome in some of them.

Materials and Methods: We performed ICG lymphography for 8 patients who had idiopathic chylous ascites or pleural effusion. All of them had been treated by pediatric doctors, administrating corticosteroid and somatostatin analog, but their effusion continued. We injected ICG intracutaneously at the web space of both feet and hands and observed the findings immediately after the injection and several hours later. Based on the findings of ICG lymphography, we performed LVA for 5 patients. One was male and 4 were female. Their age was 1~3 months old. Operations were under general anesthesia and about 1~2 cm incisions were made in their limbs. We anastomosed collecting lymphatic vessel and subcutaneous vein using operation microscope and 11-0 or 12-0 nylon sutures. Sometimes abnormal collecting lymphatic vessels were found. If we needed to trim some length of lymphatic vessel in the anastomosis, we took it for pathological examination.

Results: LVA was effective for 2 of them (complete cure), partially effective for 1 (effusion decreased), and without effect for 2 (remained the same).

Conclusion: ICG lymphography and LVA, which are usually used in lymphedema treatment and low invasive, have a possibility of opening a new page in idiopathic chylous ascites or pleural effusion treatment.

PRESENT ROLE OF LYMPHANGIO-CT (LAG-CT) IN THE DIAGNOSIS OF CHYLOUS DISORDERS

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Standard lymphangiography (LAG) uses liposoluble ultrafluid contrast (Lipiodol Ultrafluid) injected after isolation and cannulation of the lymphatics of the dorsum of the foot with microsurgical technique. If coupled with a CT scan (Lymphangio-CT, LAG-CT), LAG allows a more accurate assessment of disease extension, as well as the site of the obstacle and source of chylous leakage

The main indications to the use of LAG-CT are represented by pre-operative assessment of patients affected by primary, post-traumatic and post-operative chylostatic disorders.

The isolation of the lymphatic collector is performed using operative microscope magnification.

Once the contrast is injected entirely, the patient undergo multi slice CT examination. LAG-CT brings about precise informations about the site of chylous dysplasia and/or fistulas, since it supplies precise relations between lymphatic-lymph nodal structures and skeletal apparatus.

In the literature it is reported that lymphangiography can have also sclerosing effects on lymphatics, obtaining the closure of lymphatic fistulas in patients with chylous ascites. In our experience which includes 52 patients with chylous disorders studied by LAG-CT, none of these patients showed resolution of the pathology after lymphangiography. Thus, based on our experience, lymphangiographic sclerosis effect has to be studied better. LAG-CT represents presently the only diagnostic investigation that can supply precise topographic information about the site, cause and extension of chylous pathology and allow to plan proper therapeutic procedures.

THE VALUE OF MULTI-DETECTOR COMPUTED TOMOGRAPHY DIRECT-LYMPHANGIOGRAPHY IN PULMONARY LYMPHANGIOLEIOMYOMATOSIS

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Purpose: The study was to evaluate the usefulness of MDCT direct-lymphangiography in the diagnosis of pulmonary lymphangioleiomyomatosis (PLAM).

Methods and Materials: We collected 32 patients with pathologic/clinic-proven PLAM examined by direct-lymphangiography MDCT. Two independent observers analyzed CT findings and recorded how frequently the imaging features were seen on direct-lymphangiography MDCT.

Results: The important CT patterns of intrathoracic abnormalities of PLAM were abnormal distribution and accumulation of contrast medium in mediastinal and/or bilateral peribronchovasucular tissues (32/32 patients, 100%), the dilatation and proliferation of lymphatic channels in mediastinum and/or pleura (32/32, 100%), interlobular septal thickening (30/32, 94.8%), chylous pleural effusion (22/32, 68.8%), parietal and visceral pleural thickening and extra-pleural soft tissue thickening (18/32, 56.3%), repeated pneumothorax (12/32, 37.5%), multiple small lymphadenopathy in mediastinum and axilla (20/32, 62.5%), multiple lung thin-walled cysts (32/32, 100%). The extrathoracic abnormalities included retroperitoneal lymphatic vessels dilation and return of lymphatic fluid(32/32, 100%), retroperitoneal solid cystic lesions or abdominal LAM (18/32, 56.3%), ascites or abdominal effusion (8/32, 25%), hamartoma in liver and kidney (12/32, 37.5%), cervical involvement or thoracic duct obstruction(30/32, 93.8%), splenic lymphangiomas (4/32, 12.5%), bone or vertebral lesions(9/32, 28.1%).

Conclusion: PLAM probably is a pulmonary focal special appearance associated with systemic lymphatic abnormalities caused by thoracic duct obstruction or lymphatic dysplasia. Typical cystic lesions in PLAM maybe a secondary abnormalities with pulmonary lymphatic abnormalities. Direct lymphangiography MDCT can observed clearly the lymphatic abnormal return and the dilatation and proliferation of lymphatic channels in thorax and abdominal viscera and is quite helpful in diagnosis of PLAM.

AN UPDATE ON LYMPHODYNAMICS IN THE FETUS AND NEWBORN

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Servizio di Patologia e Terapia Intensiva Neonatale, Dipartimento di Pediatria, Università di Genova, Istituto G. Gaslini, Genova, Italy
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Our purpose is to discuss the role of lymphatic system in the complex mechanism that regulates volume in the fetus and newborn as well as the regulation of fluid distribution between the plasma and interstitial fluid, while placing special emphasis on the role the lymphatic system plays in mediating and maintaining this distribution, both during the fetal life, and during the changes occuriring in the newborn at birth to allow the infant to survive outside the womb and adapt to life in a new environment. Body fluid is distributed among three major fluid spaces: plasma, interstitial fluid, and intracellular fluid. The distribution of fluid in each of these compartments is dramatically different in the fetus and newborn compared to the adult. In addition, the amniotic fluid that surrounds the fetus may also be considered an extension of the extracellular space of the fetus. In our presentation we will discuss recent topics in this difficult field.

CLASSIFICATION OF LYMPHATIC -SYSTEM MALFORMATIONS IN PRIMARY LYMPHŒDEMA BASED ON MR LYMPHANGIOGRAPHY

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Department: Lymphology Center of Department of Plastic & Reconstructive Surgery, P.R., China

Objectives: The study aims to investigate lymphatic-system malformations and proposes a classification of primary lymphoedema based on comprehensive imaging data of both lymph vessel- and lymph-node abnormalities.

Materials and Methods: A total of 378 patients with primary lymphoedema of the lower extremity were examined with magnetic resonance lymphangiography (MRL) using gadobenate dime glumine as contrast agent. Lymph vessels and drainage lymph nodes were evaluated, leading to the proposal of the classification of primary lymphoedema and the relative proportions.

Results: A total of 63 (17%) patients exhibited defects of the inguinal lymph nodes with mild or moderate dilatation of afferent lymph vessels. A total of 123 (32%) patient s exhibited lymphatic anomalies as lymphatic aplasia, hypoplasia or hyperplasia with no obvious defect of the drainage lymph nodes. The involvement of both lymph vessel- and lymph-node abnormalities in the affected limb was found in 192 (51%) patients. The primary lymphoedema was classified as three major types as: (1) lymph nodes affected only;
(2) lymph vessel affected only with three subtypes and (3) both lymph vessel and lymph node affected with subgroups.

Conclusions: A comprehensive classification of lymphatic-system malformation in primary lymphoedema is proposed, which clearly defines the location and pathologic characteristics of both lymphatics and lymph nod e and may lead to further study of the aetiology as well as rational treatment of the disease.

HOLISTIC THERAPEUTICAL APPROACH IN LYMPHATIC MALFORMATIONS IN PEDIATRIC

PAPENDIECK C.
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Lymph appears, and must flow. A life sign, expression of cell work of the vertebrates. It runs through three hemi circuits – two with systemic lymph and one with lympha chyle – between jejuno ileon and the Pecquet cistern. Malformations are not lymphatic, they are on of the lymphatic system.. They habe been classified , based on the predominant involved vascular structure(modified Hamburg Classification) as predominant lymphatic malformations, and as anatomical/embriologycal subclassification, as extratruncular forms (diffuse, infiltrating and limited , localized). The lymphatic system is a system, because multi structural, and therefore multi functional. The two most important elements are de Vessels (+ of 150 m collectors) and lymph nodes (400 to 700 units) The function of the lymphatic endothel, has particular expression at the initial interstitial capillaries and at the central area of the lymph nodes. In the practice, it is possible to identify the anatomic kind and level of the lymphatic vascular malformation as liymphangio dysplasias (LAD I) such as hipoplasia, hyperplasia, avalvulation, dysvalvulation, lymphangioleiomiomatosis, stenosis, lymphangiectasia, lymphangiomtosis, lymphangioma, lymphangioneurosis(), and or limphadeno(nodal)dysplasia, such as hipoplasia, hyperplasia, fibrosis(peripheral, central and global),lymphangiomatosis, intranodal venous malformation, nodal hemangiomatosis(or intra nodal hemangioma. Apart from this, the meaning of the failure of other 2° Lymphatic organs, is rarely described, eg the agenesia of the spleen; the hyperplasia of the Thymus, or the bone marrow aplasia or dysplasia, etc.Dysfunction of the lymphatic system can be expressed as 1. Lymph collection or effusion of systemic interstitial lymph or chyle; 2. Cysts, 1° or 2° with systemic interstitial lymph or chyle. 3. Reflux of systemic lymph or chyle, to the interstitial space, with edema, or to the cutaneous level or cavities, with internal or external fistulas. 4. Edema: primary lymphedema with interstitial lymph compounds. Chyle collections, or its reflux, always mean canallicular malformationas, of the chylus system or the systemic vessels, or both(eg be4cause avalvulation and others)Prymary lynmphedema is duo to LAD I / II and /or dysfunction of the endothelium of the initial lymphatics, capillaries, at the interstitial or nodal level. Agenesia of some lymphatica system segments, is not really a malformation; an important extended agenesia is not compatible with the life. Any LADs with interstitial hypertension, leads to an oncologycal risk. Steward Treves Syndrome.. That needs only time. Any LADs with interstitial lymph collection, and hypertension, needs vascular rehab,- if possible, and a and a by pass of the load. All lymph collection, need a surgical shunt or its resection if endothelized. Or its sklerotherapy (Picibanil, OK 431, Bleomicyn and others,) Avaiable valves- Denver, Degni, LeVeen,do not have pediatric measures. All multi micro cystic malformations, lymphangiomatosis, is surgical. If this is not , at the skin laser. Sirulimus, Rapamycin (mTOR) is an not well evaluated alternative. In extensive not accessible areas, sysemic Sildenafil, if the compromise is lymphovenous, or Propranolol, if hemangiovenous... All lymph collections, require firs prevention with a proper diet (Ceres)-ow chain triglyceride diet. In pediatrics, this can not be permanent. That is why a surgical approach is necessary in general. The worst is the ligature of the thoracic duct.ll. All primay lymphedemas- they are not idiopatic!- requires first lvacular rehab, Vodder/Foeldi/Leduc, Manula drainage, in pediatrics with special considerations. A baby is not a small body! The drainage solves a time, a momet, but not the malformation. Therefore, they requires in general and according the degree(0 to 3) a new xourse for the lymph flow. Available techniques are according to Olszewski, (first), Becker, Campisi. Koshima is not possible with local anesthesia, and other problem is the needed time. A Cocktail is an valid alternative in some situations. All edemas needs non elastic therapeutical supports, measured, manufactered for each children, there are no two similar samples! Non elastic multilayer bandages are not so easy to use, and difficult to apply a long time, and not during the night. LAM and lymphangiomatosis, do not respond to generally proposed rules... There ar no other general indications, but there are common aspects for a precise rehabilitation. This considerations needs experience to decide what and when to do or not to do... To make decisions, in general, are necessary a anatomo pathologycal basis, to define the extension of treatments, with the significance of a surgery... In general, the pediatric clinical experience defines the necessity of treatment.

Tuesday, 17th September 2013

H. 11.15 a.m. - 1.15 p.m.

Session 5

Imaging in lymphatic diseases

Aula Magna

President

Bourgeois P. (Belgium)

Chairmen

Ningfei L. (China Rep.) - Mango L. (Italy) - Leong S. (USA)

LYMPHOSCINTIGRAPHY AND CLINIC: A FORCED TWINNING!

BOURGEOIS P.
Service of Nuclear Medicine and Unit of Lymphology, Group R&D Clinical Applications of Fluorescence Imagings, Institute Jules Bordet, Université Libre de Bruxelles, Brussels, Belgium

The tittle of the lecture that the organizing committee proposed me to present might appear at first glance somewhat surprising to the readers.
However and as a first approach of the "problematics", it has to be taken in mind that for the specialists in Nuclear Medicine who have to investigate the lymphatic system, the "simple" word "lymphoscintigraphy" raises in fact many practical-technical questions to which they have to give "their" answers (Which product? Which volume? Which activity? Injected where? How? Which kind-s of imaging? Static? Dynamic? Planar? Tomographic? Combined with a CT? When?...). When they have only to image the "sentinel lymph nodes" in cancers (the most frequent request to which they are usually faced today), the answers to these "basic" questions can be (relatively) "simple" (even if they imply in many circumstances local choices which may also be largely matter of discussions with the clinicians...). Additionally, the images that they obtain are (usually) easy to interpret.
On the other hand and when a clinician asked to his-her specialist in Nuclear Medicine a "lymphoscintigraphy" to investigate any other clinical situation in which he-she (the clinician) think (rightly or not) that the lymphatic system either may be, or is implied, he and/or she (the specialist in Nuclear Medicine) is-are no more faced to the "simple" realisation of imagings "easy" to perform (and to interpret) but to the "clinic" in its "holistic" definition. The "nuclearist" will then have to adapt him-her-self and their investigational procedures not only to give the right answers to the clinician's question-s but/and sometimes when he will be faced to the patient himself or herself. In these cases, "lymphoscintigraphy" can be no more performed as one (kitchen-cooking) "recipe" but "lymphoscintigraphy and clinic have to be forcedly twinned". Additionally, this "forced twinning" between "clinic" and "lympho-scintigraphy" becomes in many circumstances mandatory to interpret the results of the lymphoscintigraphic examinations. These different aspects of this "forced twinning between lymphoscintigraphy and clinic" will be the matter of my lecture and will be illustrated by clinico-lymphoscintigraphic examples during this lecture.

CT AND MRI FINDINGS OF SKELETAL ABNORMALITIES ASSOCIATED WITH PRIMARY LYMPHATIC DYSPLASIA

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Purpose: To discuss the imaging characteristics of skeletal abnormalities associated with primary lymphatic dysplasia.

Methods and Materials: We retrospectively analyzed the imagings of 50 patients with skeletal abnormalities in 692 cases with primary lymphatic dysplasia. All the patients underwent direct lymphangiography and CT lymphangiography(DLCT) and 23 cases underwent MRI. Most patients(n=41) were proved by histopatholoy and nine patients proved clinically, including lymphangioma (n=19), lymphangiectasia (n=15), diffuse pulmonary lymphangiomatosis (n=10), and pulmonary or abdominal lymphangiomyomatosis (n=6).

Results: Solitary skeletal lesion was showed in 1 case and multiple lesions in 49 cases that involved a total of 457 bones, including cervical (n=8), thoracic (n=46), lumbar (n=42), sacral (n=23), the pelvic (n=29),the ribs (n=12), femur (n=15) and the others(n=12). The patterns of bone abnormalities showed osteolytic lesions in 360 sites, osteoblastic lesions in 46 sites and mixed lesions in 55 sites. The low-density osteolytic lesion appeared three types: cystic lesion with or without thin osteosclerotiec rim, irregular or loofahs-like changes and large massive osteolysis. DLCT showed thoracic duct outlet obstruction (n=43), lymphatic return abnormalities in abdominal-pelvis and retroperitoneal cavity (n=36), chylothorax and pericardial effusion (n=29), and multiple cystic lymphangioma of liver and spleen and lung (n=6). MRI showed multiple long T1 and T2 signals of the bone in all 23 cases.

Conclusion: The associated bone abnormalities with primary lymphatic dysplasia ofen appeared multiple, cystic osteolytic lesions with or without thin osteosclerotic rim. Direct CT lymphangiography is quite helpful in diagnosis of bone abnormalities and primary lymphatic dysplasia.

INDOCYANINE GREEN LYMPHOGRAPHY FOR PATHOPHYSIOLOGICAL EVALUATION OF OBSTRUCTIVE LYMPHEDEMA

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Background: Management of lymphedema secondary to cancer treatment is challenging, and emphasis should be put on early diagnosis and prevention of secondary lymphedema. Indocyanine green (ICG) lymphography is becoming a method of choice for evaluation of lymphedema and for navigation for lymphatic supermicrosurgery. This study aimed to demonstrate ICG lymphography severity staging systems for pathophysiological evaluation of obstructive lymphedema.

Methods: One-hundred sixty four obstructive lymphedema patients with arm, leg, genital, or facial lymphedema underwent ICG lymphography. All lymphography images were recorded in photographs and movies. Based on changes in ICG lymphography findings with progression of lymphedema, new severity stages, dermal backflow (DB) stages were developed; arm DB (ADB) stage for arm lymphedema, leg DB (LDB) stage for leg lymphedema, and genital DB (GDB) stage for genital lymphedema.

Results: The ICG lymphography findings were classified into two large groups: linear pattern and DB patterns. The DB patterns could be subdivided into splash, stardust, and diffuse patterns. The DB patterns were found more frequently than the linear pattern in the proximal region. The DB patterns also increased significantly in prevalence overall as the duration of lymphedema increased. These findings were similar in arm, leg, genital, and facial lymphedema secondary to cancer treatments. Splash and stardust pattern (DB stage I-II) could be observed even in non-edematous region.

Conclusions: ICG lymphography is a safe and convenient evaluation method for lymphedema, which allows pathophysiological assessment of lymphedema. The DB stages are simple severity staging systems which address pathophysiology of obstructive lymphedema, and allow early diagnosis with severity stratification; ISL stage 0 can be subdivided into DB stage I and II. ICG lymphography may come to play an important role in early diagnosis and severity staging of obstructive lymphedema.

HIGH-ACCURACY DIAGNOSIS AND REGIONAL CLASSIFICATION OF LYMPHEDEMA USING INDOCYANINE GREEN FLUORESCENT LYMPHOGRAPHY AFTER GYNECOLOGIC CANCER TREATMENT

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Background: Secondary lymphedema is defined as swelling of the limbs caused by retention of lymph after cancer therapy. We diagnosed lymphedema using indocyanine green (ICG) fluorescent lymphography and developed a classification based on 12 regional types of edema in the lower bodies, with the goal of improved understanding of the pathology.

Methods: The subjects were 72 consecutive female patients aged 25 to 88 years (mean, 54.5 years) with secondary lymphedema of the lower extremities and abdominal area. The traditional diagnosis of lymphedema was stages 0, 1, 2, 3 and 4 in 5, 11, 19, 24, and 13 patients, respectively. All patients were examined by ICG lymphography.

Results: Features of dermal backflow were noted in most patients after cancer therapy, and the incidence was particularly high after radiotherapy. Regional analysis of lymphedema was classified into 12 types (A to L, definitions are given for major categories). The number of patients (number receiving radiation therapy in parentheses) in each type were A, 1 (0); B, 3 (1); C, 13 (1); D, 1 (0); E, 2 (0); F, 0 (0); G, 1 (0); H, 7 (3); I, 13 (3); J, 6 (2); K, 20 (3); and L, 5 (2).

Conclusions: The ICG test permits definite diagnosis of lymphedema at a very early stage and in mild cases. The regional analysis enables establishment of policies for conservative or surgical treatment (for example, lymphaticovenous anastomosis) for individual regions, thereby facilitating more effective lymphedema treatment.

LYMPHOSCINTIGRAPHY IN PRIMARY AND SECONDARY LYMPHŒDEMA: A TOOL FOR DIAGNOSIS, PROGNOSIS AND MONITORING

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Lymphoscintigraphy is the "gold-standard" of diagnostic imaging in primary and secondary lymphedema. In all the current guidelines, however, the method is not yet standardized in carrying out, reducing in part the specificity of the examination. The purpose of this study was to evaluate the clinical utility of lymphoscintigraphy in lymphedema, both for the confirmation and better diagnostic definition and of indications for treatment and for monitoring and prognosis.
We studied 175 patients with lymphedema of the limbs (101 primary, 74 secondary). All the subjects performed lymphoscintigraphy with subcutaneous injection of nano colloids in the plantar and palmar interdigital spaces. The measurements were performed with gamma camera at 5', 30', 60' after the inoculation.
The following parameters were considered: dermal back flow, time of appearance of the stations of the limb-root, presence of lymph node sub-stations, lymphatics alternative pathways. The examination was always performed bilaterally.
We found: distal dermal back flow in primary forms (96% of cases) and proximal in secondary ones secondary (89%), variable time appearance at the root of the limb, presence of lymph nodes along the limb normally not displayed (64%), variable lower visualization of the stations at the root of the limb in primary forms, absent in the secondary ones, presence of alternative lymphatic pathways (supra-pubic and supra-thoracic) in 59% of cases. In some cases it was observed discrepancy between the lymphoscintigraphy (apparently the most affected) and clinical picture (less important).
In cases in which (especially the primary forms) was not highlighted with the standard examination lymphatic stations at the root of the limb (25 cases), was performed a nano-colloid inoculation in the intermediate portion of the most proximal segment of the limb. In 76% of these subjects after inoculation demonstrated the new radiotracer at the root of the limb.
The examination also revealed usefulness in monitoring treatment. In controls post-treatment, in fact, showed a clear regression of demal back flow and, in some cases in which we proceeded with the application of methods of physical treatment the AA. assisted to a rapid progression of the tracer with respect to the other limb and the untreated same detection baseline.
Lymphoscintigraphy proves to be a very useful definition examination of lymphedema, in directing therapeutical and surgical treaments, in monitoring of treatment and in prognosis.

NEAR INFRARED FLUOROSCOPY: OVERVIEW OF POSSIBLE APPLICATIONS RELATED TO LYMPHŒDEMA

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Background: Even though lymphoscintigraphy remains the gold standard to study lymphatics in vivo, near infrared fluoroscopy emerged as a more accessible and additional imaging technique in the field of lymphology. The use of Indocyanine green (ICG), a tricarbocyanine dye, and a dedicated camera (PDE®), makes it possible to visualize the superficial lymphatic network architecture and the lymph propagation in real time. Video images of this lymph propagation are analyzed with the help of dedicated software, resulting in a semi-quantification of lymph flow between the regions of interest. This imaging technique contributes to map superficial lymphatic networks and provides us a sensitive tool to improve physical treatment of lymphoedema. We report our experience based on 262 lympho fluoroscopies, realized during the evaluation of lymphoedema.

Method: Patients undergo a subcutaneous or intradermal injection of highly diluted Indocyanine Green (ICG). During all the exams, we observe and record on video the tracer's progression, performing specific protocols. The objective of these protocols is to study the diverse physical treatment techniques such as different manual lymphatic drainage methods, intermittent compression therapy, multicomponent bandages or the wear of sleeves.
At the end of the examination, when substitution pathways are identified, we trace and draw them on the patient's skin in order to map them for future physical treatment.

Results: Showing videos, our communication will point out the main results of our experience with cases where lymphofluoroscopy carries out an added value to lymphedema evaluation.
The major advantage of this imaging technique is the possibility to observe in real-time fluid movements from the interstitial space to the lymphatics, lymph propagation velocity, contraction rate, kinesiology of the lymphangions, mapping of substitution pathways and detection of subclinical lymphoedema and "ectopic" lymph nodes in lymphoedema.

Key words: near infra red fluoroscopy - applications - lymphology.

UNOBSERVED SWELLINGS: ROLES OF MRI IN VISUALIZING THE PATHOGENESIS AND HENCE DESIGNING THE TREATMENT STRATEGY OF LYMPHEDEMA

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Background: Having visualized thousands of lymphedema cases with magnetic resonance imaging (MRI), we learned that lymph stasis can develop in various patterns differing from the textbook manifestation. If lymphologists fail to recognize such pathological pooling, treatment can be definitely incomplete, resulting in recurrence of the disease and possible complications. We presented herewith some educative collections of patients with lymphedema whose pathogenesis has gone further than that would be normally observed by routine examination.

Materials and Methods: Investigation with MRI was conducted in T2-weighted imaging with fat suppression under STIR (short T1 inversion recovery) mode to visualize stationary fluid. Serial images were composed into coronal and sagittal reconstruction, so that abdomen was included in the lower extremity series, and chest in the upper extremity series.

Results and Discussion: Accumulation of lymph was most likely overlooked in the following regions. 1) Femorotruncal: Overwhelming swelling of lower extremity(s) usually spread laterally upward in the subcutaneous depth that was difficult to perceive on surface view. 2) Genitoabdominal: Swelling of initial stage might escape recognition by patient her/himself, or if known s/he might feel embarrassed to inform lymphologists. The T2W/stir demonstrated clearly the hyperintense signals of dilated peripheral lymphatics distributed over the pubic area and genital organ, which thus convinced the patients. 3) Femoroperineal: Slender patients with lymphedema in legs could have medial aspect of thighs thickened up to perineum as a separated island unrecognizably. 4) Lumbosacral: Isolated pooling of lymph often developed through translumbar communications with/out lumbago. 5) Axillotruncal: Lymphedema of upper extremity after breast cancer was sometimes accompanied by swelling along chest walls. If axilla was involved, fluid buildup could be found as occasional pleural effusion a nd seroma. 6) Scapular: In advanced cases, lymphatic dilatation and proliferation prevailed above the upper arm and over the shoulder girdle. 7) Mammary: Lymph-congested breast(s) was frequently observed on MRI; occasionally retention cyst(s) was noticed. Taking advantage of pretreatment MRI, we were able to determine the distribution of pathologic congestion of lymph and customize the treatment protocol for each individual appropriately. These collectively contributed to the quick reduction of swelling by Twisting Tourniquet Compression/Decompression Technique at our Lymphology Institute of Thailand.

ASSESSMENT OF SKIN HARDNESS AND IMAGING OF THE SKIN, SUBCUTANEOUS TISSUE AND MUSCLE USING DUAL-FREQUENCY ULTRASONOGRAPHY BEFORE AND JUST AFTER LYMPH DRAINAGE IN BREAST CANCER-RELATED LYMPHEDEMA PATIENTS

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Background: Although continued lymphatic drainage (LD) is necessary for patients with lymphedema, its effects are unable to be evaluated based solely on circumference and skin pitting.

Purpose: Changes in the state of skin hardness in the dermis, subcutaneous tissue, and muscle layer using dual-frequency ultrasonography and texture analysis before and just after of LD were determined in patients with breast cancer-related lymphedema (BCRL).

Method: The study sample comprised 30 limbs of 15 women with BCRL (median age, 58 years; range, 30-66 years; median BMI, 23.4 kg/m2; range, 20.4-27.4 kg/m2; median duration of lymphedema, 5 years; range, 2-21 years). All women received manual LD for 20 min. Changes in skin hardness were evaluated using visual analog scale (VAS) scores; ultrasound evaluation of the dermis according to low echogenicity of pixels (LEP) with a frequency of 20 MHz; and evaluation of subcutaneous tissue and muscle layer according to kurtosis, skewness, and LEP with a frequency of 10 MHz. Measurements taken 10 cm below the elbow, as well as arm circumference, were recorded before and just after LD.

Results: Based on VAS scores, 10 women felt that the affected limb was softened just after LD, while five did not. Extraction of a qualitative index from ultrasonographic images, the dermis, LEP, subcutaneous tissue and muscle layer provided a new quantitative method for assessing kurtosis and skewness. When compared to control limbs, the LEP in the dermis layer was reduced in 10 subjects; furthermore, contrast was reduced by less than 25% in seven and increased by 25% or more in three. Kurtosis and skewness were increased in the subcutaneous tissue and muscle layer in 10 subjects.

Consideration and conclusion: Reduction of LEP is related to a reduction in dermis moisture; thus, LEP change after lymph drainage reflects the magnitude of change of intercellular fluid in the dermis. Based on previous studies, it was suggested that differences in the grade of lymphedema in the muscle layer were the result of changes in kurtosis and skewness; therefore, a reduction in intercellular fluid was suggested. Our analysis showed that, both in women who showed and in women who did not show changes on the VAS, intercellular fluid reduction of the dermis led to improvements in the dermis, subcutaneous tissue, and muscle layer. Therefore, dual-frequency ultrasonographic images can assess the effect of LD in real time and possibly provide motivation for patients with BCRL to sustain beneficial self-management.

LYMPHOSCINTIGRAPHY AND DYNAMIC MAGNETIC RESONANCE LYMPHANGIOGRAPHY IN LYMPHŒDEMA MANAGEMENT: WHAT TO LOOK FOR, HOW TO INTERPRET

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Objectives: To compare the imaging results of lymphoscintigraphy (LSG) and dynamic magnetic resonance lymphangiography (MRL) and improve the diagnosis and management of extremity lymphoedema.

Methods: Seventy-five patients with extremity lymphooedema were examined by LSG using the tracer 99Tc-Dextran, and by MRL using gadobenate dimeglumine as a contrast agent. Morphological abnormalities and the functional statuses of the lymphatic systems of affected limbs were compared between the two imaging approaches.

Results: With high resolution MRL revealed more precise structural abnormalities of lymphatic channels than LSG by clearly visualizing the vascular shape, diameter and distribution pattern. In considerable cases the dilated lymphatic collectors that demonstrated on MRL imaging in the lymphoedematous limbs could not be visualized or displayed as "dermal back flow" on LEG imaging. Due to the strong radioactivity of the isotopic tracer in the inguinal/iliac lymph node it could hardly evaluate the nodal architecture with LSG. The MRL however, clearly displayed the number, size, shape and structure of the regional lymph nodes. MRL imaging clearly localized lymphatic and/or lymph nodal anomalies in most of the diseased limbs, while LSG failed to demonstrate detailed malformation of lymphatic system in most cases. MRL revealed more functional abnormalities of lymph vessels and nodes than LSG by real time measurement of lymph flow speed in vessels and nodes.

Conclusions: Compared with LSG, dynamic MRL was more sensitive and accurate in the detection of anatomical and functional abnormalities in the lymphatic system in patients with extremity lymphoedema, suggesting that it may be more useful for diagnosis and management of lymphoedema.


St. Peter's Square

Tuesday, 17th September 2013

H. 2.15 - 4.00 p.m.

Session 6
Clinical aspects

Aula Magna

President

Allegra C. (Italy)

Chairmen

Pissas A. (France) - Gasbarro V. (Italy) - Andrade M. (Brazil)

PHYSIOLOGICAL PRINCIPLES IN MODERN DIAGNOSTICS AND THERAPY OF LIMB LYMPHEDEMA

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Lymphology is a fast developing scientific and clinical discipline. Over 400 years it accumulated a lot of anecdotal science. Modernization requires evidence based contributions. They should replace the generally accepted but false notions and views, often useless or even harmful in clinical lymphology. Some examples: Stemmer sign in differentiation between lymphedema and venous insufficiency, fluorescent green near infrared visualization of obstructed lymphatics, MLD pushing tissue fluid into obliterated lymphatics, low pressure manual massage stimulating obstructed lymph collectors, stimulation of lymph nodes, pre-emptying of non-edematous tissues of hypogastrium or thorax facilitating tissue fluid inflow from lymphedematous regions, high protein concentration lymphedema, filariasis as the main cause of lymphedema in tropical countries, erysipelas complicating lymphedema and others. All the listed notions have not found confirmation in random double-blind clinical studies. Moreover, there is lack among the therapists of knowledge of the hydromechanics of tissue fluid and lymph, location sites of edema fluid in skin, subcutis and muscles, and bacteriology of human deep tissues. Extrapolation of lymphangiogenesis process observations from mouse to the man.

IMAGING AND LYMPHEDEMA TREATMENT AND MANAGEMENT OF COMPLICATED LYMPHEDEMA PATIENTS

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Case 1. 73 years old active man from Nigeria complained of the right upper extremity swelling for the past 5 years with progression. He denied any history of infection, surgery or recent trauma. His clinical presentation was compatible with Stage II right upper extremity lymphedema of unknown etiology.
The venous Doppler study of the right upper extremity at the Medical Imaging Center in Santa Monica was normal. The Lymphoscintigraphy study showed atypical lymph migration, lymph nodes location of the right upper extremity and dermal backflow/retention of the tracer. The MRI study revealed smaller size and lesser number of the lymph nodes in the right axilla than on left, indicating congenital etiology of lymphedema. The patient responded to the Manual Lymph Drainage protocol treatment, IPC, exercise program and was fitted with a compression sleeve for the daily use. His right upper extremity lymphedema following the MLD Protocol treatment was reduced to Stage I.
The importance of physical examination and the correlation of Medical Imaging studies are being emphasized.

Case 2. 22 years old student and amateur boxer from Grenada was being evaluated for the right lower extremity lymphedema with progression since the age of 16.
He denies any history of trauma, infection or medical condition. His clinical presentation was compatible with Stage II-III right lower extremity lymphedema. The Lymphoscintigraphy study from Tampa, Florida showed absence of the right inguinal lymph nodes, confirming the congenital etiology.
The patient was treated with MLD Protocol treatment consisting of MLD for 30 minutes, IPC for 30 minutes and bandaging daily for the total of 9 sessions and reduced his lymphedema to Stage I-II which was measured with ultrasound.
Reduction of the epifascial space thickness of the right ankle after just one session was by 18.31%, in calf by 15.26% and thigh by 23.3%. The reduction of the epifascial space thickness of the right ankle after 9 sessions was 57.75%, in calf 22.63% and thigh 59.66%.
The ultrasound is the objective measure of the epifascial space reduction demonstrating the efficacy of the Lymphedema treatment.

HOW DOES LYMPHŒDEMA INFLUENCE FUNCTIONING OF PEOPLE'S LIFE?

RICCI M.
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Lymphedema is a disease which can cause disability since it may involve social relationships as well as daily life. Patients suffering from Lymphedema normally change their partnership, job and life.
Until now, disability behavior caused by Lymphedema has never been taken in consideration by Scientific World because it uses Functional Independence Measure and Barthel Index which are not able to measure disability in patients with lymphedema.
The International Classification of Functioning (OMS 2001) gave me the opportunity to work out a new disability scale that has been validated with a multicentric study of Section for Study and Treatment of Oedema of SIMFER (Italian Society of Physical and Rehabilitation Medicine) in 2010.
To use the scale it is necessary to elaborate a 14 Items checklist of Activity Daily Living from ICF. Ricci Disability Index (from checklist) is more able than FIM to describe the patient's disability in Lymphedema. It is different in every patient because of the distribution of the values. Two patients can show the same index coming from different values but the differences are evident.
In this presentation Author shows statistical analysis results of Rehabilitative Medicine ward's casuistry in Azienda Ospedaliero-Universitaria OSPEDALI RIUNITI of Ancona during 2011 and 2012 years.
We have decided and choosen, for a remarkable evaluation, only the post-mastectomy related lymphedema.
The goal was to recognize which Daily Living Activities are more changed related to Lymphedema.
We needed to understand the relationship between the disability onset and Linfedema, and also the time of its weakening.

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INCIDENCE OF LYMPHŒDEMA PRE-TREATMENT FOR GYNÆCOLOGICAL CANCER

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Background: Cancer-related lymphoedema has long been considered a debilitating sequelae of oncology treatment, in particular lymph node dissection or radiation exposure. However, the potential contribution of cancer to the presence of swelling has been largely unexplored. The purpose of this work was to evaluate the prevalence of lymphoedema in a gynaecological cancer cohort pre-treatment.

Methods: The LEGS study is the world's first prospective, gynaecological cancer cohort (n=396) study to track lymphoedema pre- and post-treatment. Lower-limb lymphedema was assessed via self-report and bioimpedance spectroscopy (BIS). For BIS measures, lymphoedema was determined by comparing the intracellular/extracellular fluid ratio of the legs with the arms, as well as with normative data.

Results: Approximately, 36% of study participants self-reported lymphoedema pre-treatment. The proportion of women with lymphoedema was higher for those with vulvul and ovarian cancer (about one in two women) and lower for those with cervical or endometrial cancer (about one in five women). Findings from objectively measured lymphoedema (BIS) will be available for presentation at the conference.

Conclusions: These novel findings challenge the notion that lymphoedema is a consequence of treating cancer and suggest that, at least for some women, the disease itself is associated with the development of lymphoedema. Further exploration of the relationship between cancer and lymphoedema may improve understanding of the way both conditions are managed.

MODIFIED "LYMPHANGITIS SCORE" FOR PHYSICIAN, NURSES AND PHYSIOTHERAPISTS: EARLY DIAGNOSIS FOR THE BEST THERAPY

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In this clinical review we talk about the clinical approach to Acute Lymphangitis using a specific clinical score.
We discuss the epidemiological, clinical and microbiological aspects of the most important in multidisciplinary lymphatic disease in a surgical department and emergency properly recognize the signs and symptoms of local and general diseases and to treat appropriately and reduce the serious complications such as septicemia.
Our past personal experience speaks about above 3000 patients, they were admitted in Emergency Room, and they were evaluated by lymphologycaly trained physicians: about 1,1% of this patients were diagnosed to have a acute lymphangitis and lymphangioadenitis.
After over 10 years of clinical experience and we can claim to have successfully treated over 500 patients with acute lymphatic diseases.
So we would like to propose a clinical protocol (Lymphangitis Score) for the correct approach to these particular affections, starting from the correct diagnosis in emergency room until the appropriate post-acute rehabilitation
This specific modified protocol can also be used by physical therapists and by nurses.

AN UPDATE ON LYMPHODINAMICS IN THE FETUS AND NEWBORN

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Our purpose is to discuss the role of lymphatic system in the complex mechanism that regulates volume in the fetus and newborn as well as the regulation of fluid distribution between the plasma and interstitial fluid, while placing special emphasis on the role the lymphatic system plays in mediating and maintaining this distribution, both during the fetal life, and during the changes occuriring in the newborn at birth to allow the infant to survive outside the womb and adapt to life in a new environment. Body fluid is distributed among three major fluid spaces: plasma, interstitial fluid, and intracellular fluid. The distribution of fluid in each of these compartments is dramatically different in the fetus and newborn compared to the adult. In addition, the amniotic fluid that surrounds the fetus may also be considered an extension of the extracellular space of the fetus. In our presentation we will discuss recent topics in this difficult field.

REFLEXIONS CONCERNING STEMMER'S SIGN: A FORGOTTEN OR A DISREGARDED SIGN?

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Laboratory of Anatomy Faculty of Medicine, Montpellier, France

The authors bring their experience upon Stemmer's sign and try to found why no paper has been written and no study done upon this subject.

Material and Method: In the Unit of treatment of edema they took in charge 3500 patients from 1985 to 2013.
2350 patients with upper limb edema; and 1150 with lower limbs edema: 670 primary lymphedema; 480 secondary. In 10 cases there was an association with genital edema.

Review of Literature: Since 1997 and the XVIe ISL Congress in Madrid where one of the authors presented a paper on this subject, it is very paradoxal to note that no article has been written, no communication presented either in ESL Congress or in ISL.
They explain the history of this sign since 1976 and the first paper written by Stemmer who paradoxally never wrote something again concerning it; and never tried to propose a prospective work! They remember also the first idea of Kaposi concerning pachydermia and hypertrophia of subcutaneous skin.

Results: On 670 primary lymphedema 80% concerned women and were associated in 30% of cases with lipodystrophia or phlebedema... In thoses cases Stemmer's sign is less evident (in 65% of cases). In classical primary it is present in more than 85% of cases. On 480 secondary lymphedema it is present in 56% of cases.
The authors try to explain in which stage and in which circumstance this sign exist; when does it eventually disappear?

Personal considerations: They rediscover the same results the same reflexions than in 1997 in Madrid but of course with a more important statistic!
But the principal question remains: Why does none lymphologist try to do a study upon this sign? Why does this sign has now quite dissapeared from lymphological journals? EJLRP ... Lymphology ... although it is felt in «the public property».
Why did Stemmer never proposed a real study concerning his extraordinary discover because till now it is an extraordinary discover: the pathognomonic symptom, only a clinical one in a XXIe century with less and less clinical considerations
A forgotten or disregarded sign?


Venice Square, Vittorio Emanuele Monument

Tuesday, 17th September 2013

H. 8.30 - 10.30 a.m.

Physical treatment 1

Sala Scolastica

Chairmen

Ricci M. (Italy) - Ohlin K. (Sweden) - Adriaenssens N. (Belgium)

TWO YEAR FOLLOW-UP RESULTS OF A RANDOMIZED CLINICAL TRIAL COMPARING INCIDENCE OF BREAST CANCER RELATED LYMPHEDEMA AND HEALTH RELATED QUALITY OF LIFE BETWEEN EARLY BREAST CANCER PATIENTS TREATED WITH SHORT COURSE IMAGE GUIDED RADIATION THERAPY AND CONVENTIONAL POST SURGERY RADIATION THERAPY

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Background: Breast cancer related lymphedema (BCRL) is a well-known complication of breast cancer surgery and radiotherapy (RT). The lymphatic complications of RT technologies are not fully described for all different RT techniques. As survival rates have improved, BCRL and its negative influence on Health Related Quality of Life (HRQoL) in breast cancer survivors becomes more important.
Purpose: The aim of this study is to compare the incidence of BCRL between conventional RT and short-course, image-guided RT (IGRT) as well as the correlation between the incidence of BCRL and HRQoL, two years following the intervention.
Methods: In this randomized clinical trial, patients are randomized in a post-surgery IGRT group (intervention) and a conventional RT group (control) conform to the TomoBreast trial (ClinicalTrials.gov registration NCT00459628). BCRL and HRQoL are assessed prior to and two years following RT, using respectively tape measured circumferences, presence of subjective arm symptoms and the EORTC QLQ-BR23 questionnaire. Paired sample t-tests were used to detect differences in incidence of BCRL and HRQoL over time in the population. Independent sample t-tests were used to compare between both groups. Correlation between BCRL and HRQoL was calculated with the Pearson correlation coefficient.
Results: 15 patients (14%) had an arm volume difference of ?10%. Arm volume and presence of arm symptoms increased significantly over time ($p < .05$), but no significant difference was found between both groups. Incidence of BCRL was significantly correlated ($p < .05$) to changes in the arm symptom scale of the EORTC QLQ-BR23.
Conclusion: Short-course, IGRT does not cause a higher incidence of BCRL two years following RT, compared to conventional RT. There is a significant positive correlation between the arm symptom scale of the EORTC QLQ-BR23 questionnaire and BCRL incidence in our population.

THE USE OF CONTROLLED COMPRESSION THERAPY TO REPAIR A RELAPSE OF ARM LYMPHEDEMA CAUSED BY SEPTIC ARTHRITIS – A CASE REPORT

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Background: A patient with arm lymphedema after breast cancer treatment was operated on with liposuction 19 years ago. She was our 2nd patient when we started this innovative treatment. The preoperative excess volume was 1690 ml (ratio 1.7) and the postoperative excess volume was kept stable around 200-300 ml for 19 years. The patient then suffered from a severe septic arthritis. There was a need for opening the shoulder joint, followed by healing problems. This caused a severe relapse of the lymphedema since the compression garment was removed at the orthopaedic ward.

Method: Controlled Compression Therapy (CCT) is a way of gradually decreasing the circumferential measurements of compression garments until the arm shows a minimum of pitting. This is done at scheduled check-up visits where arm volumes are measured and new garments are ordered.

Aim: To investigate if CCT is a good method in the described situation.

Result: The maximal excess volume caused by the unfortunate removal of the garment was 2457 ml and was reduced back to the initial postoperative level, and even a little better, 120 ml, in 8 weeks. No additional lymphedema treatment was needed. CCT was done together with check-up visits for changing the wound dressings. After 6 months the wound was completely healed and the excess volume was again stable at a low level.

Conclusion: CCT showed to be an effective method to completely reduce the relapse of arm lymphedema. It was a benefit that CCT could be performed together with check-up visits for wound care. It was easy for the patient to fulfill the treatment even though she needed help from the social welfare to change compression garments during the first months after discharge from the hospital. CCT is simple, effective, less time consuming, and less costly than daily bandaging and massage, and can therefore be used as a safe alternative.

THE ASSESSMENT BY QUESTIONNAIRE OF SATISFACTION DEGREE OF USERS OF COMPRESSION GARMENTS FOR LYMPHEDEMA OF THE UPPER LIMB

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The use of a suitable elastic compression garment is a therapeutical cornerstone in the treatment of lymphedema.
The optimal garment must be flat-knit and custom-made.
There are several crucial aspects, which may affect the degree of patient satisfaction: among them the precision in taking measures, the adequacy of tailoring, times of delivery.
The literature search did not identify any surveys on this particular aspect of therapies.
It was therefore developed and administered a questionnaire, with the intent to detect the degree of satisfaction of patients with lymphedema of the upper limb, in relation to compression garments and to services concerning their measurement and delivery.
Answers were given by fifty people, referred for measurements to a single center and who had got flat-knit and custom-made garment delivery as completion of a Complete Decongestive Therapy program.
The data analysis allowed us to identify an irregular use in almost half of the people. The lower satisfaction related to compression garments are, in order of importance, the bother at the crease between thumb and forefinger, the mark left by seams and the imprint left by the label.
An overall assessment on garments and service has shown a high degree of satisfaction in relation to timing and modality of delivery, as well as the perceived quality in taking measures; global satisfaction about comfort and appearance was very well valued.
Finally, in relation to possible improvements of garments, is frequently expressed a desire for an absence of seams.
In conclusion, research has allowed us to obtain data on a poorly investigated aspect of CDT, identifying the reasons for dissatisfaction related to compression garments, their use, as well as to aspects of taking measure and delivery services.
Possibly after adjustments or reductions, the developped questionnaire could be delivered to the users together with the garment, in order to widely collect data, to be used for improvement of one of the pivotal treatment of lymphedema.

CONSERVATIVE MANAGEMENT OF LYMPHŒDEMA IN CHILDREN – A SYSTEMATIC REVIEW

PHILLIPS J.
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Children with lymphoedema are estimated at 1 in 6000. While few in number, the impact on their lives and that of their families is large. Diagnosis is often delayed and then access to management of this chronic condition is poor: of the 168 lymphoedema therapists on the National Lymphoedema Practitioners Register in Australia, 27 (16%) identify their practice as offering treatment for children. Guidelines for management of lymphoedema published by the International Lymphoedema Framework (2006) make no mention of treatment for children with lymphoedema; the paediatric guideline document by the International Lymphoedema Framework produced in 2010 discusses differences in service provision needed for a paediatric population. The aim of this study was to undertake a systematic literature review of the evidence for conservative management of lymphoedema in children. PRISMA protocol was followed; a search of Ovid Medline and Cinahl identified six studies, excluding those on surgica l techniques, central lymphoedema and those with a median age greater than 18. Eligible studies included retrospective service and case reviews and prospective studies investigating different interventions. The evidence identified from these studies will be presented; clinical implications and recommendations for future priorities in research suggested.

HARD TO HEAL ULCERS AT PATIENTS WITH LYMPHŒDEMA STAGE III

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Aim: To compare the healing rate the ulcers of lower limb at lymphoedema patients in later second and third stage of lymphoedema and patients with venous and lymphatic insufficiency.

Methodes: We devided patients with ulcers on the lower leg into two group. In Group 1 were patients with lymphoedema and in Group 2 were patients with chronic wenous inssufficiency and lymphoedema. All of them were treated with propriate dressings and short-strech bandages.

Results: The folow up period was 28 days. At Group 1, where were included 8 patients with 17 ulcers, all the ulcers were healed in average 13,25 days. At Group 2 (8 patients with 15 ulcers were included into this group) only one ulcer was healed (in 17 days; all the others were still there at day 28.) The area of those ulcers were smaller for 50% at the end of the study.

Discussion: The presence of lymphoedema influence on ulcers healing and in the other way, the chronic venous ulceratios will also damage local lymphatics and that will increasing the potential for develop and worsening the lymphoedema and ulcers. At our study we find, that in group with »mixed« aethiology of ulcers, the healing rate is lower versus healing rate at ulcers only lymphatic ethiology.

SELF-BANDAGING INSTRUCTION FOR LYMPHEDEMA PATIENTS: A KEY TO INDEPENDENCE. REPORT ON 30 CASES

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Purpose: Compression therapy is essential to treat moderate and severe lymphedema but is not universally accessible in Canada. For those unable to access private lymphedema treatment, the McGill University Health Centre Lymphedema Clinic began a self-management service teaching patients and care-givers how to bandage safely and effectively. This case series describes the educational instruction, the principles underlying self-bandaging, the surveillance process and results of an innovative lymphedema self-management program.

Methods: Thirty people diagnosed with lymphedema, who were unable to access decongestive lymphedema therapy were invited into the self-bandaging program. Instruction in self-bandaging principles and proper technique was provided to the patients and to their care-giver. Surveillance occurred weekly to assess the bandaging, review techniques and measure limb circumferences. Once lymphedema reduction showed stability over two weeks or more, garments were ordered. Surveillance continued with a check of the garment fit, then at monthly and three-monthly intervals to ascertain stability of edema.

Results: The majority of participants had moderate to severe lymphedema. All patients achieved reductions in edema (48% reduction in severe lymphedema, 59% for moderate lymphedema and 92%for mild lymphedema) similar to levels reported when trained therapists provide full decongestive therapy. More than three quarters of participants reported a global change rate of 80% or higher. Qualitatively, participants understood the importance of bandaging and expressed satisfaction at being able to control their condition themselves.

Conclusion: For some people with lymphedema a self-bandaging program can be a route to reduced lymphedema, independence, and self-efficacy.

VERIFICATION OF THE EFFECTIVENESS OF KINESIOTAPING IN POST-MASTCTOMY LYMPHŒDEMA RELATED

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[2] *Nuclear Medicine, INRCA Ancona, Italy*

Introduction: Kinesiotaping have been used in Lymphedema treatment since some years in Italy without a real verification of the effectiveness. We used it daily too, in my Ward. In 2012 we decided to test it with lymphoscintigraphic examen.

Materials and methods: 8 people with 5 years or more post-mastectomy lymphedema related were recruited. Patients had a lymphoscintigraphy exam. After the 1st hour from the injection, a Physiotherapist wrapped the taping on the top of the arm near the lymphatic alternative vessels: anterior and posterior deltoid, anterior and posterior interaxillary paths. After 1 hour of kinesis (with taping) we had the 2nd uptake of radioactivity and completed the exam.

Results: Results are in the table and they show the progression of radionuclide is not evident after taping, absolutely and compared with the gym.

Conclusions: Data are insignificant because of the little sample but the exam is specific for the research. It shows a low increase of mobilization of the swelling thank Taping. This is able to stimulate cutaneus neuroreceptors and sensitive fibers with the outcome of wellness.

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LYMPHEDEMA AND THE PATIENT WITH PAD: USE OF PHYSICAL SOURCES IN THE COMBINED TREATMENT AND IN REDUCING EDEMA

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Background: The circulatory system provides to the needs of the tissues with the contribution of nutrients, with the removal of waste products, transporting hormones thereby contribute to a general maintenance of an optimal microenvironment inside the cell survival and function throughout the tissue fluid. The perfect functioning of a biological system consisting of the macrocirculation, microcirculation, volume and quality of the blood volume or carrier and a complex system of tissue distribution and "filtration" capillary contribute to the good maintenance of the microenvironment interstitial. The flow in the capillaries is regulated by the pressure gradient, or by the pressure difference between the two ends of the vessel and then from the vascular resistance by the resistance the blood encounters along the vessel. The filtrate or transudate within 24 hours, under normal conditions, can reach several liters. A functional alteration of the microcirculation caused by altered permeability, by increased resistance, reduction of the pulsatility or altered by hyperaggregability flow of red blood cells can understandably alter the perfect biological mechanism that regulates the amount and the quality of the interstitial fluid. Available therapies have not induced a significant solution in cases of chronic accumulation of liquids as in the case of lymphoedema.
Aim of the study: We have tried to reduce the aggregation of red blood cells and affect the performance of the microcirculation with the aim to improve circulation in the peripheral tissues and reduce the accumulation of transudate and, ultimately, the edema.
Materials & Methods: We enrolled patients with type II diabetes mellitus (T2DM) with leg ulcers. We have arbitrarily divided into three groups (A, B and C). Group A was treated with pulsed electrostatic field; group B with the magnetic field low frequency and group C had control role. L 'HbA1c was not statistically different between the three groups. Were monitored the weight, blood pressure, systolic and diastolic pressure and heart rate.
Results: The physical sources, electrostatic field and magnetic field, showed have positive effects on the metabolism, reduction of body weight, reduction in peripheral resistance in groups A and B. There was also a significant reduction of systolic blood pressure and diastolic blood pressure in groups A and B. The techniques were well tolerated by all.
Discussion: The physical sources have an impact on the processes of tissue and spraying on the control mechanisms of capillary transudation into the tissues were well tolerated and show to have systemic effects. These results could be explained by improved tissue perfusion as demonstrated by the accelerated healing of wounds attributable to higher contribution of O2 and nutrients of substance.

"LYMPHO-TAPING" TO REDUCE HEMATOMA AFTER LIPOSUCTION: A RANDOMIZED CLINICAL TRIAL

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Université Libre de Bruxelles, [1] Lymphology Researches Unit, [2] ULB Plastic Surgery Dept., [3] ULB Bio Electric and Mechanical System Dept.; [4] San Giovanni Battista Hospital, Rome, Italy

Introduction: Skin taping to reduce local oedema is worldwide and commonly used by numerous therapists. "Lymphotaping" (LT) is derived from the kinesiotape technique, announcing drainage capacity without actual demonstration of it. The frequent use of skin taping is in large contrast with the poverty of biophysical background and almost inexistence of scientific literature on the subject.
We propose the results of a prospective randomized clinical trial in which LT was used to study the post-liposuction hematomas in reconstructive surgery patients.

Materials and methods: 48 reconstructive surgery patients underwent a liposuction of the buttocks using a 'super wet' technique with the aim of harvesting fat for lipofilling purposes. Patients were randomized in three groups. Only one buttock was taped using one of three different taping techniques following the study protocol. The taping was performed directly after liposuction and renewed at day 5 and 10. Progressive reduction of the hematoma was semi quantitatively evaluated by spectral analysis of pictures at day 5, 10, 15 and 30 and comparison was made between the taped and not-taped buttock.

Results: Preliminary results show in all groups faster resorption of the hematoma at the skin covered with tape. There was a significant difference in absorption between the different taping techniques used.

Discussion: Observation of LT seems to indicate that the skin undergoes variations in tangential and perpendicular forces during motion. This variation in direction of forces can contribute to an accelerated resorption of the hematoma. On the contrary, simply placing a tape can modify mechanical properties and thus prevent oedema formation.

Conclusion: In this randomised clinical trial, we scientifically demonstrate that LT, used in liposuction areas, can fasten hematoma resorption underneath the taped area.

Fountain of the "Barcaccia" in Spanish Square, in the background the church of Trinità dei Monti

Tuesday, 17th September 2013

H. 11.00 a.m. - 1.00 p.m.

Lymphœdema; social and societal aspects of rehabilitation

Sala Scolastica

Chairmen

Piller N. (Australia) - Moneta G. (Italy) - Viehoff P. (The Netherlands)

THE LYMPHŒDEMA FUNCTIONING DISABILITY AND HEALTH QUESTIONNAIRE FOR LOWER LIMB LYMPHŒDEMA (LYMPH-ICF-LL): RELIABILITY AND VALIDITY

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Background and purpose: Patients may develop primary (congenital) or secondary (acquired) lymphoedema that causes significant physical and psychosocial problems. To plan the treatment for lymphoedema and monitor the patient's progress, all functioning problems (i.e. impairment in function and activity limitations and participation restriction) need to be assessed. The purpose of this study was to investigate reliability (test-retest, internal consistency, measurement variability) and validity (content and construct) of data obtained with the Lymphoedema Functioning, Disability and Health questionnaire for lower limb lymphoedema (Lymph-ICF-LL).

Methods: The Lymph-ICF-LL is a descriptive and evaluative tool and consists of 28 questions about impairments in function, activity limitations and participation restrictions for patients with lower limb lymphoedema. The questionnaire has been developed in Dutch and translated in English. The questionnaire contains 5 domains: physical function, mental function, general tasks/household activities, mobility and life domains/social life. Reliability and validity were examined on 30 patients with objective lower limb lymphoedema recruited in the Lymphoedema Center of University Hospitals Leuven (Belgium) and in the Expert Center for Lymphology of the Nij Smellinghe Hospital (the Netherlands).

Results: Intraclass correlation coefficients for test-retest reliability ranged from .69 to .94 and cronbach alpha coefficients for internal consistency ranged from .82 to .97. Measurement variability was acceptable (SEMs= 5.9 – 12.6). Content validity was good because all questions were understandable for 93% of the participants, the scoring system (visual analogue scale) was clear and the questionnaire was complete for 90% and 93% of the participants respectively. Construct validity was good. Four of 5 hypotheses assessing convergent validity and all 5 hypotheses assessing divergent validity were accepted.

Limitation of the study: Known-groups validity and responsiveness of the Lymph-ICF-LL was not investigated. This requires further examination.

Conclusions: The Lymph-ICF-LL is a reliable and valid Dutch (and translated in English) questionnaire to assess impairments in function, activity limitations and participation restrictions of patients with primary or secondary lower limb lymphoedema.

DEVELOPMENT OF ICF CORE SETS FOR LYMPHEDEMA: QUALITATIVE RESEARCH

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Erasmus Medical Centre Rotterdam Dermatology, The Netherland

Introduction: The International Classification of Functioning, Disability and Health (ICF) offers a system to describe the functioning of the patient. Since the ICF is too comprehensive for daily practice, Core Sets can be composed for easier use.

Aim of the study: The research is part of the development of ICF Core Sets for lymphedema. The purpose is to get clear the patients point of view concerning meaningful concepts which can be classified by the ICF.

Methods: 6 focus groups were organised concerning patients with lymphedema in upper and lower extremity, head and neck and genital region.Their conversation was audiotaped, transcribed verbatim and analysed.

Results and Conclusions: The research is still in progress, but final data can be delivered at the time of the congress.

THE USE OF CLINIMETRIC INSTRUMENTS ACCORDING TO THE INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH IN A MULTIDISCIPLINARY SETTING

HENDRICKX A.A.
I. Zonderland, Head Department Lymphology, R.J. Damstra, MD PhDAll connected with the Expertise Centre for Lymphology Nij Smellinghe Drachten, The Netherland

Background: Patients with lymphedema suffer from varying degrees of severity from swelling, limited range of motion, pain, loss of muscle strength and fatigue. Related to these problems, activities of daily living are limited, e.g. personal care, walking, housekeeping, sports activities as well as working. Subsequently, the overall quality of life for people with lymphedema is often significantly affected. With the utilization of the ICF, based on the bio-psycho-social model, influences upon a patient's functioning, including body functions and structures, activities and participation in relation to personal and environmental factors, can be described. In the management of lymphedema monitoring of activity of disease parameters as well as results of treatment and follow up is mandatory. Health care professionals and the patient perform monitoring. Such checks require validated measurements, in a protocolled schedule on all domains of the ICF.

Objective: Present an overview of the process of clinical measurements and reasoning on all domains of the ICF in a multidisciplinairy setting, supported by a multidisciplinary electronic patient file.

Methods/Results: We use several clinical instruments for all the phases of treatment for the patient with or at risk for developing lymphedema. When a patient has been diagnosed with lymphedema and the treatment has started, the initial measurements are aimed at the edema itself, but also at the presence of risk factors, pain, loss of joint mobility, strength, physical capacity and emotional distress. In this phase, the frequency of measurement is high. In the maintenance phase the desired level of activity and participation are leading for the therapy itself, but also for the instruments and the frequency of measuring. For example, the DASH (Disabilities of the Arm, Shoulder and Hand) and objective questionnaires regarding Health Related Quality of Life are utilized. The frequency of measuring decreases and the role of self-monitoring becomes more important.

Conclusion: Clinimatric instruments according the ICF provide tools for objective measuring the various domains of functioning in relation to prevention, treatment and follow-up of lymphedema. The multidisciplinairy electronic patientfile enables and falicitates the multidisciplinairy care for the patient with complex lymphedema in our expert centre.

LOWER EXTREMITY LYMPHEDEMA PRESENTS EARLIER AND HAS A GREATER IMPACT ON QUALITY OF LIFE THAN UPPER EXTREMITY LYMPHEDEMA IN MELANOMA PATIENTS

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Background: The impact of upper versus lower extremity lymphedema (defined as limb volume change (LVC) ≥10%) was examined over time in melanoma patients undergoing sentinel lymph node biopsy (SLNB) or therapeutic lymph node dissection (TLND) as determined by the most definitive surgical procedure.

Methods: Objective limb volume measurements were collected preoperatively and at 3-6 month intervals for 30 months using a perometer (JUZO 1000M). LVC was calculated by subtracting baseline measurements and adjusting for weight change. The Functional Assessment of Cancer Therapy-Melanoma (FACT-M) and a 19-item lymphedema symptom assessment scale (modified LBCQ) were completed at each visit. Mixed effect linear and logistic regression models were used to identify factors associated with lymphedema, as well as symptom and quality of life (QOL) scores.

Results: 269 melanoma patients were enrolled. The median number of nodes removed for upper extremity SLNB=3 (range,1-12) and TLND=28 (13-57), compared to lower extremity SLNB=2 (1-5) and TLND=17 (5-51). At 3-6 months, 16% of upper extremity and 30% of lower extremity patients presented with LVC≥10% compared to 29% and 33% at 21-24 months, respectively. In adjusted analyses, body mass index (BMI) >30kg/m^2 (OR=2.2, 95%CI: 1.2-3.2), female gender (OR=1.7, 95% CI: 1.1-2.7), and TLND (vs SLNB) (OR=2.8, 95% CI: 1.7-4.6) were associated with LVC≥10%. A strong negative correlation was observed between the sum of LBCQ symptom scores and FACT-M scores, including individual domain scores for physical and functional well-being and the melanoma surgery subscale (MSS) ($p \leq 0.0001$ for all). More significant changes in MSS scores were associated with female gender, increasing age, extremity (lower vs. upper), surgery (TLND vs. SLNB) and higher baseline score ($p \leq 0.001$ for all). Sim ilar factors with the addition of LVC≥10% were associated with significant changes in LBCQ scores. FACT-M scores were found to be influenced by baseline score and type of surgery ($p \leq 0.001$ for all). QOL scores improved over time for the majority of patients, with the exception of upper extremity patients with LVC≥10% whose scores continued to decline.

Conclusions: In this prospective, longitudinal study utilizing objective criteria and validated QOL measures, the incidence and impact of lower extremity lymphedema was higher than upper extremity lymphedema in melanoma patients. While symptom-specific measures (modified LBCQ and MSS) are most sensitive to LVC, the impact of lymphedema was captured in measures of overall QOL (FACT-M). Informed surgical consent for the treatment of melanoma should include a discussion of the risks and impact of lymphedema.

THE ENVIRONMENT AND LOAD ON THE LYMPHATIC SYSTEM – ITS IMPACT ON LYMPHŒDEMA AND ITS OUTCOMES

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No matter what the status of the lymphatic system, genetic issues associated with its (mal)formation, or issues associated with surgery, radiotherapy or some other form of soft tissue injury, one of the key leverage points in terms of progression and outcomes of lymphoedema is the interaction of the person (at risk of or with lymphoedema) with the surrounding environment.
Taken in the broadest sense, this means social and societal contacts, family presence/absence, health professional/carer interactions and their frequency.
It also means the physical nature of the environment, including barriers/aids to movement, its cleanliness. Further we have the key factors of the quality of the skin of the patient generally and of the affected or at risk of area of the body specifically and of course the patient's health status.
It's often hard to measure which of the above is playing a key role in the progression of lymphoedema and/or of the impact of treatment on it. However, we cannot ignore any one of them as they all can represent a leverage point
Collectively they might be increasing the lymph load by just that critical 5 mls per day, leading to its progression. 5mls a day, is 35 mls a week or 140 mls a month, or 1.68 litres over the year! Just as collectively they can be leveraged to help reduce the load on the lymphatics also by just that amount.
Where then is the balance point and how do we achieve that to enable the patient, in their environment, to reduce the risk of lymphoedema, or better control or halt its progress? The answer is in improved activity, reduced chance of an injury, reduced risk of infection (improved sanitation), better skin care. The question is how best do we help facilitate it?
Awareness, Education are the key pivitol points but in the end it comes down the that 5 mls per day!

LYMPHOSCINTIGRAPHIC EVALUATION OF LYMPHEDEMA FOLLOWING AXILLARY LYMPH NODE DISSECTION FOR BREAST CANCER BY COMBINED INTRADERMAL AND SUBFASCIAL INJECTIONS OF 99MTC-NANOCOLL

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IRCCS Azienda Ospedaliera Universitaria San Martino - IST, Genoa, Italy

Aim: Arm lymphedema is a frequent complication of breast cancer therapy and axillary lymph node dissection, with an estimated frequency of 5%-30%. This incidence is based primarily on studies that use volume and circumference criteria in the first years after surgery. In the extremities, the lymphatic system consists of a superficial system that collects lymph from the skin and subcutaneous tissue, and a deeper system that drains subfascial structures such as muscle, bone, and deep blood vessels. The superficial and deep systems drain at markedly different rates. In the normal arm, subfascial transport is slower than the superficial system and transports less lymph.
Material and methods: A retrospective study of 62 patients with breast cancer-related lymphedema was performed. The ages of the patients ranged from 38 to 81 years old with a mean of 57 years. They underwent both subcutaneous and intradermal injections in order to differentiate various mechanisms of edema. Superficial system was studied injecting 15 MBq of 99mTc-Nanocoll in 0.1 mL 4 injections were performed in the web space between the first and second and the second and third digits of the hands. Both arms receive injection to use one side as a control for patients with unilateral lymphedema. Deep system was demonstrate using a single 37 MBq dose in aponeurotic sites of the palms. Albumin microcolloid has a reproducible colloid size distribution (95% is <80 nm) and ease of labeling. Two-compartment lymphoscintigraphy (epifascial + subfascial) may be preferable for the differentiation of various mechanisms of extremity edema. Time for transport to regional lymph nodes, appearance of lymph vessels and nodes and distribution pattern were scored. These scores were compiled into a modified Kleinhans transport index (TI) in order to quantitate visual findings in lymphoscintigraphy. This method designes a numeric index of transport kinetics by combining visual assessment of five criteria: temporal and spatial distribution of the radionuclide, appearance time of lymph nodes, and graded visualization of lymph nodes and vessels. For assessment, scores were used ranging from 0 to 9. Thus, the resulting TI ranged from 0 (normal) to 45 (pathological).
Results and conclusions: TI of both systems in healthy extremities was less than 10. TI was found to be increased in 93% of the affected arms. Average TI for superficial and deep systems were respectively 22.6 and 22.3. Lymphoscintigraphic semiquantitative evaluation has proved to be very sensitive and able to measure the arm lymph flow in axillary lymphadenectomy related lymphedema; investigation of the subfascial transport does not seem to provide additional informations respect the assessment of superficial circulation. We retain that the intrafascial injection in not able to correct identify the deep system; in our opinion a deep lateral metacarpal injection could allow a better visualization of the deep pathways, increasing the clinical impact of the lymphoscintigraphic studies.

Tuesday, 17th September 2013

H. 2.00 - 4.00 p.m.

Surgery 1

Sala Scolastica

Chairmen

Becker C. (France) - Tashiro K. (Japan) - Brorson H. (Sweden)

VASCULARIZED LYMPH NODE TRANSFER FOR PATIENTS WITH SECONDARY INFERIOR LIMB LYMPHEDEMA

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Background: Lymphedema affects as much as 28 a 47% of patients treated for gynaecological cancer. New reconstructive approaches to the lymphatic system have been gaining a lot of interest by a growing number of microsurgeons. Authors have reported the use of free lymphatic flap transfer to treat secondary lymphedema of the upper limb.

Material and methods: Files from 38 patients with secondary inferior limb lymphedema submitted to autologous lymph node transplantation were retrospectively reviewed. Data related to the lymphedema diagnosis and history, surgical treatment and clinical assessment were collected. Limb perimetry was used to estimate the approximate volume of the leg with the truncated cone formula.

Results: The average age at the time of the procedure was 52,1±12,4 years and patients had been suffering with lymphedema for an average of 9,1±7,3 years. Thirty-five patients presented with unilateral lymphedema while 3 patients had both limbs affected, with a total of 41 limbs treated. Eleven patients (28,9%) presented with minor complications (seromas or hematomas), of either the donor or recipient sites, which were treated conservatively. No major complications were seen on this series. Files from twenty patients presented enough data to follow limb volume evolution after the procedure. Total volume reduction in eight legs (2 patients with no measures of the healthy limb and 3 bilateral) ranged from no improvement (3 legs in 2 patients) to 17%, with an average reduction of 12%. Nine of 15 patients with unilateral lymphedema and measurements of the contralateral healthy limbs presented with a reduction of more than 30% of the excess volume of the affected leg. All of these patients had a lymphedematous limb volume that would not exceed 50% of the healthy leg, while 4 of the 6 remaining patients had more than 50% excess volume.

Conclusions: Patients with secondary leg lymphedema can benefit from autologous lymphnode transplantation. Results in patients with mild presentations seem to be more expressive that in more severe cases.

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CONGENITAL LYMPHEDEMA: STRATEGY

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The lymphatic MRI is the only examen giving a map of the decease, and help us to make a better strategy to treat the patients.
The hypoplasy cases (lymph and or nodes hypoplasy) are excellent indications of ALNT – results showed –.
But lymphedema can occur because anarchy, cyst, thoracic duct lesions, hyperplasy also:then derivations (lymphovenous) are the best logical approach.
Lipoedema can be treated by external selective liposections, but b = never in internal regions.
This strategy is necessary before choose any surgical options, and to avoid no results or complications

OUR 3 YEARS EXPERIENCE IN MICROSURGICAL TREATMENT OF LYMPHEDEMA ADOPTING LVA: PRINCIPLES, OUTCOMES AND PERSPECTIVES

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Surgical management of lymphedema is challenging. Furthermore an unanimous consensus on principles, indications and outcomes is still far to be achieved.
Several surgical strategies have been described in recent years. The supramicrosurgical LVA technique, first described by Koshima, is characterized by a high success rate in minimally invasive and broad indications. Nevertheless it requires uncommon technical skills, specific training and equipment. Thanks to Prof. Koshima and his team we have introduced in Italy the LVA technique since 2010. From September 2010 to December 2013 we performed LVA on 73 patients affected by lymphedema (stage I-IV). A total of 370 anastomosis were completed.
Candidates to LVA surgery were required to exhibit one of the following features: rapid and severe evolution of the disease, poor response to physiotherapic treatments, frequent lymphangitis.
Patients were evaluated clinically and instrumentally before and after surgery. Indocianine-green flourescent lymphography, ultrasonography, volumetric analysis were taken. Also subjective compliance was evaluated adopting a dedicated questionnaire. Postoperative findings were taken every 3 months.
Outcome were assessed as objective and subjective.
Results were analyzed according to clinical stages, fluorescent lymphography patterns and time from lymphedema onset.
Data analysis demonstrated that 60 % of patients showed a volumetric reduction of the affected extremity; 90 % would repeat the procedure; 70 % of patients was referred to us by patients who underwent LVA previously; after a years 50% patients reduced the strength class of garments; 20 % do not need physiotherapy anymore.
All patients complaining lymphangitis showed a drastic decrease episodes. No complications and no clinical worsening has been observed after surgery.
According to our experience lymphatic vessels can be always detected in distal areas even in patients showing severe lymphedema.
Therefore every patient can take benefits of this technique. Moreover remission of lymphedema can be achieved in early stage. Indeed future perspectives should be focused on preventive minimally invasive surgery.

SURGICAL REDUCTION OF MALE GENITAL LYMPHEDEMA AND DEFECT CLOSURE WITH LOCAL FLAPS: TECHNIQUES AND OUTCOMES

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Background: Genital lymphedema is a debilitating condition that markedly reduces the quality of life and is difficult to treat. Currently, no surgical therapy standards exist and in most cases the plastic surgeon relies on his judgment with regard to the reconstructive procedure following the excision of diseased tissue. The aim of this study was to analyze our experience with reduction of male genitals and to describe our surgical technique.

Methods: We conducted a retrospective study of 52 male patients who received genital reduction surgery in our clinic between 1998 and 2012. Data regarding the etiology, type of surgery, complications and mode of perioperative care were collected.

Results: Thirty-two (62%) of our cases suffered from primary, whereas seven (13%) patients had secondary lymphedema. The disease was not classifiable in 13 (25%) of patients. Six patients (12%) exhibited an isolated penile affection, 22 (42%) scrotal affection, while the majority (24, or 46%) exhibited penoscrotal lymphedema. Forty-two (81%) patients underwent perioperative complex decongestive physiotherapy at a specialized lymphological clinic. Surgical therapy involved debulking the scrotum in 44 cases (85%) and circumcision in 11 cases (21%). Nine patients (17%) received orchidopexy. When required, defect closure was achieved with local flaps. Five cases suffered from complications requiring surgery: haematoma developed in four cases (8%) and dehiszence in one case (2%). Disease recurrence requiring surgery was seen in five patients (10%).

Conclusion: Our results show that genital reduction surgery in male patients can be performed reliably, with a low complication and reoperation rate.

INTEGRATIVE THERAPEUTIC CONCEPT FOR SURGICAL TREATMENT OF SEVERE CASES OF LYMPHEDEMA OF THE LOWER EXTREMITY

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Introduction: Conservative treatment of patients with elephantiastic chronic lymphedema of the lower extremity is limited and often inadequate due to the strong fibrotic changes of the tissue. The resecting surgery plays an important role in these cases.

Patients and Methods: We conducted a retrospective study of 20 patients with elephantiastic lymphedema who received reduction surgery in our clinic between 1998 and 2012. Data regarding the etiology, type of surgery, complications and mode of perioperative care were collected.

Results: The mean age of the patients was 47 (5 male and 15 female). 13 patients had a bilateral 7 patients a unilateral affection. All patients were treated preoperatively in a specialized lymphological clinic (Földi Klinik) for at least two weeks until a significant improvement of the edema and a reduction of the volume had been achieved. 17 patients underwent a single operation, one patient was operated on two times another two patients had three operations. Three of these reoperations were performed due to surgical complications such as bleeding and infection. None of the patients developed a lymphocele or erysipelas. Afterwards, all patients were transferred back to the lymphological clinic to continue the conservative treatment for further 2-3 weeks. Thus, after this ingegrative approach, a mean volumetric reduction of around 60% could be achieved.

Conclusion: This integrative concept allows a massive volumetric reduction with low complication rate.

MINIMALLY INVASIVE LYMPHATIC SUPERMICROSURGERY (MILS) FOR EARLY-STAGE LYMPHEDEMA

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Background: Lymphaticovenular anastomosis (LVA) is becoming the treatment of choice for compression-refractory lymphedema with its effectiveness and low invasiveness. However, it usually entails skin incisions of around 3 cm, and operation time of around 4 hours. With multiple supermicrosurgeons under guidance of indocyanine green (ICG) lymphography, LVAs can be simultaneously performed under local anesthesia within about 2 hours via small skin incisions with length less than 1 cm, allowing minimally invasive lymphatic supermicrosurgery (MILS).

Methods: MILS operations were performed on 11 peripheral lymphedema patients; with ICG lymphography guidance, multisite LVAs via millimeter skin incisions were simultaneously performed by multiple lymphatic supermicrosurgeons using multiple microscopes. LVAs were performed at sites where ICG lymphography showed linear pattern.

Results: Preoperative ICG lymphography revealed that pathophysiological severity stage (dermal backflow stage) was stage II in 8 limbs and stage III in 3 limbs. Two to 3 operating microscopes per limb were used for MILS. Length of skin incision for LVA ranged from 1 to 9 mm, and all LVAs were successfully performed via millimeter skin incisions. Average operation time was 1.8 hours. Lymphedematous limbs showed postoperative volume reduction.

Conclusion: LVA is a minimally invasive and effective treatment for refractory lymphedema. ICG lymphography allows easier LVA by guiding lymph vessel location on patients with early-stage (dermal backflow stage -III) lymphedema on whom ICG lymphography shows linear pattern. MILS can be a choice of treatment for early-stage lymphedema refractory to conservative treatments.

SUPRACLAVICULAR FASCIO-CUTANEOUS LYMPH NODE ISLAND FLAP FOR AXILLARY LYMPHATIC RECONSTRUCTION IN THE TREATMENT OF LYMPHEDEMA AFTER BREAST CANCER

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Background: A large number of lymph nodes and proper functionality of the lymphatics are essential for fluid homeostasis and immune surveillance. Autologous transplantation of lymph collectors derived from the thigh has been shown to be a suitable treatment option for chronic arm lymphedema after breast cancer. However, the method is not applicable for patients who are at risk of developing leg lymphedema. Here we investigated if supraclavicular fascio-cutaneous lymph node island flaps in combination with lympho-lymphatic anastomosis can be used for the treatment of chronic arm lymphedema.

Methods: 10 patients with late stage II arm lymphedema were treated with transplants of supraclavicular lymph nodes with adjacent facio-cutaneous tissue. One patient obtained lymph node transplantation without skin tissue. One patient was treated with lymph nodes, skin tissue and lympho-lymphatic anastomosis.

The plasticity of the supraclavicular vascular supply was studied in anatomical cadavers. Kapandji-Index as well as dynamometer measurements were performed after 14 days, 1, 3 and 6 months.

Results: All patients showed significant improvements of their symptoms, although one patient showed a partly necrotizing skin transplant. One patient had a mild palsy of the supraclavicular nerves. Kapandji-Index and improvements of the dynamometer values point towards a strong positive correlation with the surgery.

Conclusions: Vascularized supraclavicular lymph node transfer with multiple lymph nodes show very good results and significant improvement in arm lymphedema treatment after breast cancer surgery. Long term studies with larger patient numbers are yet to be done.

MULTIDISCIPLINARY MANAGEMENT OF ADVANCED LYMPHŒDEMA AT MACQUARIE UNIVERSITY – THE FIRST 12 MONTHS

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Introduction: The Macquarie University Cancer Institute established Australia's first multidisciplinary Advanced Lymphoedema Assessment Clinic (ALAC) in May 2012 and has embedded translational multidisciplinary clinical care and research into its surgical liposuction program. The outcomes of the first years' experience of liposuction for advanced lymphoedema will be outlined.
Patients and Method: Eligibility criteria for liposuction surgery consisted of unilateral limb lymphoedema patients with longstanding advanced (The International Society of Lymphology stage ll or lll) non-pitting primary or secondary lymphoedema, who had a limb volume difference of at least 750 ml, and for whom conservative therapies were ineffective. As long-term compliance to wearing compression garments was an essential component of effective post-operative management, patients were required to demonstrate this commitment prior to program acceptance. Seventy-seven people were screened by telephone to assess their eligibility to attend ALAC. Sixty patients were eligible to attend the multidisciplinary ALAC for their assessment by specialists in rehabilitation, plastic surgery, imaging, oncology and allied health, of whom 33% travelled from interstate. Following surgery, patients were monitored at 2 and 6 weeks, and then 3, 6, 9 and 12 months post-operatively. Assessments included history and clinical examination, bioimpedance spectroscopy (L-Dex), volume differences using circumferential measurements, Magnetic Resonance Imaging (MRI), functional assessments, and garment measurements.
Results: Between May 2012 and April 2013, 60 patients attended ALAC. Thirty five patients (58.3%) aged 57 ± 11.8 years were eligible for liposuction surgery. To date, twenty patients (33.3%) (14 arm and 6 leg) have undergone or have surgery planned. Ten of 11 patients who have undergone surgery have completed a post-operative assessment. With a mean follow up of 4.5 months (range, 1.5-12), they had a mean pre-surgical percentage limb difference of 57% (range, 22-66). At six-weeks post-operatively, the mean percentage limb difference reduced to 16% (range, 2-23), equating to a mean percentage excess volume reduction of 68% ($p = .0002$).
Conclusion: A translational multidisciplinary clinic for managing patients with advanced lymphoedema with the option of liposuction has been implemented and well received and has the potential to relieve suffering for advanced lymphoedema patients. Currently this surgery is offered to private or self-funded patients. Strategies to minimise cost and increase access are needed.

LYMPH COLLECTOR TRANSPLANTATION FOR LYMPHEDEMA MANAGEMENT IN CANCER PATIENTS: 10 YEARS OF LYMPHATIC SURGERY

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Background: Secondary lymphedema is a debilitating condition commonly causing complications in cancer therapy. This prospective study provides an overview about the treatment of secondary lymphedema by use of lymph vessel transplantation as well as pre- and post operational examination using the DASH-Score and UEL-Index for upper lymphedema and LEL-Index and AOFAS for lower extremity lymphedema.

Method: Twenty patients with secondary upper-and fifteen with lower extremity lymphedema underwent surgery by use of lymph vessel transplantation. The mean duration of lymphedema was 3 years ranging I-III.The pre- and post operational severity of their condition was evaluated with the DASH-Score, L-Dex and moisture content. The evaluation took place once before the surgery, then 14 days, 3 and 6months and 1 year after the procedure. The evaluation includes MRL, lymph scintigraphy and PDE.

Results: The standard treatment involved the transplantation of 3-4 lymph vessels of 25-30cm length from the ventromedial bundle of the upper leg. The mean follow-up time was 18months. MRL and PDE show that after 1 year the transplanted lymph collectors remain fully functional. 35 patients showed a constant decrease and stabilization of the DASH-Score and UEL-Index, AOFAS and LEL index through 18 months.

Conclusion: Lymph vessel transplantation might be a treatment option for secondary lymphedema management. The evaluation results DASH-score point towards a strong correlation for upper extremities while LEL-Index and AOFAS can be used for lower extremity evaluations.

THE GUIDE WIRE METHOD: A NEW TECHNIQUE FOR EASIER SIDE-TO-END LYMPHATICOVENULAR ANASTOMOSIS

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Introduction: Lymphaticovenular anastomosis (LVA) has become one of the treatment options for lymphedema. Among several types of anastomosis, side-to-end (S-E) anastomosis in which a window is made on the wall of a lymphatic vessel is considered to be the most effective, since it creates bidirectional bypasses through one anastomosis. However, making a side-to-end anastomosis with a small lymphatic vessel and a venule can be technically challenging. We developed a new technique, guide wire method, using an intravascular stenting (IVaS) that significantly facilitates the procedure.

Materials and methods: A lymphatic vessel and a venule are identified and dissected for anastomosis. The venule is transected, leaving the proximal end long enough for anastomosis. In LVA, you should always choose a venule with a valve to prevent back flow of the venous blood into the lymphatic. Next, with microscissors, a small window is made on the sidewall of the lymphatic vessel. Lymphatic outflow from the window can be observed if the vessel is a functional lymphatic vessel. A piece of nylon suture, or an IVaS, is inserted from this window into the lumen of the lymphatic vessel. Unlike previous methods, once the tip of the nylon suture is inserted through the opening, further insertion along the vessel is very smooth, resembling insertion of a guide wire into the blood vessel. After the IVaS is completely inserted into the lymphatic vessel, the IVaS is slid back along the lumen. The edge of the window can clearly be seen thanks to the color contrast between the blue IVaS and the lymphatic wall . The anastomosis procedure, especially insertion of the needle, is significantly facilitated since the IVaS keeps the lumen open . The last suture is left untied for removal of the IVaS. The IVaS is smoothly pulled out along the lymphatic vessel, and the suture is tied to complete the anastomosis. Patency and efficacy of the anastomosis are confirmed by the flow of lymphatic fluid into the venule.

We performed S-E LVAs using the guide wire method on 6 patients with secondary lower extremity lymphedema (LEL). Feasibility and intraoperative patency of the method, and postoperative volume reduction were evaluated.

Results: Decreases in circumferences were seen in all limbs.

Conclusions: The guide wire method facilitates S-E LVA via smooth insertion and removal of intravascular stenting, resulting in efficient lymphedema treatment.

"LYMPHA" ORIGINAL TECHNIQUE IN THE PREVENTION OF SECONDARY LYMPHEDEMA: FROM THE IDEA TO 5 YEARS CLINICAL APPLICATION

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Breast cancer related lymphedema (LE) represents an important morbidity that jeopardizes breast cancer patients' quality of life. Different attempts to prevent LE brought about improvements in the incidence of the pathology but LE still represents a frequent occurrence in breast cancer survivors. Five years ago, **LYMPHA** *(Lymphatic Microsurgical Preventing Healing Approach)*[1] was proposed and long-term results are reported in this study. From July 2008 to December 2012, 74 patients underwent axillary nodal dissection for breast cancer treatment together with LYMPHA procedure. Volumetry was performed preoperatively in all patients and after 1, 3, 6, 12 months and once a year. Lymphoscintigraphy was performed in 45 patients preoperatively and in 30 also postoperatively after at least over 1 year. 71 patients had no sign of lymphedema and volumetry was coincident to preoperative condition. In 4 patients lymphedema occurred after 8-12 months postoperatively. Lymphoscintigraphy showed the patency of lymphatic-venous anastomoses at 1-3 years after operation. LYMPHA technique seems to represent a successful surgical procedure for primary prevention of arm lymphedema in breast cancer patients.

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LYMPH-CHYLOUS REFLUX: LITERATURE REVIEW AND CASE REPORT OF A YOUNG MAN WITH DELAYED DIAGNOSIS

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Introduction: Lymph-Chylous reflux is not common cause in pathogenesis of lymphedema of the lower limbs.The clinical manifestation of this primary or secondary disease are often underestimated.
After a full review of the scientific literature about primary abdominal lymph-chylous displasias, the Authors report a case of young man with elephantiasis of the left thigh, but completely normal to below the omolateral knee

Case report: The patient, a 38 years old white male, has a history of uneventful until the age of 18 when was operated on hernia repair for the appearance of a left inguinal swelling. after two years presented recurrence of the same inguinal swelling but associated with lymphedema of the left thigh (rhizomelic)
Lymphoscintigraphic patterns of limbs confirmed lymphostasis and the patient is diagnosed with secondary lymphedema. The patient was subjected to liposuction and CDP without results
Physical examination performed after 20 years of the first surgical apporach revealed elephantiasic lymphedema of the left thigh without lymphostasis sign under the knee, lymphostatic verrucosis in omolateral inguinal region with occasional chylourrea and lymphorrea.
After making an Lymphangio-MR has shown the presence of a intestinal and lombo-aortic Lymphangiodisplasia with mild pleural effusion. So the lymphostatis of the left thigh was not attributable to a inguinal obstruction type as happens in normal post-surgical lymphedema of lower limbs but at a reflux of lymph and chylous from the abdomen, facilitated by surgical treatments and not responding to CDP.

Conclusion: In patients with lymphedema of lower limbs does not respond to traditional lymphological therapy is always useful to think in differential diagnosis of a concomitant abdominal reflux.

Tuesday, 17th September 2013

H. 2.00 - 4.00 p.m.

Poster discussion 2

Sala Timoteo

Chairmen

Eliska O. (Czech Rep.) - Failla A. (Italy) - Guerreiro Godoy M. de F. (Brazil)

EXAMINATION ABOUT THAT THE MEASUREMENT OF BIOELECTRIC IMPEDANCE (BI) IS USEFUL IN THE STAGE JUDGMENT FOR SECONDARY LOWER EXTREMITY LYMPHEDEMA

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Objectives: We examined whether measurement of Bioelectric Impedance (BI) is useful the stage judgment for secondary lower extremity lymphoedema.

Methods: The subjects were 69 women with stage 0 to IIb lower extremity lymphoedema (unilateral, 55 patients; bilateral, 14 patients). For verification, we included 83 lower extremities in this study. Data were collected from September to November 2012. The body mass indexes (BMIs) and BI values for both lower extremities were measured. BI was measured at the central medial portion of the lower limb and suprapatellar medial portion of the thigh. Staging was performed by a therapist in accordance with the guidelines of the International Society of Lymphology (ISL). The data were analyzed with a binomial logistic regression model using the SPSS. This study was approved by the ethical committee of the university.

Results: The overall mean BMI was 23.0 ± 2.9 (range, 17.2–29.3). As determined by the therapist, 24, 21, 22, and 16 legs had stage 0, I, IIa, and IIb, respectively. In the patients with a diagnosis of a stage 0 lymphoedema, the evaluation results were consistent with a 79% probability of actually having an edema. Meanwhile, 33% of the patients with a stage I diagnosis had no actual edema. All of the patients with stage IIa and IIb diagnoses had confirmed edemas. Some of the patients with lymphoedema diagnosed as stage I or lower, or stage IIa or higher had a misdiagnosis (stage 0, 13%; stage I, 14%; and stage IIa, 14%). In contrast, none of the patients with stage IIb lymphoedema had a misdiagnosis. Moreover, no false-positive diagnoses of stage 0 and I lymphoedemas were found, whereas 18% and 31% of lymphoedema cases diagnosed as stage IIa or lower, and stage IIb or higher, respectively, were false-positive.
Based on the results of the 3 analyses, the rate of concordance between our lymphoedema staging according to local BI and that by clinical judgment was poor at 67%, possibly because of judgment was performed for the whole lower limb.

Conclusion: In some patients, no concordance was found between the clinical judgment according to ISL classification system and our staging method using BI measurements, possibly because the lymphoedema status in these patients was not dependent on the location of the lymphoedema in the lower limbs. Thus, to establish self-care guidelines, lymphoedema staging based on lymphoedema localization in the lower limb may be useful.

IMPLEMENTING A MULTI-LAYERED ARCHITECTURE FOR SOURCE-AGNOSTIC LYMPHEDEMA DATA STORAGE AND ANALYSIS

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The American Lymphedema Framework Project (ALFP) created the Minimum Data Set (MDS) to collect and analyze clinical and self-reported data related to lymphedema. The ALFP-MDS contains longitudinal visit information, volume measurements, symptoms and treatment data to be computationally studied and the resulting findings are shared among a variety of stakeholders, including patients, researchers, health professionals, and industry. Because the data are collected from heterogeneous sources, the ALFP-MDS defines a standardized storage format, and implements a multi-layered architecture for data deposit and access. The primary considerations are data quality and integrity.
The 3-layer architecture allows data to be imported from a variety of formats. At the topmost layer, each record is represented abstractly and mapped to standard concepts containing one or more objects. Patient data contain demographics, treatments, and surgeries. A visit contains a patient, reported symptoms, and measurements. These objects are passed to a second layer, which handles value parsing, redundancy, and validation. The third layer corresponds to the data model, which reads and writes to the relevant database storage. The parameter-parsing layer uses a series of synonym tables to map anatomy and symptom names to a canonical form. For example, anatomical descriptions such as "left" or "Left arm" can be stored as the same conceptual entities. This facilitates cross-source comparison and allows items to be linked by concept-identifiers with third-party sources, such as SNOMED and UMLS. Contributors maintain source identifiers that make it possible to compar e individual data to global characteristics, such as symptoms or volume increase by demographic or treatment option.
Elimination of redundancy is particularly important in this setting to support overlapping data (e.g. longitudinal studies) and avoid over-counting. Upon instantiation, objects are populated and matched against existing records in the ALFP-MDS to identify duplicate entries. This could be as simple as matched source identifiers or a complex combination of attributes. If a duplicate record is found, the records are intelligently merged.
To date, the ALFP-MDS contains approximately 1300 patients across over 8000 clinical encounters. Records are stored in a canonical format, which allows simplified query and data analysis. Each source is provided a custom import pipeline to map local attributes to the ALFP-MDS, making it straightforward to add new data without intermediate curation. The end result is a fully automatable process for integration with the ALFP-MDS from virtually any source format.
This project is funded by the National Library of Medicine grant #1 G08 LM 010711-03.

NORMAL LYMPHATICS MOTOR ACTIVITY AND ITS TREATMENT

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Background: The modern theory of active lymph flow is based upon intermittent lymphangions' contractility. Methods and materials. "Normal" and "in lymphedema" isolate lymphangions' motor activity of human lower extremities were investigated. It was established that lymphangions were like heart had automaticity (frequency 4 per minute) and made more contractile activity while spreading.

Results: Rhythmic motor activity can be initiated with electrical and mechanical stimulus, catecholamines and other endogenous regulators. Lymphangions like vessels reacts at these stimulus increasing tones and decreasing its capacity. Sympathetic nerve system runs neurogenic control principally. Noradrenaline influences on beta-adrenoreceptors decreasing frequency of autorhythmic contractilities; increasing its concentration makes rhythm more frequent by activating alpha-adrenoreceptors. Local regulating activity realizes by means of tissue hormones with mastocytes. Serotonin increases but heparin decreases phase and tonic reactions of lymphangions. Histamine in low concentration stimulates but in high concentration – stops motor activity.

Discussion: There is an initial stage in lymphedema pathogenesis when lymphangions contractile activity have intact structure but change its reactivity to endogenous regulators due to endolymphatic pressure. So it leads to incompetence of lymphatic pump activity and edema. Beginning conservative treatment at this stage lets to save lymphangions contractile activity and prevent further lymphedema progression. There are some effective methods at this stage like electro-stimulation, pneumatic compression and other methods decreasing endolymphatic pressure. Solkoseril, adrenoagonists, phlebotonics, interleukin-2 increases phase rhythmic contractility and pump activity of isolated human lymphangions. Also this kind of drugs are affective in lymphedema treatment.

CERVICAL LYMPHATIC THERAPY REDUCES LYMPHEDEMA CAUSED BY THE TREATMENT OF LARYNGEAL CANCER

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The case of a 62-year-old patient is reported. Two years previously this patient had felt a strong sore throat after eating ice cream. Soon after, an outbreak of herpes zoster appeared which was treated with medications, but the pain continued and the patient was referred to an otolaryngologist who made an ultrasound and found a nodule in the larynx. The patient was referred to an oncologist who diagnosed laryngeal cancer. The patient was submitted to chemotherapy (11 sessions) and radiotherapy (40 sessions). After treatment, the patient complained of neck pain, difficulty in swallowing, decreased saliva production, difficulty in sleeping and hoarseness. The patient was then referred to the Clinica Godoy for treatment of the edema where Cervical Lymphatic Therapy – cervical stimulus as described by Godoy & Godoy was performed. This technique consists of light stimulation of the cervical region for a period of 20 minutes five times per week. A marked improvement was observed in the first few days with the voice and swallowing of solids returning to normal. The aim of this study is to describe the use of Godoy & Godoy Cervical Lymphatic Therapy to improve the clinical signs and symptoms after laryngeal cancer treatment.

INTRA-ABDOMINAL FAT IN PATIENTS WITH ARM LYMPHEDEMA AFTER THE SURGICAL TREATMENT OF BREAST CANCER

BUZATO SILVA E., BRIGIDIO AMADOR FRANCO P., BARUFI S., GUERREIRO GODOY M. de F., PEREIRA DE GODOY J.M.
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The aim of this study was to evaluate and measure the incidence of intra-abdominal fat (IAF) in women submitted to mastectomy. Forty-five female patients diagnosed with arm lymphedema in 2011 were enrolled. The measurement of IAF was by bioimpedance (InBody S 10®) the results of which were correlated with the body mass index (BMI). The paired t-test and Fisher exact test were used for statistical analysis with an alpha error of 5% being considered acceptable. An association was identified between BMI and GIA (p-value < 0.03). The authors suggest that an assessment of intra-abdominal fat should be included in preventive evaluations of patients with lymphedema after breast cancer treatment.

THE ANALYSIS OF TISSUE COMPRESSIBILITY PATTERN USING ULTRASONOGRAPHY IN LYMPHEDEMA PATIENTS AFTER BREAST CANCER SURGERY

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Introduction: To investigate the subcutaneous tissue compressibility by using ultrasonography in lymphedema patients after breast cancer surgery.

Methods: Lymphedema patients who took breast cancer operation were included. Thickness of subcutaneous tissue was assessed at two spots; 10cm below elbow (forearm) and 10cm above elbow (upper arm) at both sound side and affected side. By using probe attached to real-time pressure sensor, we could obtain pressure- thickness (subcutaneous) curves. Compressibility of each subcutaneous tissue was calculated by differentiating the curves. We defined the original compressibility as compressibility at point of no pressure. By comparing the original compressibility of normal side and that of affected side, lymphedema tissues were classified into “softer” and “harder” tissues.

Results: Overall 30 cases of lymphedema tissues and 30 cases of sound tissues were checked. The difference of the original compressibility between normal and affected side ranged from -7.62 to 4.50. The lymphedema tissues were classified into 12 softer tissues and 18 harder tissues. No demographic and clinical values, including clinical stage of lymphedema, showed statistically meaningful differences between two groups.

Conclusions: Evaluation of subcutaneous tissue with ultrasonography and real-time pressure sensor could be one of the useful tools for investigation of lymphedema tissue characteristics.

FEASIBILITY OF AN IR CAMERA SYSTEM FOR SURFACE MAPPING AND VOLUME MEASUREMENTS IN LYMPHEDEMA OF THE HEAD AND NECK, TORSO AND EXTREMITY

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Background: Secondary lymphedema may arise as a consequence of site specific therapy for cancers arising in different body sites. Techniques for volumetric assessment of the head and neck and breast are neither readily available nor clinically practical. A low-cost portable system that can provide three-dimensional quantitative volume measurements would enable lymphedema assessment and monitoring.

Purpose: To investigate the feasibility, reproducibility and accuracy of a readily available infrared (IR) camera system for the measurement of secondary lymphedema in the head and neck, breast and upper extremities.

Methods and materials: A commercial IR camera system Microsoft Kinect™ (Microsoft Corporation, Redmond, Washington) and ReconstructMe (PROFACTOR, Steyr-Gleink, Austria) and a computer (Intel i7-3610QM, 12 GB of RAM, NVIDIA Geforce GTX 670M graphics card) were used to obtain depth maps. Analysis was undertaken using 3D-DOCTOR (Able Software Corp., Lexington, MA). Two phantom models for each anatomic site (head and neck, female torso, upper extremity) were imaged at a distance of 100-120 cms from the camera. The time required to perform and reconstruct each circumferential measurement was captured. Repeated measures (n=3) with volumes of 50 to 300ml (50ml increments) were made. Comparison of the volume measures obtained was made to ground truth as determined by water displacement.

Results: Freehand movement of the camera circumferentially around the phantoms required 72 seconds (55-90) to capture and reconstruct the region of interest. Water displacement volume measures for the arm (1950ml, range: 1947-1953); breast (450ml, range 442-455) and head and neck (4780ml, range 4769-4792) were comparable to the IR camera measurements of 2150ml, range: 1754-2510; 450ml, range 420-593 and 4780ml, range 4243-5019 respectively. Repeated measures and comparison to the ground truth volume revealed fair reproducibility (coefficient of variation 9.2%) and accuracy (mean percentage difference 11.3%) of the IR camera surface measures.

Conclusion: The use of an off the shelf IR camera system provides a low-cost and feasible method for obtaining measures of volume for anatomic regions that do not lend themselves to measures of circumference. The 3D models generated in real time allow viewing and assessment from multiple perspectives. The accuracy of the data is anticipated to improve with revision in the IR camera system resolution and merits further study.

AXILLARY WEB SYNDROME OR FIBROTIC LYMPH COLLECTOR: WHICH IS THE MOST ADEQUATE NAME AND HOW TO TREAT IT? – A REVIEW

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Axillary web syndrome (AWS) is a complication of the axillary approach in the surgical treatment of breast cancer. Various names are used to define the presence of cords, pain and limitation of the shoulder range of movement (ROM). The physiotherapy interventions are diverse and there is no consensus. The objective of this study is to define which is the best name based on physiopathological status for this syndrome and which is the most adequate physiotherapy treatment. This study has been performed based on bibliographical research on the Medline and Lilacs databases. The initial findings of physiopathology with venous origin have not been confirmed and the current description is the presence of fibrosis in the lymphatic vessels, presenting cords that go along not only the axilla and the arm, but extending to the chest and the base of the thumb. The physiotherapy treatments described are associations of techniques aiming to reduce the time of cord resolution, improvement of pain and release of ROM. With a better understanding of the physiopathology and since the location of the cord is not restricted to the axilla, the name suggested to replace the AWS is the Fibrotic Lymph Collector. The physiotherapy interventions to reduce course and intensity of the symptoms is an association of manual techniques with progressive increase of shoulder ROM in abduction, to gain a better ROM, to improve pain status, to return function and quality of life of the patients who have undergone breast cancer surgeries with axillary involvement.

Key Words: Axillary web syndrome, Physiotherapy, Breast cancer, Sentinel lymph node biopsy, Axillary dissection, Manual techniques.

PAIN IN BREAST CANCER TREATMENT, AGGRAVATING FACTORS AND COPING MECHANISMS

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The objective of this study was to evaluate pain in women with breast cancer-related lymphedema and the characteristic aggravating factors and coping mechanisms. The study was conducted in the Clinica Godoy, São José do Rio Preto, with a group of 46 women who had undergone surgery for the treatment of breast cancer between 6 months to 10 years previously. This was an observational, quantitative, random study. The following variables were evaluated: type and length of surgery; number of radiotherapy and chemotherapy sessions; continued feeling of the removed breast, infection, pain (at site of removed breast or isolated), intensity of pain and factors that improve and worsen the pain. The percentage of events was used for statistical analysis. About half the participants (52.1%) performed modified radical surgery, with 91.3% removing only one breast; 82.6% of the participants did not perform breast reconstruction surgery. Most women (63.04%) were submitted to from 6 to 10 chemotherapy sessions and 71.3% had more than thirty sessions of radiotherapy. The body mass index was more than 25 in 63.4% of the cases. Insignificant pain was reported by 32.60% of the women and 67.3% said they suffered pain; it was mild in 28.8% of the cases (1-5 scale), moderate in 34.8% (6-9-scale) and severe in 4.3%. The main mechanisms used to cope with pain were painkillers in 41.30% of participants, rest in 21.73%, religious ceremonies in 17.39% and to chat with friends in 8.69%. A total of 53.17% of the women had completed high school; 58.7% were married, 21.37% were separated and 19. 6% were widowed. In respect to occupation, 21.73% worked, 30.43% were on sick leave or unemployed and 47.82% were retired. In conclusion, many mastectomized patients with lymphedema complain of pain, but pain is often underrecognized and undertreated.

GENITAL DERMAL BACKFLOW (GDB) STAGE BASED ON THE CONCEPT OF LOWER-ABDOMEN-TO-GENITALIA SEQUENCE: INDOCYANINE GREEN LYMPHOGRAPHY FOR PATHOPHYSIOLOGICAL EVALUATION AND EARLY DIAGNOSIS OF GENITAL LYMPHEDEMA

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Background: Treatment of genital lymphedema (GL) is challenging, and early diagnosis and intervention is important to prevent progression of GL. However, early treatment of GL is difficult due to a lack of appropriate evaluation methods allowing early diagnosis. This study aimed to develop a novel pathophysiological evaluation method for early diagnosis of GL using indocyanine green (ICG) lymphography.

Methods: Patient characteristics and ICG lymphography findings of 68 secondary leg lymphedema patients were reviewed. The clinical data and dermal backflow (DB) stages based on ICG lymphography findings, leg DB (LDB) stage for leg lymphedema and genital DB (GDB) stage for genital lymphedema, were analyzed to compare between the left and right region with and without symptomatic GL.

Results: Twenty-two of 136 lateralities had symptomatic GL. Univariate analyses revealed statistically significant differences between lateralities with and without GL in duration of leg edema (6.3 ± 1.1 vs. 3.8 ± 0.5 years), International Society of Lymphology stage (stage 0/1/2/3: 0/4/15/3 vs. 40/32/32/10), LDB stage (stage 0/I/II/III/IV/V: 0/0/7/9/4/2 vs. 6/35/23/29/18/3), and GDB stage (stage 0/I/II/III/IV: 0/0/0/20/2 vs. 27/43/28/16/0).

Conclusions: ICG lymphography can clearly visualize abnormal lymph circulation in the lower abdominal and genital region. GDB stage is based on the concept of lower abdomen-to-genitalia (LAG) sequence, in which genital lymphedema follows lower abdominal lymphedema, allows early diagnosis of GL before symptom manifestation. ICG genital lymphography can be a key evaluation for prevention and early intervention of GL.

INDOCYANINE GREEN LYMPHOGRAPHY FOR PATHOPHYSIOLOGICAL EVALUATION OF HEAD-AND-NECK LYMPHEDEMA

YAMAMOTO T., HAYASHI A.
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Background: Head-and-neck lymphedema is not a rare condition, whose evaluation method is not yet established. Based on our accumulated data regarding evaluation of extremity lymphedema with indocyanine green (ICG) lymphography, we assessed applicability of ICG lymphography for evaluation of head-and-neck lymphedema.

Methods: ICG lymphography was performed on 3 healthy male volunteers and 2 patients with head-and-neck lymphedema following treatment for hypopharyngeal carcinoma. ICG was injected subcutaneously or submucously at 6 points on the median line of the face and head. Fluorescence images of lymphatic flows were obtained five minutes and three hours after injection. All photographs and movies were reviewed to analyze ICG lymphography findings based on patterns of linear lymphatic flow and dermal backflow (DB).

Results: ICG head-and-neck lymphography on healthy volunteers showed linear fluorescence lymphatic images from the injection sites to the submandibular and the occipital lymph nodes, and no DB pattern was detected. In head-and-neck lymphedema patients, DB patterns were seen in the submandibular and cervical regions where edema is clinically evident, similar to findings in extremity lymphedema. The severer head-and-neck lymphedema case showed a stardust pattern, denoting progressed lymphedema, while the milder case demonstrated a splash pattern, which is the sign of early stage of lymphedema.

Conclusion: ICG head-and-neck lymphography can be helpful in diagnosis and severity assessment of head-and-neck lymphedema.

IMPLEMENTING LYMPHEDEMA PREVENTION IN CLINICAL PRACTICE

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Department of Cancer Rehabilitation at Radiumhemmet, Karolinska University Hospital, Stockholm, Sweden

At Karolinska University Hospital, Stockholm about 110 axillary clearances and about 127 mastectomies are performed on women with breast cancer each year. The seroma drainage usually is removed the first postoperative day or at a maximum 4-5 days after surgery. Patients meet with the physiotherapist the day after surgery and are informed about appropriate physiotherapy in order to regain full mobility in the shoulder, They are also informed about the benefits of physical activity. Shoulder training is initiated 5 days after removal of the drainage. Until then patients are encouraged to perform arm movements up to shoulder level in order to avoid stiffness. Women are encouraged to return to previous level of activity and exercise as soon as possible. Depending on the surgical method they are given individual advice and specific training programs. After mastectomy and/or axillary clearance, patients are called to a return visit about 4 weeks after surgery meet a physiotherap ist / lymphedema therapist for information about the anatomy and physiology of the lymphatic system, shoulder training and physical activity. In case of lymphedema the women are encouraged to seek help from lymphedema therapist as early as possible. Stockholm has a network of lymphedema therapists and procedures for monitoring of breast cancer surgery are well known in the care trajectory. No referral is needed why patients can contact a lymphedema therapist in primary care directly. In Stockholm there are 48 lymphedema therapists in primary care and another 17 are connected to the palliative care teams.

OPERATIVE CORRECTION OF LYMPH OUTFLOW AT THE LOWER LIMBS LYMPHEDEMA

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Objectives: To improve the results of surgical treatment and recovery paths with lymph lymphedema of the lower limbs and suggested the formation of various types used lymphovenous anastomoses.

Methods: The results of application and limfoadenovenous limfoangiovenous anastomosis in patients with lymphedema of the lower limbs of varying degrees of severity. Operated on 69 patients. A 17 was diagnosed lymphedema degrees 1-2, 52 patients – 4-3 degrees. Limfoadenovenous anastomosis "side to side" imposed in 18 cases. In the 45 - to impose anastomosis "end-to-side". In 5 cases formed limfoangiovenous anastomoses. In the period from 6 months to 7 years after surgery, 65 patients were examined.

Results: Best early and late postoperative results obtained in patients with grade 1-2 lymphedema. They were operated on before the sclerotic processes in the lymph nodes, and trophic skin changes. In patients with grade 3 lymphedema in the early postoperative period were recorded satisfactory results. At 4 degrees was minimal positive trend. In the late period in 64.5% of patients with grade 3-4 observed a gradual increase in swelling.

Conclusion: The experience gained in our clinic experience of surgical correction of lymphedema can be recommended for use and limfoadenovenous limfoangiovenous anastomoses at the earlier stages of the disease. In patients with lymphedema of the lower extremities 1-2 degrees more pronounced and prolonged clinical benefit.

THE ANALYSIS OF TISSUE COMPRESSIBILITY PATTERN USING ULTRASONOGRAPHY IN LYMPHEDEMA PATIENTS AFTER BREAST CANCER SURGERY

KWON C.
Seoul National University Hospital, Department of Rehabilitation Medicine, South Korea

Introduction: To investigate the subcutaneous tissue compressibility by using ultrasonography in lymphedema patients after breast cancer surgery.

Methods: Lymphedema patients who took breast cancer operation were included. Thickness of subcutaneous tissue was assessed at two spots; 10cm below elbow (forearm) and 10cm above elbow (upper arm) at both sound side and affected side. By using probe attached to real-time pressure sensor, we could obtain pressure- thickness (subcutaneous) curves. Compressibility of each subcutaneous tissue was calculated by differentiating the curves. We defined the original compressibility as compressibility at point of no pressure. By comparing the original compressibility of normal side and that of affected side, lymphedema tissues were classified into 'softer' and 'harder' tissues.

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Conclusions: Evaluation of subcutaneous tissue with ultrasonography and real-time pressure sensor could be one of the useful tools for investigation of lymphedema tissue characteristics.

COMPARISON OF APPROACHES FOR MICROSCOPIC IMAGING OF SKIN

XIUFENG WU [1], SHUANMU ZHOU [2], JIAXIN CHEN [2], NINGFEI LIU [1]

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Summary: Assessment of skin lymphatic vessels is of great significance in understanding their roles in many pathological condition s. Our aim was to identify the optimal approach for investigation of cutaneous lymphatic system. We performed comparative studies on skin lymph atic vess els using immunohistochemistry of tissue sections, compute graphic reconstruction method together with immunohistochemically stained serial sections and whole mount fluorescence in human lower limb. Lymphatic vessels were identified with podoplanin antibody. The relative merits and drawbacks of each method in evaluatio n of structure, spatial organization, and distribution of cutaneous lymphatic vessels were described. Immunohistology of tissue sections enabled the investigation of the structure and distribution of the whole cutaneous lymphatic system in two-dimensional slices, where as three-dimensional morphology of only the most superficial lymph capillary network immediately under the epidermis could be evaluated with the whole mount technique. Meanwhile, only little segmentation of skin lymphatic vessel from five immunohistochemically stained serial sections was reconstructed and evaluated due to expense and special skills required using computer graphic three-dimensional reconstruction. Furthermore, a great number of artifacts and special skills required in its processes leaded to less accurate structure of skin lymphatic vessels. Our fin dings demonstrated that the us e of either of the proposed techniques alone could not allow a comprehensive analysis of the skin lymphatic system due to their relative drawbacks. Combination of immunohistology of tissue sections and three-dimensional whole-mount preparations appears to be the best candidate for comprehensive evaluation of skin lymphatic system.


Sant'Angelo Castle

Wednesday, 18th September 2013

H. 2.15 - 4.15 p.m.

Session 7

Peripheral œdema in hearth failure

Aula Magna

President

Volpe M. (Italy)

Chairmen

Rockson R. (USA) - Okada E. (Japan) - Antignani P.. (Italy)

LYMPHATIC VESSELS AND CARDIAC FUNCTION

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The lymphatic system plays a major role in the maintenance of cardiac function. Dysfunction of the cardiac lymphatics can lead to the onset of new pathology, aggravation of existing pathology or worsening of the long term prognosis.
Obstruction or severance of the principal trunks of the cardiac lymphatics results in phenotypic lymphogenic cardiomyopathy which can manifest in a variety of ways, the most common of which is tachycardic or bradycardic arrhythmia. Localised tissue swelling resulting from lymphatic dysfunction disrupts the firing patterns of pacemaker cells within the SA and AV nodes and affects the alignment of contractile proteins within myocytes.
Removal of lymph from tissues limits the inflammatory response by removal or reduction of inflammatory mediators from the interstitium. In lymphostasis, inflammatory cells and metabolites accumulate causing localised tissue damage and fibrosis. This can lead to valvular stenosis or incompetence. The circulation of lymph also provides immune surveillance, therefore lymphostasis can increase the incidence, and severity of infective pathologies such as myocarditis and endocarditis that may confound valvular pathologies.
Cardiac lymphoedema produces changes on an echocardiogram that mimic coronary ischaemia due to the effects of tissue oedema on the microcirculation of the myocardium. Arteriovenous shunting within the myocardium results in vessel-free areas that, unless rescued, will sclerose and eventually necrotise. This causes alterations in ventricular function and plasma concentrations of hormones such as angiotensin-II and endothelin-I. This has implications in cardiac transplantation surgery as the principal lymphatic trunks are invariably dissected during this procedure. Restoration and monitoring of the function of these vessels may reduce the incidence of allograft failure, chylothorax and other post-operative complications, thereby improving patient prognosis.
Understanding the various presentations of cardiac lymphatic disruption is important in identifying other pathological pathways that may intensify future cardiac pathologies if these presentations are not considered appropriately in the early stages of disease. This knowledge could open up alternative avenues of treatment that could be explored to prevent and improve the outcomes of the abovementioned cardiac pathologies. This critical review of the literature and a dissection of it will help inform the critical role lymphatics have in cardiac and whole body health and well being and help gain improved patient outcomes.

PITFALLS IN CLINICAL LYMPHOLOGY AND CARDIOLOGY

MARTIN KLAUS P.
Földi Clinic, Department of Specialist Clinic for Lymphology, Hinterzarten, Germany

At our specialist lymphological clinic we treat an increasing number of patients with multicausal lymphedema, in addition to patients with primary lymphedema and secondary lymphedema after cancer treatment. In geriatric or multimorbid patients there are often further accompanying diseases which can independently lead to peripheral or central edema. It is essential for the treatment and progress of these patients that diseases are recorded which may negatively influence the edema situation with renal or cardiac edema components.
The following case report concerns a young woman who had a severe accident with traumatic injuries as an adolescent, the consequences of which were no longer considered over time. However, the injuries did lead to a gradual worsening of cardiac function and the manifestation of multicausal lymphedema. The patient was misdiagnosed with “massive” lymphedema. The treatment was therefore initially unsuccessful. Extensive diagnostics revealed right heart insufficiency with pericarditis constrictiva as the predominant cause of the massive swelling. It was possible to improve the patient’s health using multimodal therapy and adapted complex physical decongestive therapy with close monitoring of cardiac and renal function. The diagnosis of pericarditis constrictiva was subsequently confirmed and successfully treated with pericardectomy. The patient afterwards received further complex physical decongestive therapy for the chronic multicausal lymphedema of the legs, with fur ther improvement .One year later the general health condition was significantly improved
The careful consideration and treatment of accompanying diseases is essential in achieving good therapeutic results for lymphedema, and especially for multicausal lymphedema. Even in patients with extensive edema, with lymphedema components that have persisted for years, careful renewed recording of the history and a clinical examination by a lymphologist may reveal the causal relationships in the formation of the edema in a new light. With multimodal therapy and close clinical monitoring good therapeutic results can be achieved even for patients with severe right heart insufficiency and cardiorenal syndrome in combination with lymphedema.

ADAPTIVE ABILITY OF CARDIAC LYMPHATIC VESSELS AND VEINS IN RESPONSE TO CARDIAC HYPERTROPHY

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The total cross sectional area of epicardial lymphatic vessels (CSA-ly) and that of epicardial veins (CSA-v) were measured and analysed in relation to the weights of their left ventricles (WLV).
We used human autopsied hearts whose WLV's were 70-140g as the material. Before fixation, epicardial lymphatics and veins were inflated by differential injection with solidifiable liquid media. The histological sections of the cross cut surface of the epicardium were made and photographed. The CSA-ly and CSA-v of the hearts were measured by point intercept method on the photographs.
The correlation coefficient (γ) between CSA-ly and WLV (γ-CSA-ly-LV) was 0.955 (p

DRUGS THAT PRODUCES EDEMA IN LOWER LIMBS. DIFFERENTIAL DIAGNOSIS WITH LYMPHEDEMA

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The authors present in this paper one of the causes of edema in lower limbs that force the differential diagnose with other causes of edema-lymphedema.
A list of drugs and the phisiological mechanisms of action are pointed up in this paper.

THE SWOLLEN LEGS: THE MANAGEMENT OF EDEMA IN PATIENTS WITH HEART INSUFFICIENCY AND PHLEBOLYMPHEDEMA

LIONE F.[1], PANUCCIO A.[2], POLIMENI V.[2], BENEDETTO A.[3], LIANI R.[4], D'ANGELILLO W.[2], MONORCHIO G.[2], FRISINA A.[2]

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An accurate diagnosis with a comprehensive and integrated approach of lymphedema is essential for proper treatment. It can easily make a diagnosis of the disease based on history and physical examination in most patients: edema with increased thickness according to the fibrosclerotic tissue component; absence of the sign of the fovea already in the early stages; presence of the sign of Stemmer (non-applicability of the skin at the base of the second toe); dystrophic skin lesions (post-lymphangitic sequelae, hyperkeratosis, verrucous lymphostatic, lymphorrhoea, chilorrea, etc ...) and frequent dermatol-lymphangio-adentis (DLA). It is helpful to the evaluation of lymph node stations to highlight the possible association with acute or chronic lymphadenopathy.
In more complex forms of angiodysplasia, featuring a state of hyperstomy arteriovenous (Mayall Syndrome) or macro and microfistulas arteriovenous malformations (disease Klippel - Trenaunay Syndrome or Klippel - Trenaunay - Servelle), the clinical picture can be characterized by: gigantism with limb lengthening, deformity of the foot; angiomas color "Port Wine", plates and map; hyperhidrosis of the plant. There are, however, spurious forms, more difficult to diagnose for the prevailing lymphedematous components. Sometimes the presence of conditions such as morbid obesity, venous insufficiency, trauma, and repeated infections may complicate the clinical picture.
The therapeutic procedure must take into account other possible pathological conditions such as **congestive heart failure**, hypertension, and cerebrovascular disease. In addition, identifying the source of a unilateral or bilateral lymphedema of the extremities, especially in adults, it is necessary to consider the possibility of an occult tumor.
The care of the drip-lymphedema in patients with heart failure is a daily challenge that seeks the attention of health professionals, whether it be of hospitalized patients, patients housed in RSA or bedridden at home and followed, for example, under ADI. The factors are many and to manage the complexity 'of the patient, requires an accurate diagnosis and management of the same by multidisciplinary teams.

PERIPHERAL AND SYSTEMIC ŒDEMA. BEST CLINICAL MANAGEMENT

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Peripheral oedema is a commonly encountered manifestation of right-sided, left-sided and biventricular heart failure. The pathogenesis of this heart failure presentation is complex, invoking both hemodynamic and neurohumoral factors. It can, however, be conjectured that the appearance of peripheral edema, even in systemic disease, reflects a secondary failure of maximal lymphatic clearance mechanisms. Management of this aspect of disease is multifactorial and depends on an intimate comprehension of the pathogenetic mechanisms. These management strategies will be discussed in detail.

Wednesday, 18th September 2013

H. 4.30 - 6.30 p.m.

Session 8
Fat and lymphatic system

Aula Magna

President

Földi E. (Germany)

Chairmen

Hokuma M. (Japan) - Brorson H. (Sweden) - Munnoch A. (UK)

LIPEDEMA AND LYMPHŒDEMA: SIMILARITIES AND DIFFERENCES

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	lipedema	primary lymphedema	obesity
onset	puberty	from birth to 3rd decade	childhood, adolescent, adult
gender	female	both	both
family affection	possible	yes	possible
proven hereditary factor	possible	yes	possible
bilateral involvement	yes	possible	yes
foot involvement	absent	yes	absent
location	buttocks, legs, arms	legs, arms	trunk, limbs
pitting edema	possible	yes	absent
Stemmer's sign	absent	yes	absent
progression	yes	yes	yes

LIPOSUCTION OF POSTMASTECTOMY ARM LYMPHEDEMA DECREASES THE INCIDENCE OF ERYSIPELAS

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2 Department of Clinical Sciences, Lund University, Plastic and Reconstructive Surgery, Skåne University Hospital, Malmö, Sweden

Background: The objective of this study was to assess erysipelas incidence before and after liposuction, a treatment for patients suffering from post-mastectomy lymphedema.

Methods and Results: A prospective cohort study of 130 patients at Skåne University Hospital in Malmö, Sweden with postmastectomy arm lymphedema, who had poor outcomes from prior conservative treatment and clinical signs of subcutaneous adipose tissue hypertrophy underwent liposuction between 1993-2012. Pre- and postoperative bouts of erysipelas were available for all of them. Mean duration of lymphedema prior to liposuction was 8.8 years (range1-38, standard deviation (SD) 7.0 years). Mean age at liposuction was 63 years (range 39-89, SD 10 years). Total pre-liposuction observation years were 1147, and total post-liposuction observation years were 983. Erysipelas incidence dropped from 0.47 attacks/year (range 0-5.0, SD 0.8 attacks/year) to 0.06 attacks/year (range 0-3.0, SD 0.3 attacks/year) after liposuction, a reduction of 87%. Also, compared to 76 patients who experienced at least 1 erysipelas episode preoperatively, only 19 patients experienced erysipelas postoperatively. Of the 54 patients who did not have erysipelas preoperatively, 6 patients had erysipelas postoperatively. The total number of erysipelas attacks observed decreased from 534 to 60 bouts after liposuction.

Conclusion: Liposuction significantly reduced the incidence of erysipelas in patients with post mastectomy arm lymphedema who prior to the intervention suffered one or more attacks.

FATTY ACIDS AND LYMPHEDEMA

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Introduction: Saturated fatty acid is said to be associated with homeostatic inflammation. That is why fatty acids have been evaluated in the patients of lymphedema.

Material & Method: Twenty cases of secondary lymphedema (all female and older than 30 years old) of the extremity are examined for 24 fatty acids after taking serum during the early morning after staving since the previous dinner. Those who are obase (BMI>25) and diabetic have been excluded.

Result: Fatty acid (μg/ml) shows high in 10 patients fordocosapentae-noic acid, in 10 for nerbonic acid, in 9 for DHA, in 7 for behenic acid, in 5 for linolic acid, in 5 for dihomo-γ-linoleinic acid and in 5 for EPA, etc. TT ratio and EPA/AA are not contri- butory.

Discussion: Another research shows free fatty acid is elevated in lymphedema and some of them are saturated fatty acids. These high fatty acids become decreased after the physiotherapy of lymphedema and are considered to be associated with lymphedema. High EPA and DHA produce anti-inflammatory substances as metabolic products.

Summary and Conclusion: Some fatty acids including saturated fatty acids, EPA and DHA are increased in lymphedema.

MAGNETIC RESONANCE IMAGING SHOWS INCREASED CONTENT OF FAT AND MUSCLE/WATER IN ARM AND LEG LYMPHEDEMA

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Background: Lymphedema is a common complication after cancer treatment. The excess volume has been shown to consist mainly of epifascial adipose tissue and may therefore be successfully treated with liposuction. Until recently, the potential presence of excess fat also in the subfascial compartment had not been investigated. Using magnetic resonance imaging (MRI) and chemical shift-based fat quantification, the fat and water contents may be both quantified and localized. The measured water volume includes both edematous fluid and muscle tissue.

Objectives: To use MRI to investigate epifascial and subfascial fat and water contents in healthy controls; and in patients with arm and leg lymphedema before, and at five time points after liposuction.

Methods: The forearms of seven patients with arm lymphedema (excess volumes 685-1820 ml) and the lower legs of six patients with leg lymphedema (excess volumes 1665-7070 ml) were examined with MRI before liposuction (baseline), and at five time points (4 days, 1 month, 3 months, 6 months, and 12 months) after liposuction. In addition, the forearms of ten healthy volunteers were examined at one time point. Imaging was centered 10 cm distally of the humeral epicondyle (arms), or 16 cm distally of the femoral epicondyle (legs). Three slices were acquired at eight echo times with voxel size 1.6x1.6x5 mm^3 and fat and water fraction images were reconstructed using a linear least-squares algorithm. Fat and water volumes were calculated within each of the epifascial and subfascial compartments (excluding bone). Wilcoxon signed-rank tests ($P < 0.05$) were used to compare dominant/non-dominant arm (volunteers), edematous/healthy sides (patients), and the different time points against b aseline.

Results: Epifascia: Naturally, a significant drop of the fat volume was seen in patients after liposuction. Also, a significantly increased water volume was seen at 4 days and at 1 month compared to baseline. At one year after liposuction, a significantly smaller fat volume and larger water volume compared to the healthy side remained. Subfascia: A significantly larger volume of fat was seen in the edematous side at all time points. Significantly larger water volume in the edematous side was only detected at 1 month after liposuction, which may represent an increased muscle volume and/or water/edema volume since MRI cannot discriminate water from muscle tissue. Volunteers: No significant difference between the dominant/non-dominant arms were detected of neither water nor fat volumes.

Conclusions: The use of MRI-based fat quantification enables the detection of fat and water accumulation in various compartments in lymphedema. Lymphedema is associated with excess subfascial fat which remains 1 year after liposuction.

FREE FATTY ACID IN LYMPHEDEMA

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Background: Forty per cent of lymphedema suffer from bacterial complication which causes increase of edema. However in some of the rest 60% of the patients the lymphedema gets worse and worse although it is slowly. Saturated fatty acids are responsible with the help by alarm signals such as macrophage, angio-poietin like protein 2, ·5, 1 selectin,ER stress,hypooxydative stress(homeostatic inflammation).This inflammation activates Toll-like receptor 4 inducing remodeling of the tissue and further worsening of the lymphedema.

Objectives: Free fatty acid in which saturated fatty acid is involved has been evaluated in the patient's blood.

Methods: Sera of 15 cases of secondary lymphedema(female older than 30 of age)are taken in the early morning after starvation since the previous dinner and evaluated for free fatty acid.Serum total cholesterol is also checked in 34 lymphedema patients and triglyceride, in 27 patients.For the control normal volunteers with the same sex and age, 0 for free fatty acid, 21 for total cholesterol and 21 for triglyceride are also examined.

Result: Free fatty acid is elevated in 10 cases(67 %) ,within normal limit in 5 cases(33%) and decreased in no patients. Total cholesterol is high in 12 cases(35%), within normal limit in 22 cases(65%) and low in none. The triglyceride is high in 7(76%), normal in 20(74%) and low in none.The controls show high in 1(5%), within normal limit in 20(95%) and low in none for choleste-rol.The control for triglyceride shows high in 5(24%),normal in 15(71%)and 1ow in 1(5%).

Discussion: All influencing factors have been ruled out. Most of free fatty acid is released from the fatty tissue and made from hydrolysis of trigly-ceride.If the free fatty acid is high, saturated fatty acid is also increased which leads to homeostatic inflammation and further to arteriosclerosis. High free fatty acid and high saturated fatty acid activates macrophages induc- ing inflammation. Lipid deposit in skeletal muscle and ectopic fatty tis-sue activates TLR4. (This high free fatty acid goes down in all 5 examined cases of lymphedema after physiotherapy by sequential compression and magnetic fields, vibration & hyperthermia—unpublished data). This high free fatty acid value in lymphedema may be not so much associated with age of the patients but closely associated with lymphedema itself.

Conclusion: Free fatty acid is high in lymphedema.

PHYSICAL THERAPEUTICAL APPROACH TO LIPEDEMA

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Lipedema is a chronic disease that results in symmetrical impairment of fatty tissue distribution. It has often a familiar history, is painful and causes an impairment of daily activities. Traditional conservative treatments combine compression therapy, lymphatic manual drainage, and diet modification, mainly addressed to reduction of pain. Aim of the study was to evaluate effectiveness of adding low frequency ultrasound therapy to these treatments, through 40 KHz cavitation in reducing leg measurements after treatment. The study was conduced on 20 healthy patients (all females). The subjects underwent 10 sessions of treatment addressed to the fatty tissue of the legs, twice a week. Each low frequency ultrasound treatment was followed by manual lymphatic drainage. Leg measurements and VAS pain scale were performed before and after treatment protocol. The results showed a significant reduction of leg measurements, showing better results by combining the performed conservative treatments, compared to limited protocols observed in literature. Average values of VAS pain scale showed significant reduction after treatment. No adverse effects were observed. BMI was substantially unchanged before and after the treatment in all patients.

PRELIMINARY RESULTS OF A PROSPECTIVE CONTROLLED STUDY TO DETERMINE THE USE OF ULTRASOUND AS A DIAGNOSTIC TOOL IN LIPŒDEMA

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Introduction: Lipoedema is a chronic and progressive condition of the deposition of subcutaneous fat that affects often legs and hips. It is also known to affect the upper arms bilaterally in approximately 30% of the patients. Lipoedema is predominantly diagnosed in women; however a few male cases with a combination of hormonal imbalances have been published. To this date it is not uncommon for lipoedema patients to be misdiagnosed and thus mistreated due to lack of diagnostic tools and clinical knowledge. The progressive, chronic nature of this condition can provoke other conditions ranging from venous decongestion, lipo-lymphoedema and eventually immobility. Therefore early recognition can make a difference and possibly prevent the progression of this condition. Ultrasound is proven to be a useful tool in a variety of diagnostic procedures. The echogenic feature insures the reflection of the area of interest is processed in an image. It can be used for superficial imaging such as the epidermis or be useful for the imaging of internal organs.

Methods: In June 2012, 48 women with diagnosed lipoedema have been screened and assessed with the following measurements. Total height in cm, Body Mass Index, waist and hip circumference as well as leg circumference have been accurately measured. The Indurometer has been used to assess tissue resistance and with the Stemmer sign test and the pitting test lymphoedema was excluded. Also subjective measurement such as the Wold Criteria and SF36 Short Health Questionnaire has been completed by each participant. The participants physical functioning and restrictions has been recorded with a questionnaire concerning daily activities and participation problems. The control group consist of 26 obese women with a BMI> 25 and 10 women with BMI < 25. Amongst other screening instruments we measured each patient with ultrasound. The ultrasound device is a GE Healthcare LOGIQ e. Probe with reach of 5-13 MHz (10 MHz was standard) and was used on three set measurement points, above trochantor major, at vastus medialis and calf area. Thickness of different aspects of the skin were measured and compared with adipose tissue size and normal tissue samples.

Results: Demographic results of the researched items, will be presented.

Conclusion: Ultrasound is a promising diagnostic tool for lipoedema patients.

Fori Imperiali

FROM LYMPH TO FAT: THE ROLE OF LIPOSUCTION IN LYMPHEDEMA

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In 1987 we noted an excess of adipose tissue in the lymphedematous tissues and recommended liposuction in order to remove the excess volume. This was questioned by several lymphologists. In recent years more and more information show that we now have clear evidence that lymphedema leads to deposition of adipose tissue. Thus we now know that patients with chronic, non-pitting, lymphedema develop large amounts of newly formed subcutaneous adipose tissue, which precludes complete limb reduction utilizing microsurgical reconstruction or conservative treatment. Although incompletely understood, this adipocyte proliferation has important pathophysiologic and therapeutic implications.

1. The findings of increased adipose tissue in intestinal segments in patients with Crohn's disease, known as "fat wrapping", have clearly shown that inflammation plays an important role [Borley N.R., Mortensen N.J., Jewell D.P., Warren B.F.: *The relationship between inflammatory and serosal connective tissue changes in ileal Crohn's disease: evidence for a possible causative link.* J. Pathol., 2000; 190: 196–202].
2. Consecutive analyzes of the content of the aspirate removed under bloodless conditions, using a tourniquet, showed a very high content of adipose tissue in 44 women (mean 90%, range: 58-100) was found [Brorson H., Åberg M., Svensson H.: *Chronic lymphedema and adipocyte proliferation: Clinical therapeutic implications.* Lymphology, 2004; 37(Suppl): 153–5].
3. In Graves' ophthalmopathy a major problem is an increase in the intraorbital adipose tissue volume leading to exopthalmus. Adipocyte related IEGs (immediate early genes) are overexpressed in active ophthalmopathy and CYR61 (cysteine-rich, angiogenic inducer, 61) may have a role in both orbital inflammation and adipogenesis [Lantz M., Vondrichova T., Parikh H., Frenander C. et al.: *Over-expression of immediate early genes in active Graves' ophthalmopathy.* J. Clin. Endocrinol. Metab., 2005; 90: 4784–91].
4. A functional inactivation of a single allele of the homeobox gene Prox1 led to adult-onset obesity due to abnormal lymph leakage from mispatterned and ruptured lymphatic vessels. Prox1 heterozygous mice are a new model for adult-onset obesity and lymphatic vascular disease [Harvey N.L., Srinivasan R.S., Dillard M.E., Johnson N.C. et al.: *Lymphatic vascular defects promoted by Prox1 haploinsufficiency cause adult-onset obesity.* Nat. Genet., 2005; 37: 1072-81].
5. Tonometry can distinguish if a lymphedematous arm is harder or softer than the normal one. If a lower tissue tonicity value is recorded in the edematous arm, it indicates that there is accumulated lymph fluid in the tissue, and these patients are candidates for conservative treatment methods. In contrast, patients with a harder arm compared with the healthy one, have an adipose tissue excess that can successfully be removed by liposuction [Bagheri S., Ohlin K., Olsson G., Brorson H.: *Tissue tonometry before and after liposuction of arm lymphedema following breast cancer.* Lymphat. Res. Biol., 2005; 3: 66-80].
6. Investigation with VR-CT (Volume Rendering Computer Tomography) in 8 patients also showed a significant preoperative increase of adipose tissue in the swollen arm, followed by a normalization at 3 months paralleling the complete reduction of the excess volume [Brorson H., Ohlin K., Olsson G., Nilsson M.: *Adipose tissue dominates chronic arm lymphedema following breast cancer: An analysis using volume rendered CT images.* Lymphat. Res. Biol., 2006; 4: 199-209].
7. Analyses with DXA in 18 women with postmastectomy arm lymphedema showed a significant increase of adipose tissue in the non-pitting swollen arm before surgery. Postoperative analyses showed normalization at 3 months. This effect was seen also at 12 months. These results paralleled the complete reduction of the excess volume ("edema volume") [Brorson H., Ohlin K., Olsson G., Karlsson M.K.: *Breast cancer-related chronic arm lymphedema is associated with excess adipose and muscle tissue.* Lymphat. Res. Biol., 2009; 7: 3-10].
8. Parathyroid hormone-like hormone (PTHLH), which can inhibit adipogenesis, is downregulated both in active and chronic ophthalmopathy, indicating the possibility of an increased risk of adipogenesis [Planck T., Parikh H., Brorson H., Mårtensson T., Åsman P., Groop L., Hallengren B., Lantz M.: *Gene expression in Graves' ophthalmopathy and arm lymphedema: similarities and differences.* Thyroid, 2011; 21: 663-74].
9. Adipogenesis in response to lymphatic fluid stasis is associated with a marked mononuclear cell inflammatory response [Zampell J.C., Aschen S., Weitman E.S., Yan A., Elhadad S., De Brot M., Mehrara B.J.: *Plast. Reconstr. Surg.,* 2012; 129: 825-34).
10. Lymphatic fluid stasis potently up-regulates the expression of fat differentiation markers both spatially and temporally [Aschen S., Zampell J.C., Elhadad S., Weitman E., De Brot M., Mehrara B.J.: *Plast. Reconstr. Surg.,* 2012; 129: 838-47].

Liposuction can be performed in patients who fail to respond to conservative management or microsurgical reconstruction because the hypertrophy of the subcutaneous adipose tissue cannot be removed or reduced by these techniques.

Wednesday, 18th September 2013

H. 2.00 - 4.00 p.m.

Other therapies in lymphœdema

Sala Scolastica

Chairmen

Hokuma M. (Japan) - Campisi C. (Italy) - Kathleen W. (Australia)

LYMPHŒDEMA THERAPY: A MICROVASCULAR VIEW POINT AND APPROACH

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Lymphoedema is, as far today, a very fearful clinical condition due to its tendency to get invalidating by becoming chronic. Under a aetiologic view point, there are some very detailed classification worldwidely accepted and used. Under a therapeutic aspect, there are several therapies including physical, medical and surgical approach. Taking into account the physiopathology of limphoedema, a very key aspect seems to be played by the "capillary-tissue unit", namely the functional-physio-pathologic activities of pre- and postcapillary blood microvessels (arteriole and venule), neuroautonomic endings and lymphatic microvessel all taken together. Exactly here, in the Extracellular Matrix space, initial, pathologic lymph accumulation develops since the earliest modification of transmural pressure balance. The capability to detect and monitor the early phases of lymph stasys represents a very useful "weapon" under a diagnostic view point, and it may represent also a very helpful advantege in the early phases of therapy. We focused on such microvascular aspect of lymphoedema by performing a microvascular evaluation (Optic Probe Video-Capillaroscopy-OPVC- , Dopler Laser Flowmetry-DLF, Plethismography-PTG) on more than 560 patients suffering from lower limbs phlebolymphoedema lasting no more than 1,5 year and without macrovascular abnormalities (insufficiency; duplex-scanning and power-dopler). Common microvascular findings were a capillary-venular stasys (CVS-OPVC) with a clear-cut reduction of arteriolar sphygmicity (AS-DLF), absence of neurovegetative variables (flowmotion, vasomotion, FM,VM-DLF) and the typical absence of the physiologic dicrotic incisure of descending branch of systo-diastolic complex (DIDB-DLF). In a double-blind, randomized, placebo controlled protocol we treated all patients for 12 months (mths) adding to the "conventional therapy" placebo (PL) or a phyto-omeopathic drug (ACT) with vasoactive and antioedema activities. After 3 mths, ACT-treated patients showed an initial increase of microvascular perfusion units (MAX-V, MIN-V, Mean-DLF) in contrast to Pl treated patients. After 6 mths, ACT patients continued in improving the abovementioned microvascular variables, constantly in contrast to PL treated patients in whom corresponding variables showed a very little modification. After 9 mths, ACT-treated patients showed a doubling of MAX-V, MIN-V, Mean at DLF, with a concomitant clear reduction of erythroaggregation of endoluminal blood column in both orders of post-capillary venules (OPVC). FM reappeared in 67,3% of patients and VM in 31,4% of patients. In none PL patients such type of modification were present. At the end of the clinical study, the 89.2% of ACT treated patients showed flowmotion (11,2% in PL), the 58,9 % vasomotion (5,2% in PL), the 51,5% the reappearance of DIDB (6,9% in PL), the 47,1 % values of MAX-V, MIN-V, Mean constantly more than the double of baseline values (respectively 22%, 10,1% and 6,7% in PL treated patients). Even if more data are obviously requested, these instrumental and clinical evidences show an addictional “lymphokinetic therapy” is very useful in the treatment of early phases of development of lower limbs-phlebolymphoedema, and reinforce the importance of microcirculation in the genesis of this disease, together with the utility of a complete microvascular instrumental diagnosis.

HERBAL PHARMACOTHERAPIES FOR LYMPHŒDEMA: EFFICACY, SAFETY, AND EVIDENCE BASED MEDICINE

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Recent years have witnessed growing clinician awareness of lymphoedema. This development has contributed to better patient outcomes, with more affected individuals receiving access to improved diagnoses and treatments.
However, while manual lymphatic drainage, exercise/activity and compression garments offer symptomatic relief and reasonable control, individuals sometimes struggle to meld these into their daily routines. This often leads to poor or even non-compliance and an interest in alternative treatment options, including Complementary and Alternative Medicine (CAM).
In fact, around the world, there is a growing trend towards patients seeking out herbal remedies as a supplement to allopathic therapies. With respect to lymphoedema, unfortunately, there exists significant ambiguity in the scientific and grey literature between myths and facts about herbal pharmacotherapies. It is critical that healthcare professionals be aware of these alternatives, especially knowledge concerning their efficacy and safety as supported by evidence based research. Such awareness is pivotal to informed advice-giving and in negotiating optimal and holistic treatment care-plans.
This presentation will document the various herbal remedies currently available for the treatment of lymphoedema around the world. The findings of a systematic review of literature will be presented and discussed, with a specific focus on studies involving randomized controlled trials and good science.
Where possible, mechanisms of action for the herbal pharmacoptherapy (or its active chemical compound/s) will be outlined, as well as contraindications and adverse reactions. Being better informed about what patients may choose can lead to better communication and improved outcomes.

TREATMENT OF LYMPHEDEMA BY ORAL EPA COMBINED WITH OR WITHOUT PHYSIOTHERAPY

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Introduction: Besides bacterial inflammation the lymphedema is most likely to be associated with homeostatic inflammation. To prevent this inflammation is one of the keys to get a permanent healing. Metabolic products of EPA and have antiinflammatory effects. That is why this clinical trial has been per-formed.

Material and Method: Lymphedema patients are all female secondary lymphedema of the lower extremity and are compressed by elastic & less elastic bandages. The observation period is variable after the case. *Patients I:* 4 cases are given oral EPA (1800mg a day) with the combination of seqential compression (Ohkuma, 2011) & physio-therapy by magnetic fields, vibration & hyperthermia. (Ohkluma:2002). *Patients II:* 14 patients who receive only the above physiotherapy. *Patients III:* 6 cases who have received the same physio-therapy as patients II but have been stable in the past at least 6 months are given only oral EPA. *Patients IV:* the same patients as III (al l are unilateral lymphedema) but the uninvolved extremities are evaluated. The effects are expressed by way of relative coefficient rate of contraction (Ohkuma: Europ. J. Lymphol.12:129, 1991).

Results: I. 3 patients, ++ effective, 1 +, II. 12 ++, 2 +, III. 1 ++, 2+, 3 -, IV. 0 ++, 0 +, 6 -.

Discussion: Fluid but not fatty tissue is decreased by oral EPA because there is no change in the extremity's volume in patients IV. Metabolic product of EPA, Resorbin E1 & E2 have anti-inflammatory effects. That is why the EPA is effective. The effect of compression has been excluded because in the patients III the compres-sion has been applied at least 6 months before the start of evaluation. It must be evaluated after more cases are evaluated which the physiotherapy with or without oral EPA more effective is.

Summary & Conclusion: Oral EPA with and without combination by sequential compression & physiotherapy by magnetic fields, vibration & hyperthermia is effecti ve in the treatment of lymph- edema.

BENZOPYRONS IN LYMPHŒDEMA TREATMENT

MACCIÒ A.
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For Clinical Lymphologist pharmacological supports are very important in daily activity for the treatment of primary or secondary lymhostasis in association with the combined therapy in this rewiev we will show you the role of benzopyrons in lymphoedema treatment.
We analyzed all the most important contributions of literature for discuss pharmacokinetics and pharmacodynamics of these natural substances.
"Level C" evidence have been reported by many authors, but what are the real effects on lymphangion? What proteolitic effects in the fibrotic/lymphostatic tissue? What real effect on capillary permeability? What effect on prostaglandins and on leukotriene production?
At last, where such effects have been demonstrated in vitro or in vivo, what dosages should we use in lymphoedema patients, which the minimum titration?

NATURAL CUMARIN IN SURGERY OF LYMPHŒDEMA

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According to the recent 2013 revision of the "Consensus Document of the International Society of Lymphology (ISL) on the Diagnosis and Treatment of Peripheral Lymphedema, oral Benzopyrones, which have been reported to hydrolize tissue proteins and facilitate their absorption while stimulating lymphatic collectors, are neither an alternative nor substitute for CPT" (Combined Physical Therapy) and Operative Treatment as well, particularly if we consider Microsurgical Derivative- Reconstructive Procedures as operative approaches designed to augment the rate of return of lymph to the blood circulation.

The exact role for Benzopyrones (which include those termed Rutosides and Bioflavonoids) as an adjunct in primary and secondary lymphedema treatment, also considering filariasis, is still not definitively determined including appropriate formulations and dose regimens. Coumarin, one such Benzopyrone, in higher doses has been linked to liver toxicity.

Recent research has linked this toxicity with poor CYP2A6 enzymatic activity in these individuals.

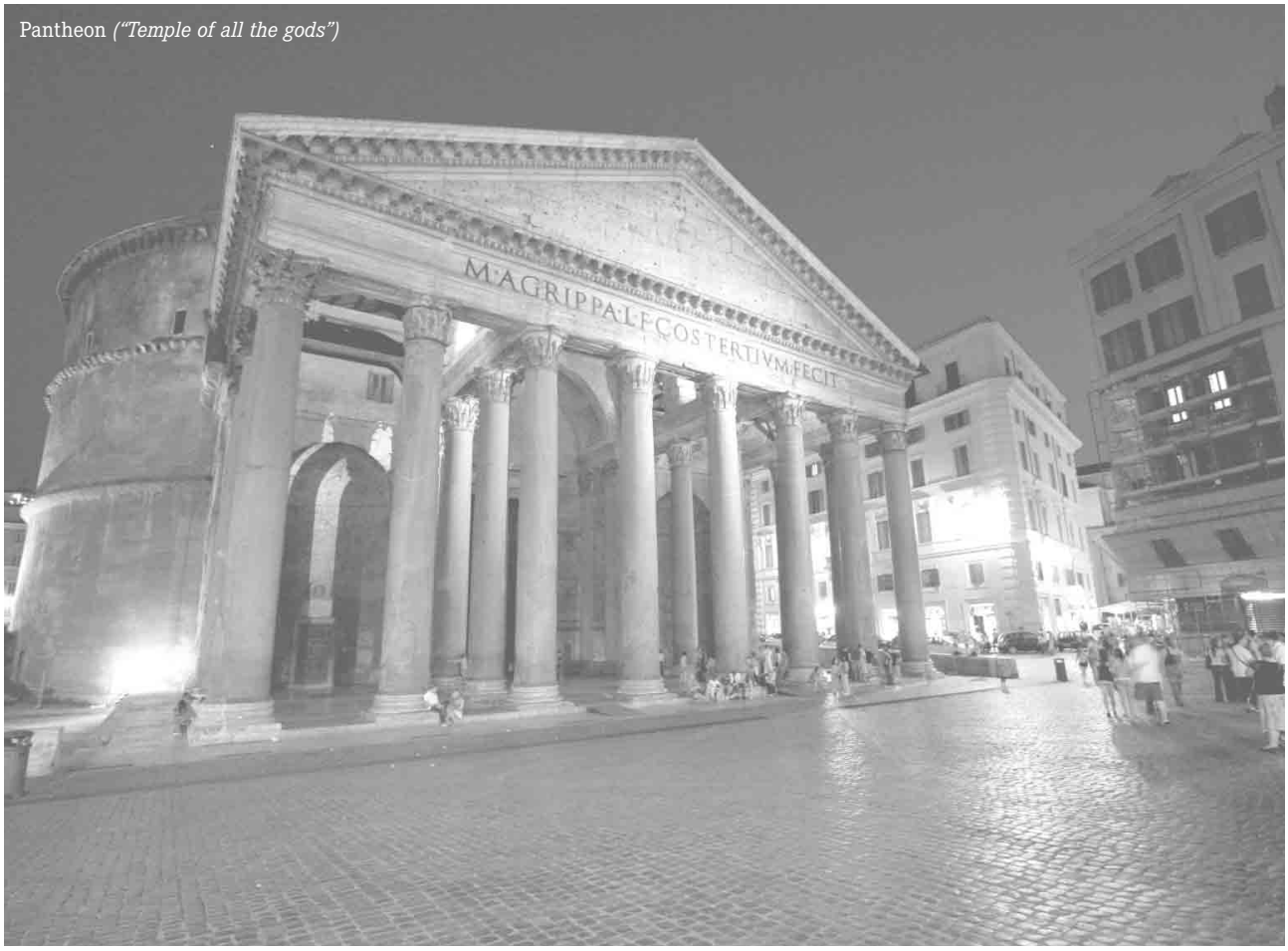
At the end of '80s years, France as first produced a Melilotus Officinalis abstract for the treatment of the Veno-Lymphatic Insufficiency (VLI), containing 30 mg of Melilotous titled by 1% of Coumarin. Encouraging results were obtained with significant diffusion of this product in all Europe, including Italy.

About 10 years after in Australia, a new synthetic formulation of Coumarin at highest doses was developed (200-400-600 mg), with positive results, even if without comparative studies with low dose Coumarin, and without comparative studies between natural and synthetic Coumarin, considering the potential heavy side-effect concerning liver toxicity of high dose synthetic Coumarin in comparison with natural Coumarin.

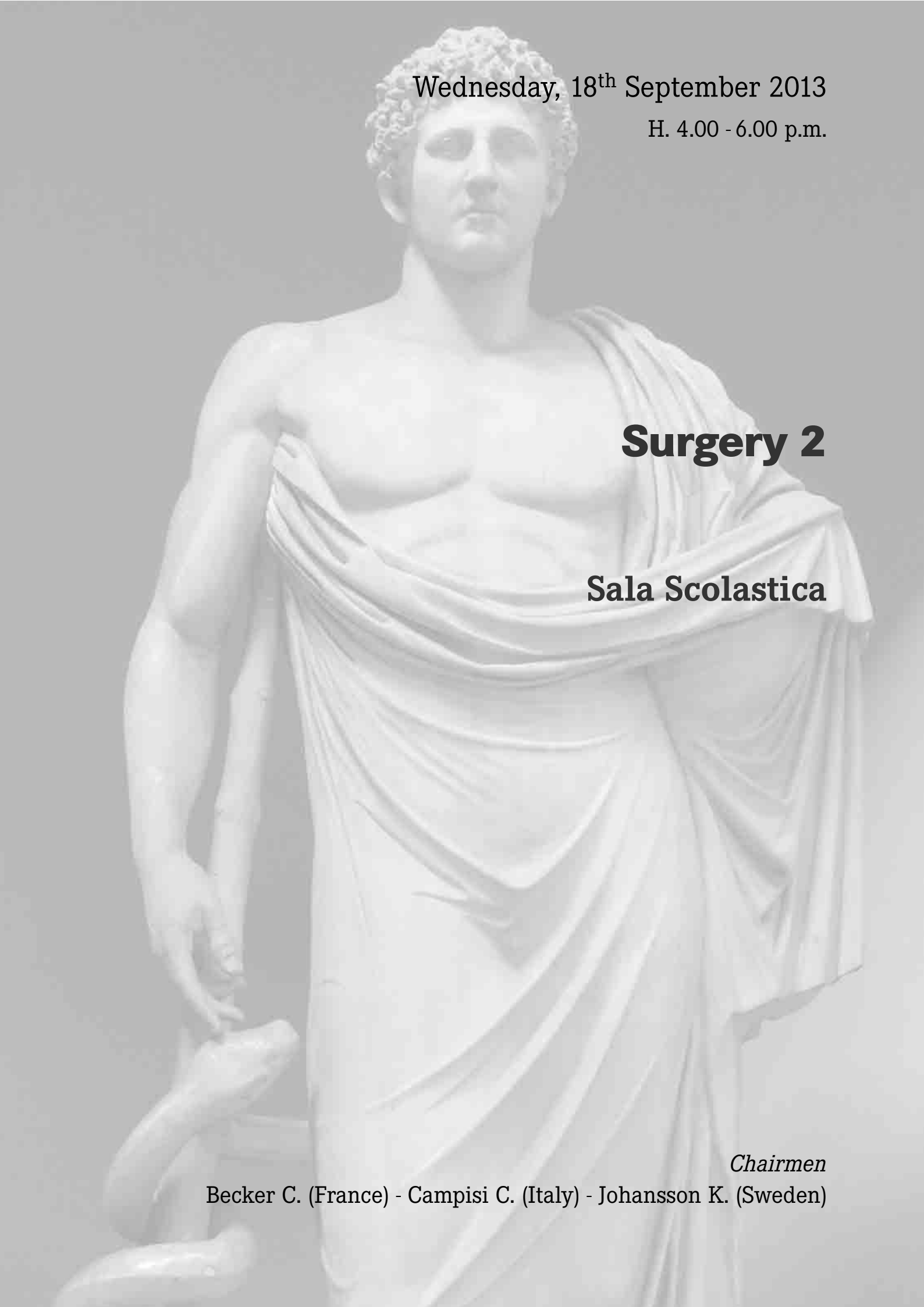
Up today there is still no EBM study confirming dose-dependent lympho-kinetic clinical efficacy of Coumarin or not in comparison with the receptorial dose- undependent action of mechanism hypothesis, and with the staging of lymphedema,including consequent histopathological changes of lymph vessels, lymphonodes, skin,subcutaneous tissue and extracellular matrix.

According to the Guidelines of the Italian Society of Lymphangiology future Research Agenda includes the following items:

1. the effective role of Derivative-Reconstructive Multiple Lymphatic-Venous Microsurgical Shunts for the Early Treatment of the Peripheral Lymphedema and for its Primary Prevention (concerning Secondary Lymphedemas);
2. the clinical-pharmacological efficacy of Natural Coumarin (dose-dependent or receptor-linked?), according to the staging of lymphedema and to the timing of Surgery.



Pantheon *("Temple of all the gods")*



Wednesday, 18th September 2013

H. 4.00 - 6.00 p.m.

Surgery 2

Sala Scolastica

Chairmen

Becker C. (France) - Campisi C. (Italy) - Johansson K. (Sweden)

NINETEEN YEARS' EXPERIENCE OF COMPLETE REDUCTION OF ARM LYMPHEDEMA FOLLOWING BREAST CANCER

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AIM: Patients with chronic non-pitting lymphedema do not respond to conservative treatment probably because diminished lymph flow and inflammation result in the formation of excess subcutaneous adipose tissue. Previous surgical treatments utilizing either total excision with skin grafting or reduction plasty seldom achieved acceptable cosmetic and functional results. Microsurgical reconstructions, although attractive as a physiological concept, cannot provide complete reduction in chronic non-pitting lymphedema because they do not eliminate the newly formed, subcutaneous adipose tissue collections.
Methods: 141 women with non-pitting edema, a mean age of 64 (range, 39-89) years and a mean duration of arm swelling of 9 (range, 1-38) years underwent liposuction. Mean age at breast cancer operation, mean interval between breast cancer operation and lymphedema start, and duration of lymphedema were 52 years (range, 33-86), 3 years (range, 0-32), and 9 years (range, 1-38) respectively. Aspirate and arm volumes were recorded.
Results: Aspirate mean volume was 1814 ml (range, 650-3850) with an adipose tissue concentration of 94 % (range, 58-100). Preoperative mean excess volume was 1576 ml (range, 545-3915). Postoperative mean reduction was 103 % (range, 50-194) at 3 months and more than 100% during 19 years' follow-up, i.e. the lymphedematous arm was somewhat smaller than the healthy arm. The preoperative mean ratio between the volumes of the edematous and healthy arms was 1.5, rapidly declining to 1.0 at 3 months, and less than 1 after one year.
Conclusion: These long-term results demonstrate that liposuction is an effective method for treatment of chronic, non-pitting arm lymphedema in patients who have failed conservative treatment. Because of adipose tissue hypertrophy, it is the only known method that completely reduces excess volume at all stages of arm lymphedema. The removal of hypertrophied adipose tissue, induced by inflammation and slow or absent lymph flow is a prerequisite to complete reduction. The newly reduced volume is maintained through constant (24-hour) use of compression garments postoperatively.

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LVA FOR FACIAL LYMPHEDEMA

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Lymphaticovenous anastomosis (LVA) is a treatment for lymphoedema that can improve lymph circulation by the anastomosis of lymph vessels and veins. A therapeutic effect of LVA for lymphoedema has been shown in limbs, but efficacy for other regions has not been shown. Lymphoedema in the head-and-neck region following cancer resection and radiotherapy is mainly treated with manual lymphatic drainage. However, there is no alternative when this treatment is ineffective because application of compression treatment using a bandage is difficult in this region. We used LVA for lymphoedema in the head-and-neck region and achieved a good outcome. Functional and dilating lymph vessels were identified using preand intra-operative fluorescent lymphography, and a lymph vessel with a diameter of about 0.2-1.0 mm was anastomosed with a vein using supermicrosurgery. The outcome of this case suggests that LVA is applicable for treatment of lymphoedema in the head-and-neck region.

AMELIORATION OF SECONDARY LYMPHEDEMA OF LOWER EXTREMITY BY ENDOVASCULAR MANAGEMENT

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Introduction: The primary lymphedema of lower extremity seems to be an insoluble problem, but for the secondary lymphedema of lower extremity following any surgical trauma in the pelvis causing venous outflow impedance is probably remediable if the pressure of pelvic vein can be reduced by any means. With the advance of imaging study and IVUS (intravascular ultrasound) study, pelvic vascular morphology can be identified clearly and treated with endovascular stenting for amelioration of lymphedema.

Methods: Between March 2008 and Dec 2012, 445 consecutive patients (median age 55, range 28 to 82) with chronic lymphedema of lower extremity were reviewed. Among 445 patients, 288 patients were classified as secondary lymphedema on the basis of a history of pelvic surgery including gynecological malignancy, benign lesions, C-section and elective tubal ligation and a history of trauma involving lower extremity or pelvis. The remaining 157 cases were classified as primary lymphedema and not included in this review. The diagnosis of pelvic venous pathology was established by the iliac venogram with multi-detector computed tomography (MDCT). The pelvic venous patholgy was defined as radiographic evidence of occlusion, stenosis, morphological change, compression at the site of artery-venous intersection and venous collaterals. All patients received percutaneous endovascular balloon dilatation with or without stenting. Angioplastic dilatation alone without stenting was applied to 38 cases, while 250 patients underwent iliac vein stenting .

Results: The technical success rate was 100% with deployment of 375 stents. Follow-up time ranged from 6 months to 48 months, averaging 20 months. Patency rate at 3 months, 6 months, 12 months and 24 months were 98.3%, 96.6%, 84.7% and 80% respectively. Two % of patients had total occlusion of stent during the follow-up period and it required re-intervention. Clinical symptoms improved significantly in terms of pain, swelling and function of the affected limb.

Conclusion: Patients with lymphedema of lower extremity secondary to whatever etiology will be benefited from endovascular management by performing percutaneous angioplastic balloon dilatation of pelvic vein either with or without stent placement. The long-term follow up is necessary to assure the stent patency and the long-term effect of lymphedema reduction.

LYMPHŒDEMA RECONSTRUCTION WITH MICROVASCULAR FREE TISSUE TRANSFER AND LYMPHOVENOUS ANASTOMOSES

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Introduction: Many patients have difficulties to accept compression therapy for the treatment of lymphoedema. Microvascular free tissue lymphnodes transfer and lymphovenous anastomoses (LVA) might be an option.

Material and Methods: In 2011 we introduced new treatment options in Sweden for patients with lymphoedema following cancer surgery or lymphoedema of unknown origin. The patients were preoperatively evaluated with Indocyanine green (ICG) and Photodynamic eye (PDE) to identify useable lymph vessels. We have so far treated 9 women with DIEP flaps with lymph node transfer from the lower abdomen, and 9 patients with 1-3 lymphovenous anastomoses in the lower legs and genitals.

Results: A reduction in the volume of the affected limb in all the women undergoing DIEP and lymph node transfer, range 1-13%, has been seen in the follow-up time ranging from 2-24 months. A reduced need for compression garments has been reported, especially in patients with a small pre-existing lymphoedema. In the patients with lower limb lymphoedema treated with LVAs a local reduction of the lymphoedema between 4% (6 month) and 7% (12 month) has been observed.

Discussion: The new techniques in the treatment of lymphoedema are rapidly developing due to technical improvements both in operating equipment and technique. We believe in the importance of participating in this development and offering the latest treatment options to our patients.

LASER ASSISTED LIPOSUCTION AND LYMPHNODE TRANSFER FOR THE TREATMENT OF MODERATE UPPER LIMB LYMPHEDEMA

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Background: Postoperative lymphedema after breast cancer surgery is a challenging problem. Restoring the continuity of lymphatic drainage by lymphaticovenous or lymphaticolymphatic anastomosis was observed in the short term to be patent but eventually occluded because the elevated interstitial pressure will cause obliteration of lumens. The transplantation of lymph vessels is a novel and promising microsurgical method but don't provide a complete reduction especially in the persistence of hypertrophied adipose tissue and fibrosis. The use of laser liposuction has been shown to be effective for destruction of fat and fibrotic tissues. In this study we present the preliminary results of treatment using the vascularized lymph node transfer combined with laser assisted liposuction in patients with upper extremity lymphedema.

Methods: Between October of 2012 and March of 2013, 10 patients (mean age of 52 years) with moderate upper extremity lymphedema underwent vascularized groin or supraclavicular lymph node transfer combined with laser liposuction, a pulsed 1,064nm Nd: YAG laser (SmartLipo, DEKA, Italy). All patients had histories of radical mastectomy and irradiation therapy for breast cancer. Outcome was assessed by upper limb girth, tonicity, and lymphoscintigraphy.

Results: Postoperative measurements in an average of 6 months follow up showed that significant decrease of circumferences of the arms on all levels at surgery side were achieved. The tonicity of the skin was improved in all patients. Postoperative lymphoscintigraphy revealed decreasing of lymph stasis. No donor-site morbidity was encountered.

Conclusion: The results suggest the strategy of laser liposuction combined with lymphnode transfer is a safe and reliable procedure. This combined treatment may provide a useful method and an ideal option for patients who suffer from lymphedema after mastectomy and axillary dissection.

LYMPHŒDEMA-FAT GRAFT: AN IDEAL FILLER FOR FACIAL REJUVENATION

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Background: Lymphedema is a chronic disorder with lymph stasis in the subcutaneous tissue. Lymphatic fluid contains several components as well as Hyaluronic Acid and many important properties. Over the last years many plastic surgeons are researching for ideal tissue to implant. Because of its unique composition, the fate Lymphoedema-Fat is an interesting subject for investigation, and it has significant possibilities of application particularly in facial rejuvenation.

Method: Over a 36 months period, we treated and assessed 8 patients with lympoedematous limbs underwent facial rejuvenation with Lymphoedema-Fat.

Results: The overall mean general appearance score at an average of 6 months after the procedure was 7,2 ± 0,5. Patients had maximum improvement in skin texture with reading of 8,5 ± 0,7. Related to the psychological parameters, patients had maximum improvement in self esteem.

Conclusion: This study demonstrated a clinically applicable way of Lymphoedema Fat as an ideal autologous injectable filler easily available in patients with lymphoedema. We presume as well as recommend the study and the investigation of this tissue having important properties and qualities for future applications and research.

MODIFIED CHARLES PROCEDURE AND LYMPH NODE TRANSFER FOR ADVANCED LOWER EXTREMITY LYMPHEDEMA

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Introduction: Treatment of advanced lymphedema remains a challenge in reconstructive surgery. Microsurgical techniques seem to be effective in early stage lymphedema, however in advanced stages their role is not well established. Herein we present a novel approach for advanced lymphedema combining excisional procedure (Charles) with vascularized lymph node transfer (LNT).

Patients and Method: From 2010 to 2013, 24 patients (18 women, 6 men, mean age 53 years old) presented with late stage of lower extremity lymphedema. The modification of Charles procedure consisted of preserving the superficial venous system of the dorsal of the foot and the lesser saphenous vein, which were used for the venous anastomosis of the grafted lymph node flap. In 14 patients we transferred the inguinal lymph nodes from the contralateral site, meanwhile in 13 patients supraclavicular lymph nodes were used.

Results: Maximum reduction of the lymphedema was achieved. No major complication was detected postoperatively. There were 2 patients with partial loss of the skin graft necessitated re-grafting. All the lymph node flaps survived well. The patients resumed normal daily activities within a period of two months. The mean follow-up was 14 months (3 to 26 months). During this period, no recurrence of the lymphedema was observed.

Conclusion: The combination of the modified Charles procedure with vascularized LNT is an effective method for treatment of advanced stage lymphedema. The vascularized lymph nodes are able to decrease the risk of recurrence and infection.

LYMPH NODE FLAP BASED ON THE RIGHT TRANSVERSE CERVICAL ARTERY AS A DONOR SITE FOR LYMPH NODE TRANSFER

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Lymph node transfer is a novel technique in lymphedema surgery. In this study, we present our experience in harvesting lymph node flap based on the right transverse cervical artery. in a period of 1 year, we harvested 15 lymph node flaps based on the transverse cervical artery (TCA). The reliable anatomy of the TCA and the low complication rate of the donor site make the lymph node flap ideal for transfer in the treatment of lymphedema. knowledge of the regional anatomy and the anatomic variations of the TCA are mandatory for safe dissection of this flap. In our series, the TCA was a branch of the thyrocervical trunk in 9 patients and arose directly from the subclavian artery in 2 patients. We also present the preliminary results of our first cases in which we performed lymph node transfer for secondary lower extremity lymphedema. The mean reduction after LNT was 3.6% above the knee, 11.1% below the knee, 16.7% at the level of ankle, and 9.9% at the foot. Postoperative lymphoscintigraphy showed improvement of the lymph flow in all patients.

BREAST ŒDEMA FOLLOWING BREAST CONSERVING SURGERY AND RADIOTHERAPY: PRELIMINARY RESULTS

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Introduction: Breast edema following cancer treatment is very rarely documented.

Objectives: The aim of this study was to evaluate the incidence of breast edema in patients treated with breast conserving surgery and radiotherapy (RT) and to compare axillary node dissection (n=24) to sentinel node biopsy (n=96).

Methods/Design: One hundred twenty patients were included and measured at start and end of RT, 2 weeks, 1, 3, 6 and 12 months post RT. Local edema in both breasts was measured with MoisterMeterD (Delfin Technologies Ltd, Finland) A parameter, tissue dielectric constant (TDC), directly proportional to tissue water content to the effective depth of 2.5 mm, was measured. Breast edema was defined as a TDC ratio exceeding 1.3 (mean + 2SD) between the irradiated and healthy breast. Patients' experience of tension, heaviness and pain in the breast was scored on a visual analogue scale (VAS).

Results: The mean TDC ratio between the treated and healthy breast at the 7 test occasions were 1.3, 1.4, 1.4, 1.4, 1.6, 1.5 and 1.4 with no difference between the axillary dissection and sentinel node biopsy except for increased tendency for the axillary dissection group (p=0.08) at 3 months. The percentage of patients with breast edema were 40%, 56%, 50%, 56%, 72%, 77% and 51%. The highest score on the VAS was found at end of RT with 63%, 50% and 58% for tension, heaviness and pain respectively, showing a decrease at 12 months follow-up to 24%, 22% and 31%.

Conclusion: Incidence of breast edema was high already before RT, increased up to 6 months but decreased at 1 year. However, the highest incidence of patients' experience of tension, heaviness and pain in the breast was found at the end of RT. The study is on-going and the next follow-ups will be made at 2 and 3 years.

SUPERMICROSURGICAL LYMPHATICOVENOUS ANASTOMOSIS FOR GENITAL LYMPHEDEMA WITH SEVERE LYMPHORRHEA

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Genital lymphedema is difficult to adopt one of prevailing therapies, conservative compressive treatment. Advanced areas are not only augmenting but also trigger recurrent cellulites and lymphorrhea which result in functionally and emotionally disabiling and emotionally incapacitating entity. Current strategies reported in literatures involve lymphangioplasty or removing lymphedematous tissues with local reconstruction. We suggest supermicrosurgical lymphaticovenous anastomosis (LVA) as most effective treatment for genital lymphedema. This procedure is based on circulation anatomy. Ordinarily, the lymph reaches venous circulation at the site of the thoracic, right lymphatic, or subclavian ducts. Here we report some cases who have released from longtime lymphorrhea and repeated inflammation after LVA. Our procedure under local anesthesia is minimal invasive and supplies patients suffering from severe genital lymphedema with remarkable improvement in quality of life.

APPLICATIONS OF SPECT-CT LYMPHOSCINTIGRAPHY FOR LYMPHATICO-MICROSURGERY TO EVALUATE LYMPHATIC VESSELS IN LOWER LIMB LYMPHEDEMA

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Introduction: It is important to visualize lymphatic system to detect the lymphatic vessels for treatment of lymphedema. However, ICG fluorescence lymphography (ICG-LG) shows only superficial lymph flow and planar lymphoscintigraphy shows two-dimensional images. SPECT-CT lymphoscintigraphy (SPECT-LG) has been used for detection of sentinel lymph node in cancer surgery. We have used SPECT-LG for lymphatico-microsurgery to find out the lymphatic vessels in the deep layer. In this paper we report its usefulness.

Methods: Symbia T16 (Siemens) was used for this study. We applied preoperative SPECT-CT lymphoscintigraphy for evaluation of lymph flow to 66 patients with lower lymphedema who underwent lymphaticovenous side-to-end anastomosis (LVSEA). LVSEA was performed under general anesthesia by using ICG-LG. During surgery we put skin incisions for anastomosis according to lymph flow mainly by ICG-LG and images of SPECT-LG. The numbers of the lymphatics detected in total and in the thigh area by each examination were compared.

Results: Out of 318 incisions in the 66 patients we could detect 268 lymphatic vessels in total. Out of 268 detected lymphatics 200 lymphatics (75%) were found by using ICG-LG and 66 (25%) by SPECT-LG images could be detected. On the other hand, in the thigh area 21 lymphatics (38%) by ICG-LG and 34 lymphatics (62%) by SPECT-LG were detected, respectively.

Discussion: In my experience LVSEA has been performed mainly in the dorsum of the foot and the leg because the lymphatic vessels can be easily detected by ICG-LG. In the thigh area it is difficult to find the lymphatics by ICG-LG because of thickness of the subcutaneous fat. To overcome this SPECT-LG was applied to evaluate lymph flow in the deep layer to the patients with lower limb lymphedema. From the results SPECT-LG seems to be useful not only for detection of the lymphatics in the deep layer but to know relationships between superficial and deep lymph channels.

FIBRO-LIPO-LYMPHO-ASPIRATION (FLLA): A LYMPH VESSEL SPARING PROCEDURE (LVSP) AS A LATER INTERVENTION FOR ADVANCED STAGES OF LYMPHEDEMA

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Peripheral lymphedema remains an often poorly recognized disease that causes significant morbidity in advanced cases, in terms of physical limitations and infection risk. Chronic lymphedema is associated with fibrotic tissue changes and adipose formation ("non-pitting" edema) that is irreversible when untreated. Lymphatic Microsurgery has an important role in the treatment of advanced and chronic lymphedema, where it is useful to help resolve the lymph stasis that contributes markedly to the chronic swelling associated with advanced lymphedema [1-3]. Notwithstanding the success of the microsurgery, there often remains significant adipose tissue in the affected limb of patients with advanced lymphedema, which contributes to residual lymphstasis and increased risk of infection [4-5].
The author discusses a recently developed Fibro-Lympho-Lipo-Aspiration technique (FLLA) to improve this chronic swelling of patients with advanced lymphedema, using a Lymph Vessel Sparing Procedure (LVSP). Brorson and colleagues have presented liposuction as a relatively recent treatment for advanced stages of lymphedema; however, liposuction can be associated with varying degrees of tissue damage, including that of the lymph vessels [6-8]. In patients with lymphedema, the lymph vessels and channels are often dilated and tortuous in the advanced stages and therefore may be more difficult to avoid with the liposuction cannula. FLLA gives surgeons a method to reduce the risk of further lymphatic injury in these vulnerable patients.
Using blue patent violet (BPV), together with the photodynamic eye (PDE) procedure with Indocyanine Green (ICG) Fluorescent Micro-Lymphography, to highlight the lymphatic pathways in the limb, the excess adipose tissue is carefully aspirated with a tumescent method. The post-operative results from the initial series of 10 patients are shown, providing evidence of the efficacy of this technique in limb-reshaping whilst maintaining the optimal lymphatic flow restored by previous Lymphatic Microsurgery.

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Wednesday, 18th September 2013

H. 2.00 - 4.00 p.m.

Poster discussion 3

Sala Timoteo

Chairmen

de Francisci S. (Italy) - Dimakakos E. (Greece) - Valle G. (Italy)

ANGIOPOIETIN-2 PROMOTES INFLAMMATORY LYMPHANGIOGENESIS AND ITS EFFECT CAN BE BLOCKED BY THE SPECIFIC INHIBITOR L1-10

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Angiopoietin (Ang)-2, a ligand of the receptor tyrosinekinase Tie2, is known to be involved in the regulation of embryonic lymphangiogenesis. However, the role of Ang-2 in postnatal pathological lymphangiogenesis, such as inflammation, is largely unknown. We used a combination of imaging, molecular, and cellular approaches to investigate whether Ang-2 is involved in inflammatory lymphangiogenesis. We observed strong and continuous expression of Ang-2 on newly generated lymphatic vessels for 2 wk in sutured corneas of BALB/c mice. This expression was concurrent with an increased number of lymphatic vessels. TNF- expression also increased, with peak TNF- expression occurring before peak Ang-2 expression was reached. In vitro experiments showed that TNF- stimulates Ang-2 and Tie2 and ICAM-1 expression on human lymphatic endothelial cells (LECs) and blood vascular endothelial cells (BECs). Ang-2 alone did not affect the biological behavior of LECs, whereas Ang-2 combined w ith TNF- significantly promoted the proliferation of LECs but not BECs. In mouse models, blockade of Ang-2 with L1-10, an Ang-2-specific inhibitor, significantly inhibited lymphangiogenesis but promoted angiogenesis. These results clearly indicate that Ang-2 acts as a crucial regulator of inflammatory lymphangiogenesis by sensitizing the lymphatic vasculature to inflammatory stimuli, thereby directly promoting lymphangiogenesis. The involvement of Ang-2 in inflammatory lymphangiogenesis provides a strong rationale for the exploitation of anti-Ang-2 treatment in the prevention and treatment of tumor metastasis and transplant rejection.

DIAGNOSIS OF INGUINAL LYMPH NODE METASTASES USING CONTRAST ENHANCED HIGH RESOLUTION MR LYMPHANGIOGRAPHY

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Rational and Objective: Inguinal lymph nodes can be the first or the only clinical signs of tumor metastases. The aim of the study was to evaluate the role of contrast enhanced high resolution MR lymphangiography in diagnosis of inguinal lymph node metastases.

Materials and Methods: The study enrolled 26 patients with inguinal lymph node metastases. Contrast-enhanced lymphangiography was performed using a 3.0T MR unit after intracutaneous injection of gadobenate dimeglumine into the interdigital webs of the dorsal foot. Images of inguinal lymph nodes were acquired before and after contrast injection.

Results: All patients exhibited edema in the subcutaneous layer with significant dilatation of lymphatic collectors in the affected lower limbs on MR images. Before contrast injection, the outline and structure of the affected nodes were unclear on T2 weighted images. Structural changes became evident on post injection T1-weighted images. Nodal involvement on contrast enhanced MR lymphangiograms was characterized as: (1) heterogeneous structure with partial or marginal enhancement of the node indicating partial occupation by tumor. (2) homogeneous structure of the node without contrast enhancement, indicating total occupation with metastasis, with increase or no change in size; (3) heterogeneous structure with punctiform nodal enhancement indicating diffuse growth of tumor within the node. Further examinations confirmed the diagnoses of inguinal lymph node metastases of either regional or distal tumors.

Conclusions: Contrast enhanced high resolution MR lymphangiography was a sensitive modality in the diagnosis of malignant peripheral lymphedema and the identification of inguinal lymph node metastasis in patients with various tumor origins.

PHLEBOLYMPHOLOGICAL REHABILITATION SERVICE

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The treatment of lymphedema is based on four foundamental approach dictate by International/italin guidelines; its use as a integrated scheme definited CPT combined physical therapy.
The phlebolymphological rehabilitation service in dayhospital, developed for ours institute, provides that the patients is treated in a multidisciplinary way for full time (daily or three times week) for 30/max 60 days.
Ours therapeutic protocol developed with:
- physical therapy under bending,
- pharmacologic therapy,
- respiratory therapy,
- instrumental therapy,
- psychological support,
- medical support to correct diet,
- hydrotherapy.

This project have the purpose of reduce, optimize and improve a appropriate therapeutic operation such as the outcomes in the long term to reduce, also, the SSN's care and production costs.

MICROSCOPIC ANALYSIS OF LYMPHATIC VESSELS IN PRIMARY LYMPHEDEMATOUS SKIN

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Summary: Changes of dermal collagen are characteristic for chronic lymphedema. To evaluate these changes, a real-time imaging based on two-photon excited fluorescence and second harmonic generation was developed for investigating collagen of lymph edematous mouse and rat tail skin in vivo. Our findings showed that the technique could image the morphological changes and distribution of collagen in lymphedematous mouse and rat tail skin in vivo. More importantly, it may allow visualization of dynamic collagen alteration during the progression of lymphedema. Our findings demonstrated that multiphoton microscopy may have potential in a clinical setting as an in vivo diagnostic and monitoring system for therapy in lymphology.

NEW REHABILITATION PROCESSES IN THE PUBLIC HEALTH ORGANIZATION IN SALENTUM: AN *AD HOC* IDEA TO SOLVE A BUG IN THE ITALIAN PUBLIC HEALTH SYSTEM

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Although the World Health Organization considers Lymphoedema as a debilitating and worsening disease, the Italian Public Health System and the Italian Ministry of Health still consider it as a simple skin defect.
In Italy, the most common lymphoedema is caused by the loco-regional lymphadenectomy resulting from a surgical exeresis of a neoplasia. However, the frequency of primary lymphoedemas, which are often clinically unrecognized or even undetected, is gradually increasing too.
In 2007, in Lecce (Salento, in the South-East of Italy), the Super District Structure of Rehabilitation (S.S.R.) a branch of the Department of Rehabilitation of the Local Public Health Institution, the Azienda Sanitaria Locale of Lecce (ASL Lecce), ran a strategic project called "Lymphoedema Project". Following a multidisciplinary approach, the project specifically targeted people affected by secondary lymphoedema (especially women that had been mastectomized for breast cancer). In particular, with the aim of better complying with the EBM criteria, a rehabilitative lymphological team, composed by a physiatrist, a physiotherapist, an orthopaedist, and a psychologist, was set up. Moreover, a diagnosis-therapy simplified path was designed.
In addition, since more than one year, the S.S.R. has been closely working with "S.O.S. Linfedema", an ONLUS that acts at the national scale and whose members are people affected by primary lymphoedema. The aim is to raise the awareness of local institutions and to promote a better disclosure of information to the public, in order to shed light on the complexities of the lymphoedema problem.
Furthermore, this cooperation represents the first public health reference point for patients affected by lymphoedema. In doing so, it promotes the understanding of patients' needs and the reduction of extra-regional mobility.
Today, dedicated surgeries of the ASL Lecce treat patients between 6 and 85 years old, affected both by primary and secondary lymphoedemas.

PRESENTING THAILAND AS A MEDICAL HUB IN LYMPHEDEMA FOR SOUTHEAST ASIAN NATIONS

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Background: Lymphedema is thought as untreatable by general physicians in many countries, including Thailand and other Southeast Asian Nations. As a result, a pitfall emerges within the health care system, because major malignancies like, e.g., breast and cervical cancer, are certain to produce sequelae of limb swelling. This well-known fact had never been corrected of public and private sectors until lately.
Material & Methods: On reviewing literature and related media, it was clear that Japan was the first in Asia to found Society of Lymphology, as early as in 1976. Subsequently, lymphedema patients in India, China, Taiwan, and Korea could benefit the practice of their innate lymphologists. Thailand has become number six in Asia to develop a center devoted to lymphedema. In this study we explored the huge database of Thailand Lymphedema Day Care Center which is now equipped with dedicated MRI facility.
Results & Discussion: During the last seven years, 3,100 patients have visited the Center to seek professional care on lymphedema and lymph-related ailments. Having invented a series of innovative devices, Twisting Tourniquet or Schnogh, we excelled in dramatic reduction of limb swelling which escalated as Talk of the Town for repeated years, with articles appearing on Thai, Japanese, English, and Chinese newspaper, and special TV programs broadcast nationwide and via satellite. Providing course treatment and follow-up, so far we have served patients from Iceland, England, Wales, Belgium, Germany, Italy, Portugal, France, Switzerland, Netherlands, Norway, Sweden, United States of America, Canada, Peru, Australia, Sudan, Israel, Lebanon, Oman, Iran, Iraq, Kuwait, United Arab Emirate, Bangladesh, India, Maldives, Nepal, Myanmar, Laos, Cambodia, Malaysia, Singapore, China, Korea, Taiwan, and Japan, making 37 nations over 6 continents. With reputation in uniqueness treating difficult diseases without medication nor invasive procedure, word of mouth conveyed to our center, patients of various underlying diseases, such as atopic dermatitis, psoriasis, SLE, rheumatoid arthritis, gout, Klippel Trenauney syndrome, varicosis, hemangioma, deep vein thrombosis, lymphoma, HIV, neurofibromatosis, elephantiasis, etc, of which each has recalcitrant swelling as part of their problem. The use of vegan diet as a therapeutic, prophylactic, and protective tool was scientifically proven, thus well adopted among patients. In view that ten ASEAN members, Thailand, Myanmar, Laos, Cambodia Vietnam, Malaysia, Singapore, Philippines, Indonesia, and Brunei, are planned to be unified as an Asean Economic Community by year 2015, we proudly propose Thailand as a Medical Hub in Lymphedema subserving 600 million population of the region.

LYMPHEDEMA AND PRURITUS: PHENOTYPE, PATHOLOGY, AND MEDICATION - FREE MANAGEMENT

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Background: When pruritus is present in lymphedema patients, itching problem can cause concern no less than swelling. We experienced many patients who presented recalcitrant itch, and had been diagnosed variously, thus treated differently yet failed, before their visit to our Lymphology Institute of Thailand. In some, their skin manifestation was so extreme that the lymphedema appeared relatively minor or even nearly null. Since pruritus manifests in different patterns with similarity and peculiarity, in this study we attempted to classify its phenotype and addressed the therapeutic care delivered successfully without prescribing any medication.
Materials & Methods: Among 3,100 patients, about 150 came with itch as a chief complaint; age ranged from childhood, 1.5 years, through adulthood of seventh or eighth decade. Grouping by itching severity as a mild, moderate, intense, and severe, was not employed, because personal expression as the desire to scratch appears very subjective and varies largely from person to person; ladies scratch rather sparingly, whereas children do almost unlimitedly. Our pruritic lymphedema patients were classified as follows.
Results & Discussion: Group I, bad-lymph sickness, came with eruptive disorders since early childhood. Multisegmental lymphedema was present in a right face-left upper limb-right lower limb, zigzag fashion, with repetitive pustule formation. Group II, dermatitis, came with eczema noted as thousands of maculopapular rashes. Old rashes remained with ugly-looking hyperpigmentation. Both groups were almost always diagnosed for "allergic" disorders, with/out known allergens, but identified here with massive lymph nodes on our MRI study. Group III, psoriasis, came with characteristic cutaneous changes distributed bilaterally. In cases whose lymph oozed out, the erythrodermic plaques were notably difficult for daily activity. Group IV, arthritis, came with scratch wounds centered arround joints and spread widely from limbs through trunk. The latter three groups had minimal lymphedema, but arthritis could generate striking swelling. Compression-decompression was given by Twisting Tourniquet technique [Ekataksin *et al.*, 2009], or by intermittent elastic bandaging. Cool gel was promptly applied to soothe the itch. All patients were subject to vegan diet therapy, avoiding any ingredient of animal origin, especially chicken, pork, beef, dairy products, eggs, shrimp, crab, other seafood, and stock/broth therefrom. These resulted in lessening the symptoms to varying degrees till cure. Many patients were amazed at the rapid improvement of their chronic symptoms that totally changed their quality of life then; we prescribed essentially no medicine.

COMPRESSION THERAPY TO RESUME GAIT QUALITY IN "NEGLECTED" PATIENTS WITH MINIMAL SWELLING

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Background: Walking instability with/out pain, is experienced to various degrees by many people who though received treatment such as medication, surgery, rehabilitation, physiotherapy, chiropractic, acupuncture, and massage, still cannot ambulate normally. These patients share one common complaint, "minor swelling", which is more or less obvious, and regarded as a sign of chronicity or ageing degenerative changes. As a result, their mobility constraints are "neglected" and hence their unsolved gait problem, notwithstanding their productive years to come.
Materials & Methods: Under a Prescribe-No-Medicines policy, we applied lymphologic compression procedures with long-stretch elastic support, using One-Touch Free Supporter made of Spark Nylon (Daiya, Japan), to those patients who for months or years have been suffering from a variety of disorders including osteoarthritis, rheumatoid arthritis, SLE, lumbar/cervical spondylosis, disk herniation/prolapse, deep vein thrombosis, varicosis, plantar fasciitis, paresthesia with/out diabetes mellitus, fibromyalgia, chronic fatigue syndrome, and unexplained leg weakness/numbness. Wrapping was done at 30~60 mmHg in a simple spiral and/or a crisscross/figure-of-8 manner over the swollen segment, up to hip joint and lumbosacral joint in some cases. Lymph pooling was demonstrated by MRI.
Results & Discussion: Results were striking. Almost all patients could get up and walk easily within seconds. Pain, tenderness, or arthralgia, diminished and/or vanished, and weakness significantly decreased and/or disappeared, so that patients perceive a sudden lightness in legs and thighs and abruptly improved strength to stand up; they suspected if the wrapping material was coated with medicinal compounds. One patient who was diagnosed elsewhere with pending deep vein thrombosis, was surprised at immediate improvements in his unassisted ability to leave wheelchair, walk without aid, and step up and down stairs; all changes took place in minutes so that relatives were literally amazed. Many patients used to believe they could never again sit on a low chair or on the floor, were surprised and delighted to experience a rapid physical fitness to sit flat on the floor, squatting and up-righting without difficulty. They admitted while tested stepping up/down stairs that they sensed a back-to-youth feeling in muscle power. Chronic leg numbness and foot pain were swiftly erased in many patients, thus easing their confidence in footing. We concluded that minor swelling of lower extremities, though partial or minimal, that occurred in patients who most likely would not consult a lymphologist, interferes profoundly with gait quality. The principle of compression therapy therefore should be understood widely and practiced commonly in routine clinics.

LYMPHOSCINTIGRAPHY IN LIPEDEMA: A SHORT SURVEY

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Background and aim: Lipedema is an often misdiagnosed adipose tissue disorder due to fat cells hyperplasia nearly exclusively affecting female gender often on a familial basis. Lipedema is characterized by disproportional obesity of lower limbs with onset at puberty. The symmetrical increased fatty tissue distribution affects tights and legs but feet are spared. Bruising for minimal trauma and pain for mild pressure on the skin are usual findings in this condition. Despite different clinical history and presentation pattern lipedema is frequently mistook for primary lymphoedema. Lymphoscintigraphy has been proposed as a useful tool to get the differential diagnosis between the two conditions but its diagnostic role has been recently questioned [Reich- Schupke *et al.*, 2013]. Our preliminary study has been aimed to a survey of the Literature data in order to address our limited experience on the basis of a larger clinical experience.

Patients and methods: A research was performed on Pubmed using the key words "lipedema and legs and lymphoscintigraphy". The data reported by the different authors are discussed on the basis of our experience (55 subjects).

Results: The reference research yielded 10 papers in a time span from 1993 to 2013. The studies were not easily comparable due to different aims, protocols and population characteristics. However, despite these limitations it is evident that lymphoscintigraphy is a useful technique in differentiating lipedema from lymphoedema. In the former condition in fact the lymphoscintigraphy is normal [Bräutigam *et al.*, 1997] or shows a slow and an asymmetrical pattern of the lymphatic flow [Bilancini *et al.*, 1995] whereas in lymphoedema there is an obstruction to lymphatic flow. In our patients only high grade lipedema is characterized by a moderately abnormal scintigraphic pattern with slow, often asymmetrical lymphatic flow and with evidence of the superficial lymphatic vessels.

Conclusions: The lymphoscintigraphic pattern in lipedema is dependent from the stage of the disease. Usually normal at the beginning of the disease it progressively impairs due to the secondary compression and obstruction of the lymphatic vessels exerted by the increased adipose tissue. Due to its high diagnostic content, lymphoscintigraphy should be considered an important procedure in lipedema diagnosis and evaluation. Lymphoscintigraphy appears largely justified by its safeness, very low dosimetric burden, ease of execution and low costs.

RECURRENT CERVICAL SWELLING DUE TO THORACIC DUCT OBSTRUCTION: CASE REPORT

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Introduction: A left-side supraclavicular mass is a rare conditions and represent different conditions such as: reactive degeneration of lymph nodes, infectious disease, brachial cleft cysts and begnin or malignant tumors. An important differential diagnosis to these conditions is the thoracic duct cyst (TDC). Symptoms are sensation of pressure, difficulty of swalloring, pain, dyspnea, hoarseness by pressure on the reccurent laryngeal nerve. The patogenesis of TDC is not clearly established. Some theories considers as a congenital weakness of the duct or as an acquired condition: trauma, infection, inflammation, atherosclerosis. Another possibility is the obstruction of the lymphoid flow in the angle between the left jugular vein and the subclavian vein.
The diagnosis is combined with different radiological tools. CT scan and MR imaging are excellent. Sonography is useful and easy procedure for the TDC diagnosis. As evaluated in a recent paper, the echo-color-doppler (ECD) "is to be considered an effective tool in cervical swelling and TD anomalies investigation". The TDC on the cervical part of the thoracic duct is rare condition, in literature have been reported only 16 cases.

Case Report: E.P. 50 year-old woman, affected by Hypertension, with 26.29 of BMI , refer in past 5 years 3 episodes of swelling of the left side of the neck. All events were spontaneously reversible within a few days.
In the last episdode patient refer severe pain on the left arm, after electrostimulation for a cervical pain due to a referred , and immediately swelling of the left side of the neck. The patient referred: pain, pressure sensation. A magnetic resonance imaging was performed, that sowed a lacunar left supraclavicular effusion and detecting, apparent, dilated TD.
ECD sowed a dilation of the TD (> 9 m) with apparent obstruction by homogenous and hyperechogenic plug and an atipical image as large hyperechoic valve. Aftre 5 days ECD sowed reduction of dilatation of TD (5.0 mm). In 7 days all symptoms are disappeared without therapy.

Conclusion: The case report documents a recurrent cervical swelling with spontaneous resolution due to, probabily, a chyli stop determined to malformation valve, that may be carefully detectable by ECD. Although, this valve malformation was never been previously documented. ECD rapresents a easy tool for investigation supraclavicular fossa in case of swelling.

CLASSIC X-RAY LYMPHOGRAPHY IN THE PRESENT - YES OR NO?

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Thorough examination of a patient with lymphadenopathy is necessary to make a correct and accurate diagnosis. However, we have to emphasize, that the last word in most of the cases has histological verification. It is sometimes very difficult to obtain the verification, especially from abdominal area- from retroperitoneum and the pelvic region. We have to realize the fact that not every time when an enlarged lymph node is found, it does not have to be a lymphadenopathy in the true sense, and the other way round. When we mention the word lymphadenopathy, it often evokes benign lesions, sometimes even malignity, with enlarged lymph nodes found. However, sometimes in the CT scans a few enlarged but normal lymph nodes can be seen. So when using even the "most" noninvasive diagnostic method this image is considered as a pathology, which is not always correct. Interesting thing is that the radiologists are overlooking small lymphatic nodules, when their size is around 0,5 to 1 cm. But – what is their structure? We do not even think that there might be a pathological process going on in those small ones, we are just looking for those enlarged ones. So what should we do? The question is- should we start using the classic X-ray lymphography again? To obtain at least images of structures that is not possible by methods mentioned below. Or should we go back to biopsies? To obtain histology material intraoperatively? Yes, when the primary focus is known, or when the peripheral node is positive (or for staging). Even that is not completely accurate. Noninvasive methods are favorable for both patients and doctors, but how can we confirm or disprove positive results from USG, CT, MR, PET, CT-PET? All this methods are merely imaging techniques. Not even one of them can give the final verdict- at least the evidence of structural changes in X-ray lymphangiography. The most ideal is the histological result. That is why the complicated lymphat ic system remains still terra incognita.

LYMPHATIC CONTRACTILITY EVALUATION USING ICG VELOCITY

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Background: Lymphatic contractility is a critical function maintaining fluid circulation. After pelvic cancer treatments, lymph obstruction at the pelvic region leads to abnormal lymph circulation, resulting in lymph pump dysfunction. As well as lymph circulation, lymph pump function is important for lymphedema evaluation.

Methods: We assessed and analyzed lymphatic contractility of 12 secondary lower extremity lymphedema patients using indocyanine green (ICG) lymphography according to corresponding severity stage. ICG velocity and transit time could evaluate lymph pump function; ICG velocity decreases and transit time increases as the lymphedema severity stage progresses.

Results: Measurement of ICG velocity required 5 minutes after the dye injection, whereas that of transit time took more than 1 hour in severe cases. With progression of lymphedema, ICG velocity significantly decreased ($P < 0.001$), and transit time increased ($P < 0.001$).

Conclusions: ICG velocity can be easily obtained, and is recommended for evaluation of lymphatic contractility compared with transit time. Dynamic ICG lymphography, which evaluates both lymph pump function and circulation, plays an important role in comprehensive assessment of lymphedema pathophysiology.

STUDY OF THE SUPERFICIAL LYMPH FLOW IN LOWER ABDOMEN AND GROIN WITH THE SECONDARY LOWER EXTREMITY LYMPHEDEMA USING ICG FLUORESCENCE LYMPHOGRAPHY AND LYMPHOSCINTIGRAPHY

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Objective: We observed the superficial lymph flow of the lower abdomen with the secondary of lower extremity lymphedema using ICG flouorescence lymphography (ICG-FL), and compared with the lymphoscintigraphy findings.

Materials: The secondary lower extremity lymphedema (74patients, 82limbs) who received the LVSEA

Method: All patients recieved lymphoscintigraphy on their first medical examination. During the LVSEA, we observed the superficial lymph flow in the lower abdomen and the groin using the ICG-FL. We performed injection with ICG each on the level of the umbilical and on the base of the thigh (peripheral of the inguinal ligament). While observing the lymph flow in the PDE camera, and we marked it with Piokutanin. We examined the findings on each site. We examined the differences of the superficial lymph flow that was observed in the ICG-FL by the presence or absence of visualization of inguinal lymph nodes(LNs) in lymphoscintigraphy.
For the statistical study, we used statistical analysis software, StatMate IV (ATMS Co, Ltd Tokyo, Japan), we used Fisher's Exact Test with Yates' continuity correction in comparison

Result: Without ipsilateral inguinal LNs, there was a representation of the contralateral inguinal LNs in 51 cases. No representation of inguinal LNs on both sides was 18 cases. Superficial lymph flow in thigh area did not vertically exceed inguinal ligament. Superficial lymph flow was towards the genital area or outside direction in many cases. A significant correlation was observed in the superficial lymph flow toward the inguinal LNs and with or without visualization of the LNs in lymphoscintigraphy.

COMPRESSION THERAPY BY ELASTIC STOKINGS IN COMPLEX PHYSICAL THERAPY IN LOWER LIMB LYMPHEDEMA BASED ON TYPES OF LYMPHOSCINTIGRAPHIC IMAGES (MAEGAWA'S CLASSIFICATION OF DEGREE OF SEVERITY)

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In lymphedema caused by the abnormality of the lymphatic system, there are few papers to be associated with a lymphatic function and complex physical therapy. For a long-term medical therapy of lymphedema, our clinic has been trying to make use of elastic stockings without bandage in order to reduce edema, at the same time, to put much value on patients' daily-lifestyle and to improve QOL.
We examined the effect that the lymphatic function of the patients with lymphedema gave for complex physical therapy statistically. We adopted Maegawa's classification on degrees of severity (Type I ~ Type V) of lymphatic dysfunction [Maegawa J., et al: *Types of lymphoscintigraphy and indication for lymphaticovenous anastomosis.* Microsurgery 2010; 30(6): 437-442].
The treatment protocol of our clinic is to select an optimal elastic stockings for a patient according to Maegawa's classification and the condition of leg volume after intensive lymph drainage phase.In case of high severity level or difficult to maintain a certain level of leg volume, the patient used a simplified-compressive-aids (custom made by our clinic) at night or wore stockings doubly.
The affected leg volume reduction rate showed from 6% to 15% (according to Maegawa classification) at intensive lymph drainage phase and during maintenance phase the patients dereased their leg volume gradually from 13% to 25%. The degree of severity of lymphedema by Maegawa's classification was confirmed as the important index for complex physical therapy of lymphedema.

PILOT STUDY ON NOVEL LYMPHATIC TAPING TECHNIQUE - PUNCH TAPE

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Introduction: Punch-tape is a type of Tape with holes in an asymmetric pattern that create different tension lines within the same piece of tape. This has a major effect on the superficial fascia, neuro-lymphatic system and analgesic response (endorphins), draining haematoma and edema.

Objectives: To assess if the Punch-Tape treatment can be an alternative to the traditional treatments.

Method: The patient participating in this study is a 61-year-old woman, who had modified radical mastectomy over four years ago. For the past four years, the patient has been using compression garments to address her lymphedema condition.

For this study the patient uses only use Punch Tape in her treatment, with the application repeated every 7 days.

The Punch-Tape application consists of three strips placed along the length of the affected arm in spiral. The first applied from the subclavian triangle, the second from the top of the shoulder and the last one from the posterior thoracic area, ending around the wrist and the hand.

The volume changes were evaluated using the Markowski formula:

(Σ pre-treatment circumference − Σ post-treatment circumference x 100 / Σ pre-treatment circumference)

And volume control of Kuhnke formula: Vol = (C12 + C22 +... Cn2)/π

Results: In the beginning of the treatment with Punch Tape, the sum of the measures of the circumferences has been evaluated in middle finger, hand, wrist, 5 cm over wrist, forearm and 10, 15 and 20 cm over olecranon, was 177.9 and Markowski rate 1.03, after the eight weeks of Punch-Tape treatment, the results were: the sum of the measures of the circumferences was 171.6, and the Markowski rate was 3.54, Note that the largest reduction occurs in the edematous areas with respect to the healthy side.

Conclusion: The Punch-Tape in lymphedema is a completely new treatment. Despite the good results obtained, more lines of investigation must be opened to improve and optimize the use of this method, not only in lymphedema but in other edema related pathologies and circulation problems. The results indicate that the most edematous evolve more favorably to Punch-Tape treatment, so you would think that in patients in the acute phase of edema evolution could be more responsive to Punch-Tape treatment.

Keywords: Lymphedema, Punch-Tape, Physiotherapy, Post-Mastectomy Lymphedema.

REAL-TIME IN VIVO IMAGING COLLAGEN IN LYMPHEDEMATOUS SKIN USING MULTIPHOTON MICROSCOPY

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Changes of dermal collagen are characteristic for chronic lymph edema. To evaluate these changes, a real-time imaging based on two-photon excited fluorescence and second harmonic generation was developed for investigating collagen of lymph edematous mouse and rat tail skin in vivo. Our finding s showed that the technique could image the morphological changes and distribution of collagen in lymphedematous mouse and rat tail skin in vivo. More importantly, it may allow visualization of dynamic collagen alteration du ring the progression of lymphedema. Our finding s demonstrated that multiphoton microscopy may have potential in a clinical setting as an in vivo diagnostic and monitoring sys tem for therapy in lymphology.

SATISFACTION GAINING CONTROL OVER THE HABIT OF WEARING EFFICIANT COMPRESSION GARMENT FOR A WOMAN WITH SECONDARY ARM LYMPHŒDEMA

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Introduction: Wearing a compression garment is a basic, but often stressful treatment for women with lymphoedema following breast cancer treatment. The problem of gaining control over the habit and efficiancy of compression garments was initially observed among several patients and resulted in this evaluation for one woman over a year.

The aim: The aim of study is to compare two different approaches towards gaining control over the habit of wearing efficiant compression garment. One year of traditional habit of getting new garment every third month, and one year with new garment eftery third month and altered garment by sewing after wear and reduction of efficiency.

Methods: A single case study, a woman registered as a patient at the Lymphodemia Unit participated. The woman used compression garment regularly and has preformed self-care with lymph drainage. Between 2011 and 2012 the woman has used bandage at night with custom made sleeve of Mobiderm, a sort of padded material, twice a week and Mobiderm without bandage other nights of the week. Since 2012 she has changed that to only use the custom made sleeve of Mobiderm every other night of the week. A local lymph and physiotherapist has given lymph drainage every two weeks during the whole year. To evaluate the use of compression garment here called a devise and the service around the assessment, the Quebec User Evaluation of Satisfaction with assistive Technology was used. A Visual Analogy Scale was used to compare the differences between the two years.

Results: A significant satisfaction were the medium score for wearing the compression garment was 4,57 out of 5.00 possible, 5,0 for service and 4,72 for wearing compression garment and service together. 1 represent not satisfied and and 5 represent very satisfied. From all the variables the woman chose durability, comfort and effectiveness as the three most important. The two questions supplemented to evaluate one year of traditional habits of wearing compression garments the woman scored 32 mm. To evaluate one year of altered compression garment by sewing after wear and reduction of efficiency the woman scored 90 mm. 58 mm of a difference.

Conclusions: To offer this method by evaluating two different years of approach, can improve for women with lymphoedema to gain control over the habit of wearing efficient compression garment in comparison with wearing old garment.

LONG-TERM FOLLOW UP PROCEDURES FOR LYMPHŒDEMA PATIENTS FOLLOWING LIPOSUCTION OF ARM AND/OR LEG LYMPHŒDEMA. 10 PRACTICAL ADVICES FOR THE CLINIC

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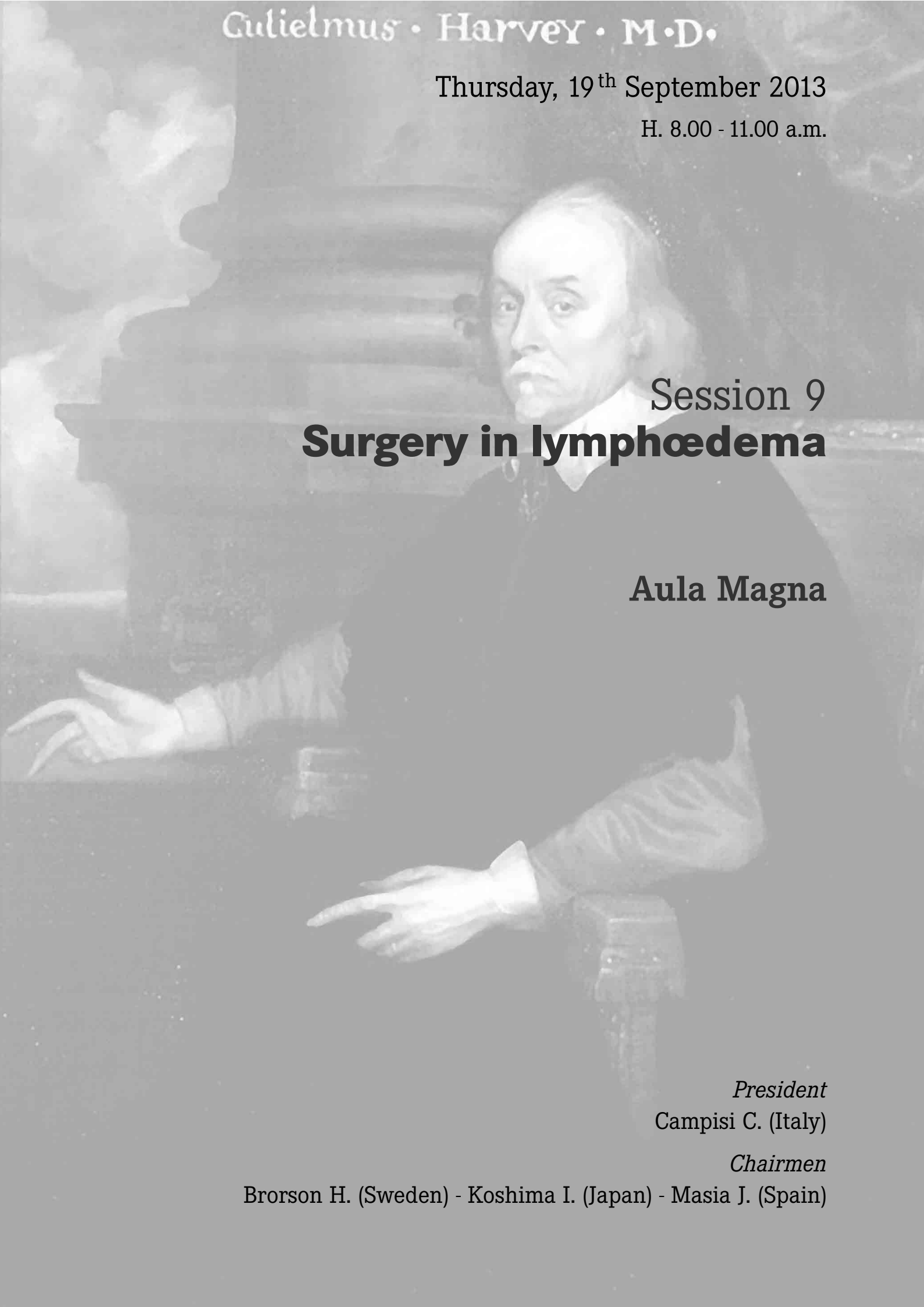
Introduction: Relevant and repeated control measures are important to get stable and successful results in the long run for patients with chronic non-pitting lymphoedema who have been treated with liposuction due to adipose tissue hypertrophy.

Methods: Measuring of excess volume: the difference between the edematous and non-edematous extremity is measured with water plethysmography. The shape of the extremity is measured at fixed anatomic landmarks using a tape measure. The range of motion at relevant joints are assessed. Measurements are taken to order compression garments. The goal is complete reduction to obtain equal size of the extremities. Quality of life parameters are measured with SF-36, and a VAS-scale measures subjective pain as well as difficulties with activities of daily living (ADL). Photos are taken at all follow-up visits at 1, 3, 6, 9 and 12 months, and then once a year.

Results: On average, complete reduction of the excess volume is achieved within 6-12 months. At the 12-months follow-up visit, compression garments for the following year are ordered and after that, only yearly follow-up visits are needed without additional treatment like CDT.

Conclusion: A multi-disciplinary team approach towards lymphoedema patients treated with liposuction surgery has shown to be successful. The idea is to create a “mental contract” between the patient and the team. The patient is aware of and accepts our postoperative compression recommendations, and is at the same time encouraged by direct visual feed back from volume-, and circumference measurements at check-up visits.



Thursday, 19th September 2013

H. 8.00 - 11.00 a.m.

Session 9
Surgery in lymphœdema

Aula Magna

President

Campisi C. (Italy)

Chairmen

Brorson H. (Sweden) - Koshima I. (Japan) - Masia J. (Spain)

ACTIVE ROLE OF SURGERY IN LYMPHŒDEMA MANAGMENT

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A wide clinical experience in General Surgery has developed a remarkable knowledge about lymphatic disorders; both primary and secondary. Diagnostic and histopathological studies of lymphatic diseases gave a better understanding of the etiological aspects and pathophysiological mechanisms responsible for the complex clinical features associated with lymphatic dysfunctions. Translational, lymphologic, basic, and clinical research has helped to improve therapeutic approaches from both the medical and surgical point of view. Thus, strategies of treatment are proposed to prevent lymphatic injuries, avoid lymphatic complications, and to treat lymphatic diseases as early as possible in order to be able to, in some cases, cure these pathologies.

Methods: The authors' wide clinical experience in the treatment of patients with peripheral lymphedema by microsurgical techniques is reported (Over 2600 cases with a follow-up of at least 5 years, to over 15 years). Derivative multiple LVA or lymphatic pathway reconstruction using interpositioned vein-grafted shunts (MLVLA) were performed at a single site, either the axillary or inguinal-crural region. Objective pre- and post-operative clinical evaluations consisted of limb volumetry, lymphoscintigraphy, and duplex scan. Patients were followed for a minimum of five years to over 20 years. Clinical outcomes included excess limb volume (ELV), frequency of dermatolymphangioadenitis (DLA) attacks, and use of conservative therapies.

Results: Over 2600 patients affected by upper and/or lower limb lymphedema, between 1983 and 2013, underwent lymphatic microsurgery. Compared to pre-operative conditions, patients obtained significant reductions in ELV of over 84% on average. Over 86% of patients with earlier stages of disease (stages IB or IIA) progressively stopped using conservative therapies and 42% of patients with later stages (stages IIB and III) decreased the frequency of physical therapies. DLA attacks considerably reduced by over 91%. Histological findings showed adverse lymphatic and lymph-nodal tissue changes in early stage lymphedemas, whilst significant fibrotic lesions were demonstrated in late stage lymphedemas.

Conclusion: Microsurgical lymphatic derivative and reconstructive techniques give positive results in the treatment of peripheral lymphedema; above all in the early stages when tissue changes are slight and allow almost a complete functional restoration of lymphatic drainage.

FUNCTIONING LYMPHATICS TRANSFER FOR TREATMENT OF SEVERE LEG LYMPHEDEMA

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Lymphaticovenular anastomosis (LVA) can reduce the incidence of cellulitis and end up with minor infection to reduce the compression therapy. Such postoperative long-term improvement has been obtained with mild compression for edema. These effect is particularly marked for edema in the early stage. However, LVA is uneffective for severe cases. Since 2004, vascularized normal lymphatics transfer with LVA been attempted for severe edema resisted to LVA. We will report the results of this new combined techniques.

Materials and method: Since 1990, we carried out LVA for 1000 cases. since 2004, functioning lymphatics transfer for severe edema was performed for 66 cases with severe edema. The age of patients was 13 to 76, the arm was 2 cases lower limbs was 64 cases (20 cases with primary edema, 46 cases with secondary edema, bilateral in 33 patients). The edema of those cases was resisted to LVA with compression therapy in all patients. Functional lymphatics transfer was performed for patients with edema for 7 months to 43 years after the occurrence of edema. In the patients with hemilateral leg edema, the lymphatics were harvested from the contralateral normal dorsal foot. In the patients with bilateral leg edema, functioning lymph-nodes were obtained from the left lateral thoracic region.

Results: Forty-nine patients were followed from one month to 7 years after surgery. Twenty-five cases showed remarkable improvement, 18 cases effective, 3 cases constant, 3 cases worse. The effect with each methods is unknown at this time. There was a tendency that the effect relates to the number of transplanted tissue and LVA. Lymphatic smooth muscle degeneration and regeneration seems to affect the course of post-operativeimprovement.

Conclusion: Combined surgical treatment using LVA and functioning lymphatics is a new strategy for severe leg edema.

TEN YEARS PERSONAL EXPERIENCE IN LYMPHATIC SURGERY. LYMPH COLLECTOR TRANSPLANTATION FOR LYMPHEDEMA MANAGEMENT IN CANCER PATIENTS: RESECTION TO MODIFY LYMPHATIC RECONSTRUCTION

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Background: Secondary lymphedema is a debilitating condition commonly causing complications in cancer therapy. This prospective study provides an overview about the treatment of secondary lymphedema by use of lymph vessel transplantation as well as pre- and post operational examination using the DASH-Score, L- dex and Delfin for upper lymphedema and LEL-Index and AOFAS for lower extremity lymphedema.

Method: Here we show twenty patients with secondary upper-and fifteen with lower extremity lymphedema underwent surgery by use of lymph vessel transplantation of the modify technique during the past years. The mean duration of lymphedema was 5 years ranging I-III. The pre- and post operational severity of their condition was evaluated with the DASH-Score, L-Dex and moisture content. The evaluation took place once before the surgery, then 14 days, 3 months, 6 months, 12 months, 18 months and 24 months after the procedure. The evaluation includes MRL, lymph scintigraphy and PDE.

Results: The standard treatment involved the transplantation of 3-4 lymph vessels of 25-30cm length from the ventromedial bundle of the upper leg. The mean follow-up time was 24 months. MRL and PDE show that after 1 year the transplanted lymph collectors remain fully functional. All these patients showed a constant decrease and stabilization of the DASH-Score and UEL-Index, AOFAS and LEL index through 24 months.

Conclusion: Lymph vessel transplantation might be a treatment option for secondary lymphedema management. The evaluation results from both DASH-score and L-Dex and Delfin and UEL-Index point towards a strong correlation for upper extremities while LEL-Index and AOFAS can be used for lower extremity evaluations.

A NEW SURGICAL TECHNIQUE FOR MANAGEMENT OF GENITAL FILARIASIS

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Genital filariasis both in male and female are common presentation in endemic countries but patients seek medical help at a very late stage. It is relatively simpler in managing female genital lymphoedema with nodules and lymphorrhia whereas in males it is both the scrotum and penis are involved. It is technically difficult to correct the deformity and give a functionally and aesthetically acceptable organs, for which we have evolved a new technique for correction of ramphorns penis and a separate scrotal pouch. Without recurrence of lymphorrhia and the deformity by adding bilateral nodo venal shunt along with a single stage reconstruction of the penis and the scrotum. We have done twelve cases using this new technique and followed it for twelve years without any problem post-operatively, which will be discussed in detail by a power point presentation showing the exact technique.

LIPOSUCTION NORMALIZES LYMPHEDEMA INDUCED ADIPOSE TISSUE HYPERTROPHY IN ELEPHANTIASIS OF THE LEG – A PROSPECTIVE STUDY WITH A TEN-YEAR FOLLOW-UP

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AIM: Patients with long-standing pronounced non-pitting lymphedema do not respond to conservative treatment or microsurgical procedures because slow or absent lymph flow, as well as chronic inflammation, cause the formation of excess subcutaneous adipose tissue, which cannot be removed by these methods. The swelling of chronic non-pitting arm lymphedema following breast cancer, can be completely reduced by liposuction and has not recurred during more than seventeen years' follow-up. Encouraged by this experience, we decided to test the effectiveness of liposuction on leg lymphedema.

Methods: 48 patients with an age of 53 years (range, 17-76) and a duration of leg swelling of 14 years (range, 2-50) underwent liposuction due to non-pitting, chronic lymphedema. There were 25 primary (PL), and 23 secondary lymphedemas (SL) following cancer therapy. Age at cancer treatment and interval between cancer treatment and lymphedema start were 43 years (range, 20-65), and 3 years (range, 0-26) respectively. Age at onset of PL was 32 years (range, 4-63). All patients had received conservative treatment before surgery without further reduction. All were wearing compression garments before surgery. Aspirate and leg volumes were recorded.

Results: Aspirate volume was 4067 ml (range, 1210-8475) with an adipose tissue concentration of 94% (range, 61-100). Preoperative excess volume was 4195 ml (range, 1200-8475). Postoperative mean reduction was 83% (range, 22-135) at 3 months and 103% (range, 56-163) at 1 year, and more than 100% during 10 years' follow-up when it was 115% (range, 112-119), i.e. the lymphedematous leg was somewhat smaller than the healthy one. The preoperative mean ratio between the volumes of the edematous and healthy legs was 1.4, rapidly declining to 1.0 at 1 year and less than 1 after one year.

Conclusion: Liposuction is an effective method for treatment of chronic, non-pitting leg lymphedema in patients who have failed conservative treatment. It is the only known method that completely reduces excess volume at all stages of lymphedema. The removal of hypertrophied adipose tissue is a prerequisite to complete reduction. The reduced volume is maintained through constant use of compression garments.

INDICATIONS OF LYMPH NODES TRANSFERS FOR IATROGENIC ARM

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A complete blockage of the lymph drainage pathways after removal and/or damage to lymph nodes is an absolute indication for ALNT, in view of replacing the missing or damaged lymphatic tissue. This condition can be diagnosed by lymphoscintigraphy as a lack of uptake of a radioactive particle (technetium-99m). More recently, magnetic resonance lymphography (MRL) with non-contrast T2-weighted images, also called lymphatic magnetic resonance imaging (L-MRI), is being used to visualize the lymphatic system anatomy. The sensitivity of MRL is greater than that of lymphoscintography. An absence of lymph nodes and/or lymph channels traversing the previous surgical site may appear as a black area on MRL (ref 9, 10)

Other indications for ALNT procedures are lymphedema resistant to conservative treatment, pain or signs of brachial plexus neuropathy, and chronic infections in the lymphedematous extremity. If conservative treatment fails to bring satisfactory long-lasting results and if lymphatic MRI or lymphoscintigraphy demonstrate gradually worsening of the situation, ALNT is indicated to reconstruct the damaged or missing lymphatic tissue. Release of scar tissue and placement of vascularized, non-irradiated tissue, after thoracic neuromas release, can treat the pain and stabilize the neuropathies. Chronic infections are also a main indication for ALNT due to the improvement of immune function by the lymph nodes. This abstract is showing the lineal results and imagings.

THE ANALYSIS OF COMPLETE CURED CASES FOR LYMPHEDEMA AFTER LYMPHATICO-VENOUS ANASTOMOSIS

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Lymphatico-venous anastomosis (LVA) has made it possible to reduce compression therapy and decrease the frequency of phlegmone. We have experienced some cases which need not to do any compression therapy and edema does not get worse. In our 500 cases of upper arm and lower leg lymphedema after LVA, 25 cases show no need to do compression therapy. In 25 cases, lower leg cases are 11 cases and upper arm cases are 14 cases, primary lymphedema is 1 case and secondary lymphedema is 24 cases.
In our experience, the lymphatic smooth muscle function and degenaration has individual variation and they have important roll in postoperative result. We think the regeneration of lymphatic function has occurred in the complete cured cases. In this study, the early stage lymphedema cases, especially cases within a year from onset, are promising to get complete cure. Furthermore, for prolonged course cases, LVA is also thought to be effective treatment option, and compression therapy is also key factor for regeneration of lymphatic function.

THE IMPORTANCE OF AN INTEGRATED THERAPY CONCEPT FOR SURGICAL TREATMENT OF SEVERE CASES OF LYMPHEDEMA

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Over the last 15 years, new microsurgical techniques have been propagated for treatment of chronic lymphedema. However, the conservative treatment, complex decongestive physiotherapy (CDP), still plays a main role in the treatment of chronic lymphedema. In severe cases, treatment by CDP alone may be inefficient. Ablative surgery could be a treatment option, but this is often considered to be a high risk procedure due to the concomitant diseases presented in those patients as well as the expected postoperative complications. These patients are frequently rejected in different clinics and feel frustrated and hopeless.
We present our experiences with an integrated therapy concept that we apply to treat severe cases of lymphedema affecting the lower and upper extremity as well as the genital area. The patients are treated preoperatively in a specialized lymphological clinic for several weeks until a significant improvement of the edema and a reduction of the volume has been achieved. Afterward, the patients undergo reduction surgery in a plastic surgery department and are subsequently transferred back to the lymphological clinic to continue the conservative treatment for further 2-3 weeks.
We demonstrate that severe cases of lymphedema can be successfully treated by combination of perioperative CDP and plastic surgery procedures. This integrated therapy concept also contributes to reduce the rate of postoperative complications.

SEARCHING THE IDEAL SURGICAL TREATMENT FOR LYMPHEDEMA: SIX-YEAR EXPERIENCE IN THE COMBINED TECHNIQUE

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Lymphedema is one of the most feared complications of breast cancer therapy and its treatment is a challenging problem for plastic surgeons. Although more conservative surgery has been introduced, it continues to be a prevalent iatrogenic problem that affects quality of life. In an attempt to provide breast cancer patients with an integral treatment we initiate lymphedema treatment using two surgical techniques: lymph node transplant and lympho-venous anastomosis. We present our working protocol and results.

Material and Methods: Retrospective study from January 2006 to January 2012 in 86 breast cancer patients (mean age 51.1 y) with lymphedema (levels I-IV) who underwent surgical treatment. All were studied preoperatively with lymphogammagraphy and the study was completed with ICG lymphography (Photodynamic Eye - PDE) from 2008, and also with lymph-MRI from 2009. Eight patients underwent lymph node transplant, 52 received lympho-venous anastomosis and 26 patients underwent both techniques.

Results: We clinically assessed the quality of skin tissue and the reduction of the circumference of the affected limb. After a follow up of 6-72 months, we observed the circumference of the arm decreased from 0,9 to 6,1 cm (average 3,25 cm). The rate of preoperative versus postoperative excess circumference decreased in range from 12 to 95,7% (average 39,72%).

Conclusion: Results are very variables and difficult to predict. They depend on many factors but the most important is the functionality of the lymphatic channels and its intraoperative identification. Treatment must thus be individualised for each patient in order to achieve optimal results.

THE USE OF "LYMPHA" TECHNIQUE TO PREVENT EXTREMITY LYMPHEDEMA AFTER MELANOMA TREATMENT

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The incidence of lymphedema of extremities after melanoma treatment is significant. The purpose of the current study was to assess the efficacy of LYMPHA technique to prevent secondary lymphedema. A retrospective review of patients undergoing groin dissection in melanoma treatment from February 2006 to April 2009 was performed. A total of 59 melanoma patients with positive groin lymph nodes comprised 18 patients (T-group) with melanoma in the trunk and 41 patients (E-group) with melanoma at the extremities. 18 patients (T-group) had primary prevention of lymphedema with microsurgical lymphatic-venous anastomoses (LVA) performed simultaneously with groin dissection (LYMPHA technique). 41 patients (E-group) underwent LVA to treat secondary lymphedema of lower extremity following groin dissection, after an accurate oncological assessment. Limb volume measurements and lymphoscintigraphy were performed pre- and post-operatively to assess short and long term outcome. No lymphedema occurred after microsurgical primary preventive approach. Significant (average 80% reduction of pre-op excess volume) reduction of lymphedema appeared after microsurgery performed for secondary leg lymphedema. Lymphoscintigraphy was performed post-operatively in 35 patients and allowed to demonstrate the patency of microsurgical anastomoses in all the cases. The follow-up period was averagely 42 months. LYMPHA technique has shown to reduce lymphedema after inguinal lymphadenectomy. Lymphatic-venous multiple anastomoses have also proved to be a successful treatment for already clinically evident lymphedema, above all if treated at early stages.

VALUE AND LIMITS OF LYMPHATIC SURGERY

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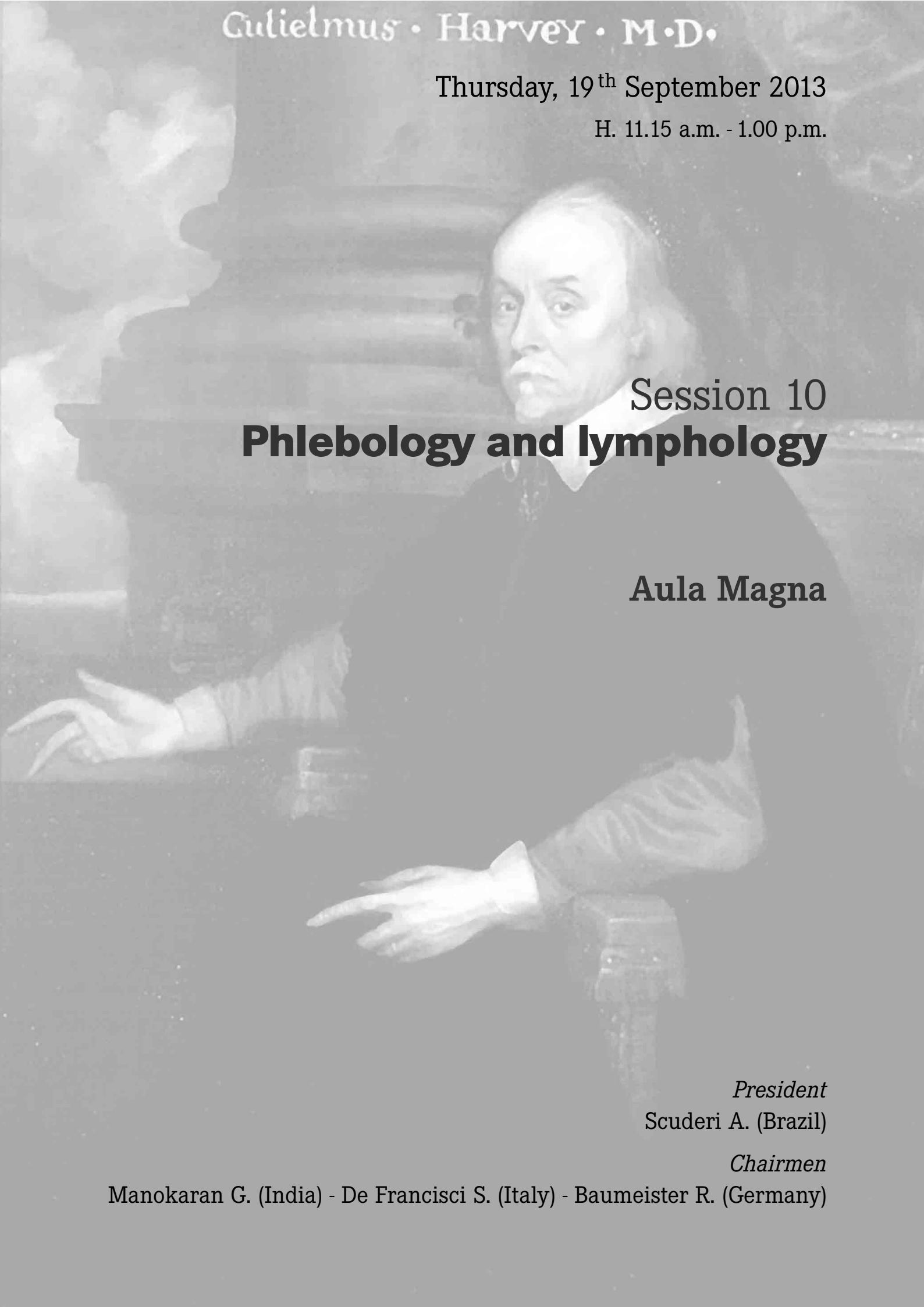
Lymphatic surgery consists of different approaches to deal with the origin and the sequels of lymphedema.
There are three types of lymphatic surgery available: resectional, divertive and reconstructive methods.
The goal of all types should be to achieve a significant surplus above the limits of nonsurgical treatment procedures. The ultimate goal is to liberate the patient of any further treatment.
All types of treatment have to balance the chances and the risks.
Resection methods may free the patient of the heaviness , in advanced stages also of the immobilization. Mostly they need additional compression to prevent a relapse. The indication is seen in late stages where the secondary tissue changes are predominant.
Divertive methods provide the patient with the chance to relieve the lymphatic system via spontaneous lymph-lymphatic connections or peripheral lymphatic-venous shunting. The latter may be performed with low invasivity. There the indication is seen in an early stage where a high lymphatic pressure is present within unaltered lymphatic vessels .
Reconstructive methods try to reverse the underlying origin of a lymphedema, especially if a localized interruption was the cause. When using autogenous lymphatic grafts the pumping mechanisms of the lymphatic vessels may be utilized to improve the lymphatic outflow also if already altered lymphatic vessels are present within the lymphedematous extremity. If one succeeds to elevated the lymphatic transport above the lymphatic load, an additional treatment should no longer be necessary.
The limits of lymphatic surgery are seen where the risks surmount the chances. This may be seen differently from the surgical and non surgical point of view. Objective data of the results, as well as liberation of any prejudice may help to provide the patient with correct informations. Than the individual patient may decide to take the chance and the risk as well.


Way of Conciliation and St. Peter's Basilica



Thursday, 19th September 2013

H. 11.15 a.m. - 1.00 p.m.

Session 10
Phlebology and lymphology

Aula Magna

President

Scuderi A. (Brazil)

Chairmen

Manokaran G. (India) - De Francisci S. (Italy) - Baumeister R. (Germany)

LYMPHATIC IMPLICATIONS IN VENOUS DESORDERS

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First we must define what is meant by microcirculation, what are its limits, the biophysic of the capillaries and vasomotion of the initial lymphatics, all of which are elements present both in the Starling equation as well as in the research of Adamson and Levick. Illig defined the microcirculation as a terminal bed referring in this manner only to the capillary bed. Merlen states the limits in an anatomical sense by affirming that the microcirculation began where the so-called terminal arteriole had a diameter below 50 microns and the internal elastic membrane was discontinuous, finally Bloch and Zweifach defined the functional micro circulatory unit as a monad in which all of the smallest vascular anatomical units of the organ, that is to say the arteriole terminal, the capillary bed, the initial venules, the preferred channel, the interstitial tissue with the nerve fibers and initial lymphatic fissures and the organs specific cells were present. Amongst other things, Bloch and Zweifach distinguished in the capillary bed the true capillaries that depart from the arterial capillary and have precapillary sphincters and direct capillaries that join the terminal arteriole and initial venules The latter is also called the metabolic pathway, the first derivative or short route, preferential pathway that drains 50-70% of blood from the arterial to the venous system through the preferred channel also distributing to the capillary bed. In the anatomy of the capillary blood it is also important to remember the glycocalyx and the initial lymphatics or lymphatic fissures with its interstitial tissue anchorage fibres.
The Starling equation is a scheme that only takes the capillary bed and the interstitial tissue into consideration and therefore the plasmatic oncotic pressure, the interstitial oncotic pressure, the capillary and interstitial hydrostatic pressure Jv = Kf where is the net filtration pressure, Kf is the net filtration pressure; Kf is the proportionality constant and Jv the net fluid movement between compartments. Kf represents the filtration coefficient and is produced by two components: 1) the surface area of capillarity; 2) hydraulic conductance of capillarity. A high value of the filtration coefficient indicates a very high water capillarity represents the reflection coefficient often understood as a corrective factor in that the different oncotic pressures contribute to the net resultant force depending on the permeability of the capillary wall to proteins that varies depending on the organ in question (no permeability to albumin in the kidney capillaries, high capillary permeability in the liver).
Even a modest permeability to proteins in other districts would lead to high values of interstitial oncotic pressure and, furthermore, not all protein interstitial fractions are effective compared to the water retention. Consequently, the reflection coefficient represents a correction factor according to the two aforementioned variables and has a value of between 0 and 1.
What is not taken into account in this law:
a) The initial lymphatics contained in the interstitial tissue,
b) The glycocalyx.
These two elements interfere significantly on the Starling equation but are not taken into account by Adamson in his 2004 study and by Levick in 2010 in their dynamism and on humans. However, if we look at the complete research of Michel and Phillips, and integrate this with the assumption of Adamson "space under the protected glycocalyx", we come to the conclusion which has already been hypothesized by Allegra and collaborators for years in their studies on the lymphatic microcirculation namely that the so-called venous edema, is in fact lymphatic, meaning that the edema in the CVD becomes irreversible only when the initial lymphatics interstitial are no longer able to compensate for the increase of oncotic tissue pressure (A method - Sixth World Congress for Microcirculation) that is no longer balanced by the oncotic capillary pressure and the scrolling speed of the GR inside the capillary blood, bearing in mind that the scrolling speed of the GR is an element that interferes with the viscosity within the capillary in an inversely proportional manner. It is important to remember the anatomy of the lymph fissure and its interstitial tissue anchoring fibres; anatomofunctional situation crucial both in determining the number of open and therefore visible initial lymphatics, which in turn is in close dependence with the interstitial pressure both hydrostatic as well as oncotic and the variations in return pressures. With regards to this, our studies on the initial lymphatics have shown that the pressure inside of the micro initial lymphatics is significantly reduced during respiration for recalling by subcutaneous microlymphatics.
A further element to consider is the relationship between subcutaneous skin microcirculation and subcutaneous lymphatic collectors. Allegra and collaborators have observed that the micro lymphatic flow is periodically recalled by subcutaneous lymphatic collectors denominating this phenomenon lymphatic vasomotion (method B – Exeter, U.K. 22° Meeting of ESM), a phenomenon most likely connected to a tensor lymphatic gradient that, removing blocking devices, causes the recall of the lymph deep system (16-17 book bbl Microlymphatic chapter)
Another element to consider is the arteriolar vasomotion that, through the vasoconstriction and vasodilation phenomenon, modifies the oncotic and hydrostatic pressure in the capillary. The Starling principle modified by Adamson takes into account the fissures in the glycocalyx-capillary interstitial space but does not take into account the interference of the initial lymphatics in respect to the hydrostatic pressure and interstitial oncotic pressure that of the latter triggers the function. It is therefore my opinion, demonstrated by in vivo measurement of the intralymphatic pressure, that the Starling equation must be maintained as a simplifying framework for understanding the capillary blood-tissue exchange revisited by the presence of the glycocalyx and slits passage, an experimental element, and enriched by in vivo studies on the initial lymphatics.
In conclusion, the micro lymphatic system which represents the balance of transitional and permanent edema must be reevaluated.
The in vivo studies demonstrate how the intralymphatic pressure varies progressively depending on the severity of chronic venous insufficiency and therefore demonstrates that the edema depends on the vasomotion of the terminal arteriole that may affect the relationship between oncotic pressure and interstitial pressure in the capillary blood , by the power of compensation of the lymphatic microcirculation and finally the re-absorption of subcutaneous lymphatic circulation through the opening of the blocking devices demonstrated by the group of Allegra. The limitations of the study of the microcirculation in vivo and in humans are only those related to the possibility of examining only the skin microcirculation.

BIOIMPEDANCE SPECTROSCOPY IN PHLEBOLYMPHEDEMA: POSSIBILITIES AND LIMITATIONS

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Aims: To collect by means of bioimpedance spectroscopy (BIS) data on L-dex (where applicable), resistance (related to extracellular fluid content) and reactance (related to tissue composition) in patients affected by phlebolymphedema (PLL) of the lower limbs.

Patients and methods: 150 patients (51 M, 99 F, mean age 56,2 years) affected by unilateral or bilateral PLL related to varicose veins, post-thrombotic syndrome, angiodysplasias, post-traumatic edema, and in C3-C4 class of CEAP classification, were investigated by means of BIS through U-400 machine (Impedimed®). L-dex (when PLL was unilateral), together with resistance and reactance parameters were collected through raw data analysis with Impsoft® software. CEAP distribution in the 300 limbs was 235(78,3%) C3, 65(21,7%) C4a or C4b. Absolute figures and percentage differences for each parameter were calculated: a) for each C stage, b) comparing different C stages in the same patient, c) according to age groups.

Results: Mean absolute figures + standard deviation (SD) of resistance were 249.9 (SD+/-48.1) in C3, 222.6 (SD+/-43.2) in C4. Reactance data were: 10.7 (SD+/-4.6) in C3, 9.1 (SD+/-3.3) in C4. Percentage difference of resistance and reactance between limbs of the same patient clearly highlighted decreases figures of resistance and reactance in C4 limbs vs C3 limbs.; similarly when PLL was unilateral a significantly higher value of resistance and reactance was highlighted in the normal limb. Finally resistance and reactance values decrease with patient's age increase.

Conclusions: BIS assessment of limbs affected by PLL and C3-C4 of CEAP classification proved to be of help to assess fluid content and tissue composition. Absolute figures and comparative figures of resistance and reactance in C3-C4 CEAP stages showed a good correlation with the clinical state of the limb; age stratification resulted in correlated data as well. A significantly wide range of figures of reactance and resistance was collected in the present cohort of patients, in agreement with the extreme variability of these parameters in the general population.

LYMPH-DEPENDENT CVI: TISSUE CELL SIGNALS FROM LIMB LYMPHATIC TRAPS FOR NODE RESPONSE AND VENULE LEUKOCYTE ARREST REGULATION

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This study was designed to identify the basic lymph flow disturbance patterns involved in an origin of early clinical stages of chronic venous disease, passed ahead or coincided with the initial remodeling signs of small and middle veins in patients without delay of venous blood return. 50 patients of various clinical classes according CEAP (I-IV) classification without venous refluxes, outflow increase at hydrodynamic loading in their vertical positions at plethysmography were investigated. Also a CVI pathogenesis in 44 patients with their variants in different patient clinical groups, incompetence of valves and changes in venous capacity and return delay are studied. All patients were explored by Echo-Doppler, functional lymphography (for lymphatic vessel contractility estimation), stress-lymphoscintigraphy (time appearance, node uptake function, for early LV and tissue dynamic images). Our model of an independent tissue drainage areas and isolated (autonomic) ways of a lymph outflows (see PubMed articles and Open Library for <Segmental Theory of Lymphatic System>) was applied to revealing of unequal degree of pump function increase or phasic activity oppression a various segments and groups of limb lymphatic vessels between a bifurcation points after their common fluid overload and in the non-active segments of large lymphatic vessels drained a changed limb skin and tissue zones (on a shin and a thigh).It was shown a fluid-lymph-dependent origin of chronic venous disease in patients without venous refluxes and hypervolemia, and motivated signaling pathway hypothesis for early (I-II) and late (III-IV) clinical classes according to the CEAP classification. Clinical and pathological phenotypes of CVI were simultaneous or secondary to temporal or constant tissue cell activation and two-phase limb lymph node response after common lymphatic vessel (LV) overload, and later – after a segmental smooth muscle cell (SMC) contractility stress and constant interstitial lymphatic traps appearance for leukocyte activation. Confirmations of their early fluid - and lymph flow- induced origin are: 1) a plasma ultrafiltration increase via venules; 2) lymph formation and lymph volume raising ; 3) rapid removal of radiocolloid from depot and heightenedlymph flow velocity via separate lymph streams with differed pumping activity in others; 4) early segmental tissue cell activation and 5) early limb lymph node response (radiotracer retention) in the absence of tissue inflammatory manifestations. Late CVI potentiation is continued against a constant segmental interstitial and lymphatic traps for radiocolloid, delay in its transport, and it is connected with activation of tissue and limb node cells: leukocytes, macrophages and dendritic cells (DCS), mast-cells (MCS). It is accompanied by: 1) phase pumping activity decrease; 2) segmental contractility lymphangion stress; 3) a delay in tracer transport – tissue and lymphatic clearance of its activity; 4) by additional activity of a radionuclide preparation in tissues and in non- active LV segments, corresponding to localisation of clinical signs of disease and 5) non- flow-dependent, possible, by TNF-initiated signals from activated tissue cells with early (radiotracer retention) and late (enlargement) lymph node responses. The findings demonstrate that the revealed self-regulatory mechanism is responsible for the duration of each clinical class by flow-dependent or/and antigen-induced early or late limb lymph node response with an alternative choose of signaling pathways for disease progression.

THE LYMPH EYE METHOD (LYEYE)

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Introduction: Fascia relationship of Short Saphenous Vein [SSV fascia_duplication, Passariello 1991, 1992] and Great Saphenous Vein [GSV Saphenous Eye, Bailly, 1992] are useful for ultrasound detection and theoretical definitions [Caggiati, Ricci, 1997; Caggiati, 2001]. Also Basilica Vein (BV) has similar properties. Daily investigations provide examples of Saphenous Eye modifications, especially in ubiquitous Lipoedema/Lymphoedema changes [Passariello, 1991].

Aim: To investigate by Ultrasound the Saphenous Eye tissue properties in lipoedema and lymphoedema.

Methods: In this preliminary study only a small sample was examined. Patients were excluded with an history of a recent intrafascial vein thrombosis or peri-saphenous lymphangitis or saphenous ablation (Stripping, Laser, RF, Foam, Harvesting). Clinical cases of lipoedema (LP), lymphoedema (LY), non-lymphatic oedema (NLO), other diseases (OT) and healthy volunteers (HV) were scanned, measuring the thickness of several layers of the Saphenous Eye.
Changes after compression and isometric contraction were examined. Data were collected in structured form, the method being named The Lymph Eye Method (LyEye), defining a set of connected measures and computations.
In some cases a comparison was added with the anterior-tibia (AT) compartment measures at the superior third of the leg.
In a few cases also lymphoscintigraphy (LSG) was available.

Results: Patients were 20, 4 arms (BV) and 35 lower limbs, 33 GSV, 10 SSV. Limbs were 3 HV, 9 OT, 2 NLO, 14 LY, 9 LP.
6 AT comparisons and 3 LSG were performed. These small numbers are only witness of the intention to extend the research.
LyEye is still in a semi-quantitative observational phase, it allows localized and easy ultrasound investigations.

Discussion: LyEye seems promising and the number of cases must be increased.
LyEye is applicable when exclusion criteria are absent, being reliable when LP/LY is localized on the same limb. Small and extremely localized tissue modifications aren't detectable by LyEye.

Keywords: Lipoedema, Lymphoedema, Ultrasound.

SINGLE DRUG APPROACH IN DVT TREATMENT

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Venous thromboembolism (VTE) globally identifies deep venous thrombosis (DVT) and its main complication i.e. pulmonary embolism (PE). VTE constitutes the third cause of vascular mortality and is estimated to affect approximately one out of 1000 subjects each year.
Treatment of VTE is traditionally based on the use of injectable heparin, usually a low molecular weight heparin (LMWH), associated with a vitamin K antagonist (VKA). Heparin is administered for the initial 5 days and then continued until the VKA induced anticoagulation reaches the recommended therapeutic range. A more convenient single drug approach has recently been proved to b as effective and safe.
This approach is based on the early use of rapidly acting oral anticoagulants such as Rivaroxaban and Apixaban. These are new agents, have a specific anti Xa activity and have been tested in a wide range of clinical conditions including VTE prevention after major orthopedic surgery, atrial fibrillation and acute coronary syndromes.
In the specific setting of VTE, Rivaroxaban has been compared to the traditional dual drug approach in the EINSTEIN-DVT and EINSTEIN-PE clinical trials. In both DVT and PE patients Rivaroxaban was found non-inferior to the combination of LMWH and warfarin. In addition, it could be effectively and safely used for treatment continuation beyond the usually recomended 6-12 months period.
Similar findings have been recently reported with Apixaban in the studies AMPLIFY and AMPLIFY−Extension. Altogether, the VTE trials with Rivaroxaban and Apixaban clearly indicate the opening of a new era in the treatment approach of patients with VTE. The availability of effective and safe oral agents which do not require laboratory monitorization is going to greatly simplify the treatment of VTE.
Hospitalization may be restricted to high risk patients and treatment duration significantly extended to prevent DVT recurrences. Rivaroxaban has already been approved for VTE treatment in most countries and the recommended dosing is 15 mg twice daily for the first 3 weeks followed by 20 mg once daily.

PRACTICAL MANAGEMENT OF PATIENTS WITH DVT

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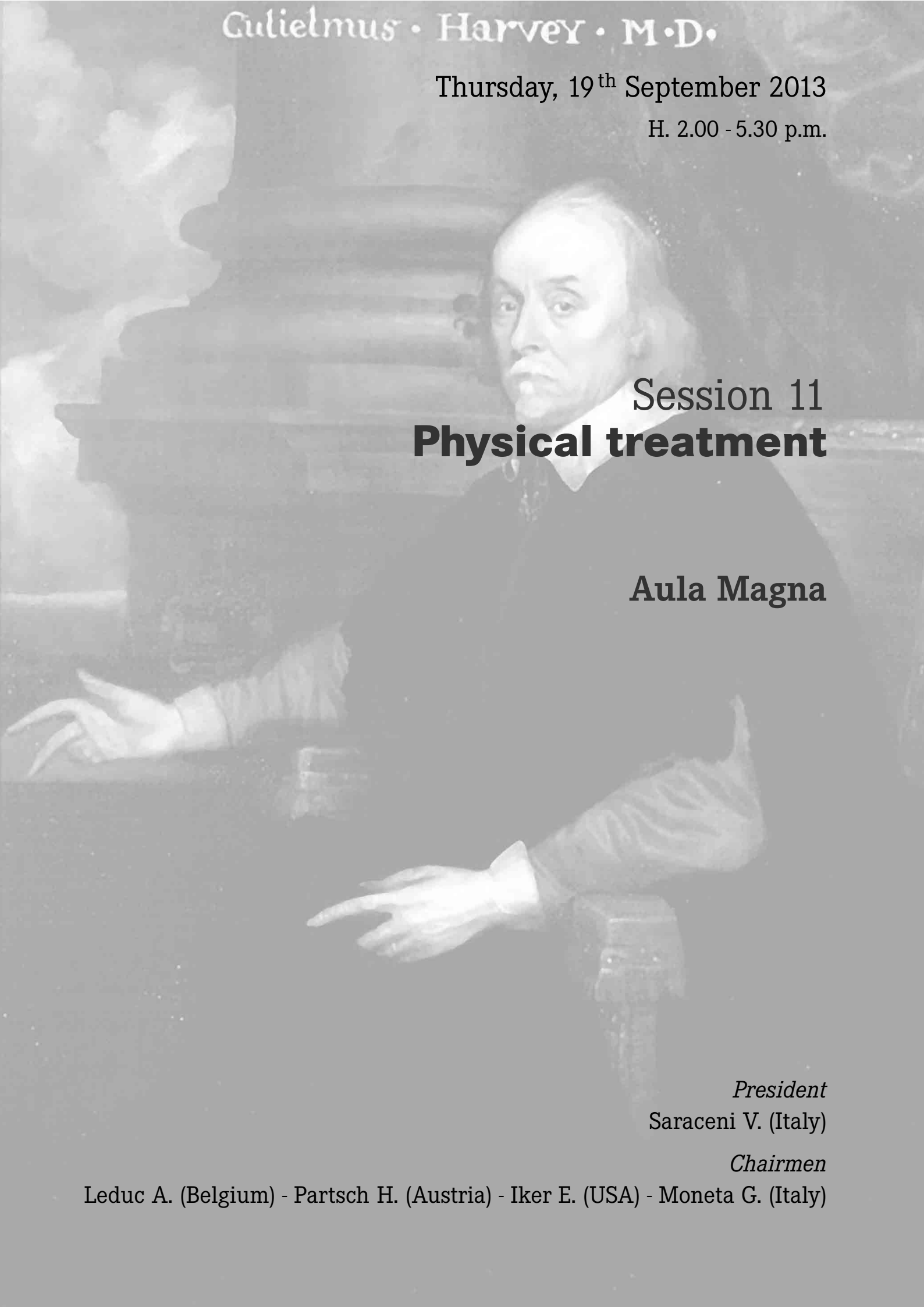
New oral anticoagulants are effective and safe and more convenient than existing agents.For treatment of DVT/PE and prevention of recurrencies, rivaroxaban15 mg bid for first 3 weeks followed by 20 mg od is administered. A reduction from 20 mg to 15 mg should be considered if the patient's risk for bleeding outweighs the risk for recurrent VTE. Patients with renal/hepatic impairment or receiving certain co-medications are at increased risk of bleeding. Use of rivaroxaban is contraindicated in patients with CrCl <15 ml/min, in patients with hepatic disease Child–Pugh B and C, in patients receiving systemic azole-antimycotics, HIV protease inhibitors. Rivaroxaban does not require routine coagulation monitoring.Anti-Factor Xa chromogenic assays have been developed and are now commercialized.If necessary, haemostatic status can also be assessed with PT (seconds) using Neoplastin only.

PHLEBOLOGY AND LYMPHOLOGY: A TWINNING FORCED

SCUDERI A.
President of UIP, Brazil

Since many years ago the connection between the Venous and Lymphatic System is well-known.
Indeed this twinning is a kind Siamese.
The lymphatic and the veins have a close correlation in anatomy and physiology.
According the last consensus of UIP about C3 (venous edema in CEAP classification) the venous edema should be treated in commence to avoid the lymphatic involvement.
There is a consensus that all chronic venous pathology will end affecting the lymphatic system causing a lymphedema.
Many surgical maneuvers to treat the varicose syndrome should take in consideration the lymphatic vessel. They are delicate and normally invisible to the naked eye. The stripping of the GSV without appropriate care frequently determines an iatrogenic lymphedema.
The UIP consensus on C3 strongly recommend to take in consideration the involvement of lymphatic system as in diagnosis as in the therapy.



Thursday, 19th September 2013

H. 2.00 - 5.30 p.m.

Session 11
Physical treatment

Aula Magna

President

Saraceni V. (Italy)

Chairmen

Leduc A. (Belgium) - Partsch H. (Austria) - Iker E. (USA) - Moneta G. (Italy)

PHYSICAL TREATMENT: PAST - PRESENT - FUTURE

LEDUC A., LEDUC O., BRUN J.P.
Belgium

The treatment objective of the physical treatment of edema was, till the last part of the 20th century, mainly limited to the treatment of the symptom himself. The authors give a review of the most significant physical treatments that were proposed.
Actually, the physical treatment is not only taking in account the treatment of the symptom himself but we must also consider the specific elimination of the different biochemical components of the edema. For this reason, the authors insist on the fact that the physical treatment may not be limited to the application of only one technique. The specific influence of the different physical techniques in use during the edema treatment implicates that the physical treatment must also being elaborated by taking in account the etiology of the disease.
Since the end of last century several lymphology societies have published a consensus concerning the edema treatment.
In the future, the authors suggest to investigate the influence of different other lympho-stimulating techniques but also to develop the incidence of derivative lymphatic pathways in order to drain the edema along "unexpected" pathways.

MANUAL LYMPH DRAINAGE MASSAGE REVISITED

SCHMIDT K.
Mayo Clinic, PM&R, Rochester, USA

Complete Decongestive Physiotherapy (CDP) is endorsed by the International Society of Lymphology and considered the standard of care in lymphedema management in much of the world. Its four components include compression, manual lymph drainage massage (MLD), skin care, and exercise. MLD is likely the most expensive and time-consuming compnent of CDP. However, the literature is mixed as to whether it has benefit even in the initial treatment phase, and there is even less literature to suggest it has benefit in preventing long-term progression of lymphedema. MLD also has been touted as helping in other edematous states such as venous edema and lipedema. Its use has also been expended to many other non-edematous conditions including headaches, arthritis, acne, constipation, etc. Yet there is very little evidence to definatively support its widespread use.
The discussion will include the theories as to how MLD works as well as the literature regarding its efficacy. The pros and cons of including MLD in lymphedema management will be discussed, and I will review how I use MLD in my practice in the Lymphedema Clinic at the Mayo Clinic.

A RETROSPECTIVE STUDY TO DETERMINE THE INCIDENCE OF GENITAL ŒDEMA FOLLOWING TREATMENT WITH MODERN INTERMITTENT PNEUMATIC COMPRESSION (HYDROVEN 12, LYMPHASSIST)

WIGG J., LEDUC A.
UK / Haddenham Healthcare, UK

The ISL consensus document (2003) state intermittent pneumatic compression (IPC) as a treatment modality for lymphoedema management. IPC has been linked with an 43% incidence of genital oedema and concerns of high pressure application and having a limited effect on lymphatic drainage (Boris et al 1998). Development of modern pumps mimicking manual lymphatic drainage are designed specifically considering the past concerns and use retrograde flow and reduced pressures (Wigg 2008). More recently these machines show the removal of fluid via the lymphatic's (Mayrovitz and De Wit (2008), Furnival-Doran (2012).
Methodology; A retrospective study has taken place to determine the incidence of genital oedema on all patients who have undergone treatment using the Hydroven 12 on the LymphAssist cycle as stand alone, maintenance or as part of Decongestive Lymphatic Therapy (DLT). Demographic details, treatment length, pressure, if used in combination or instead of MLD and if genital or trunkal oedema occurred have been collated and analysed using LymCalc 3 data programme.
Results; 4444 appointments on 230 patients were audited at the treatment centre who received LymphAssist therapy instead of MLD or with clearance to the proximal area since 2006. 30% were BCRL, 25% primary and a combined other type. This study shows that there is no reported incidence of genital oedema regardless of pressure, time or treatment type. Lymphoscintigraphy reporting demonstrated improved lymphatic uptake using the machine on the LymphAssist mode.
Conclusion; The introduction of new retrograde pumps with built in safety mechanism to ensure reduced pressure and proximal to distal drainage are useful in the management of Lymphoedema, do not cause genital oedema, do enhance lymphatic drainage and assist with resources.

MULTI MODALITY TREATMENT OF LYMPHATIC FILARIASIS GIVES THE BEST RESULT

MANOKARAN G.
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As you all are aware lymphatic filariasis is as old as human existence. Inspite of the development in medical science and technology still we are not in a position to eradicate this chronic non communicable endemic disease from this world. Around 120 million people are at risk and 70 million are affected by some form or other of this disease. As a morbidity control we have to do or help these unfortunate patients to have better living and make there life as a near normal life. For this we have been trying various medicines, medical, surgical and non surgical techniques for the last thirty years in our centre. At last we have evolved a multi modality treatment which includes foot hygiene (hygiene at the affected parts), elimination of focus sepsis, manual lymph drainage or complete decongestive therapy along with surgical technique whenever needed as help to thees people. We have been using this multi modality treatment for the last nine years in various patients with lymph atic filariasis and followed up most of the patients for the last nine years and found to be very satisfying and make the patient live a near normal life. The technique which we have followed and its modality of application and the outcome with data will be discussed in detail with a powerpoint presentation.

QUALITY OF TREATMENT DOCUMENTATION IN LYMPHEDEMA THERAPY TO IDENTIFY ASSOCIATIONS BETWEEN TREATMENTS AND OUTCOMES IN PRACTICE BASED EVIDENCE RESEARCH

TIDHAR D., RAM T., REUT SHAVIT NAOR, SIGALIT HORESH DIAMOND, SOKOLOV M., KIRZON N., DEUTSCHER D.
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Background: The conventional physical therapy for lymphedema management is Complete Decongestive Therapy (CDT) that consists of four major elements: manual lymph drainage; multilayer inelastic lymphedema bandaging; remedial exercises; and skin care. Although CDT is considered an effective treatment for lymphedema, the value and efficacy of each CDT component has not yet been studied. Accurate treatment documentation is a key feature in practice based evidence (PBE) research design enabling to reveal associations between various therapy interventions and outcomes.
Purposes: 1. To define mutually exclusive lymphedema therapy intervention codes that best describe the full scope of lymphedema rehabilitation care. 2. To assess ability of lymphedema therapists to select intervention codes that describes treatment scenarios in an accurate and consistent manner.
Methods: In 2009, lymphedema therapy intervention codes were selected using the international consensus document for best practice management of lymphedema. A comprehensive description of each treatment code was defined and implemented among all 27 lymphedema physical therapists working in Maccabi Healthcare Services, the 2nd largest public health plan in Israel.
All therapists were asked to participate in a computerized exam that tested ability to accurately select 19 intervention codes for 10 treatment scenarios. Each intervention code was scored by the percentage of therapists that accurately selected it for the correct treatment scenario. Test accuracy was defined as the percentage of intervention codes that were accurately selected by 90% of therapists. Each therapist was scored by calculating the percentage of intervention codes that he/she accurately selected. Test consistency was calculated as the percentage of therapists that accurately selected 90% of intervention codes. Overall test score was calculated as the average therapists' score. Acceptable levels of accuracy, consistency and overall test scores were predetermined as 90% or more.
Results: Twenty six (96%) lymphedema therapists participated in the study. Test accuracy, consistency and overall score were 79%, 77% and 95%, respectively.
Conclusions: Overall, the ability to correctly identify treatment interventions in lymphedema therapy was supported. Nevertheless, the need for improvements in accuracy in coding specific interventions and consistency among lymphedema therapists was identified. Ways to improve definitions of specific interventions and their implementation among therapists were proposed. A follow-up study is needed to assess if acceptable levels of accuracy and consistency can be achieved when documenting interventions in lymphedema therapy.

EXPERIENCE OF THE CLINICA GODOY IN THE INTENSIVE TREATMENT OF LYMPHEDEMA OF THE LOWER LIMBS

PEREIRA DE GODOY J.M., AMADOR BRIGIDIO FRANCO P., GUERREIRO GODOY M. de F.
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Lymphedema is a chronic incurable disease. Even so it is possible to maintain the limb within the normal size range with treatment. Over the last few years, Godoy &Godoy have used intensive treatment of 6 to 8 hours per day to rapidly reduce edema in cases of grade III lymphedema. This approach uses an inelastic grosgrain compression stocking, Mechanical Lymphatic Therapy (RAGodoy®), Manual Lymphatic Therapy (Godoy) and Cervical Therapy (Godoy) with preventive care against infections. This form of treatment was adapted to the pathophysiology of each patient. With this approach the volume of edema is reduced by an average of 50% in five days of treatment. In the studies until today, the minimum reduction was 34% and the maximum was 70% in grade III lymphedema. The reduction in the second week of intensive treatment is about 10% to 30% of the volume of lymphedema. At this stage it is essential to adjust the intensity of treatment taking into account the ex cessive skin folds. Compression mechanisms, when possible, are used from the initial stage in all patients and with this the retraction of the skin is almost total with clinical treatment without requiring resective surgery. In grade III lymphedema it has been possible to reduce the volume of the edema by more than 90% in all patients. Recently this approach has been used in grade I and II lymphedema. As in any chronic disease, maintenance of the results and preventive care are necessary in the follow up of these patients.

THE RIGHT CHOISES OF PHYSICAL THERAPIES IN PRIMARY AND SECONDARY LYMPHŒDEMA

FAILLA A., CARDONE M., MONETA G., FIORENTINO A., CAPPELLINO F., MICHELOTTI L., MICHELINI S.
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The complex decongestive physical treatment requires a "personalization" of the components of training that is depending from the developmental stage of the disease, but essentially by the patient who is affected.
Manual lymphatic drainage, indicated in all clinical cases, it should be addressed according to the responses occurred within the first sessions. The sequential pressure is reserved primarily for those who need (for various reasons) of prevailing passive physical therapy. The elastic bandage also requires a customization that is a function of physical expressive ability of the individual patient. For the treatment of fibrosis are used ultrasound and the radial shock-waves, as well as the vacuum-therapy (especially in the regions of the face and of the external genitalia). Surely the isotonic exercise, active and or passive, spontaneous or against resistance, isotonic (never isometric), especially if carried out under bandage, provides the main thrust to the drainage of stagnant fluids. In any case it is to be proscribed only one type of physical therapy.
In the postoperative period (microsurgery and super-microsurgical) treatment is mainly based on manual lymph drainage and bandaging and must be initiated no later than two weeks after surgery.
In our experience of 374 patients with primary and secondary lymphedema (212 women and 162 men between the ages of 2 and 77 years old), including 35 in the postoperative period, we found:

- Average reduction of limb circumferences of 84% from baseline
- Average improvement of the ROM of the large joints of the affected limb by 28%
- Increase in muscle tone-trophism (with evidence of the average thickness of the sub-fascial ultrasound examination) of 19%.

The best results were obtained in patients unable to perform adequate exercise distributed throughout the day (178 patients). In 103 of these (57.9%) we performed the double treatment (morning and afternoon) daily, according to the obteined clinical results, shortening the overall cycle of induction treatment.
In all cases the results were maintained with the prescription of the definitive elastic garment, knitted flat, and mostly "tailored".

I-PRESS PNEUMATIC DRAINAGE VERSUS MANUAL DRAINAGE IN UPPER LIMB LYMPHŒDEMA

THEYS S.
CHU Mont Godinne, Department of Med. Phys. et Réad., Belgique

Introduction: Pressotherapy is wydely used but is often said to have lesser compression yield than manual drainage in upper limb secondary lymphoedema. This idea is difficult to wipe out. One of the main complaints is to find in the anterograde mode of non professional material used or using. Since 1993, some pumps can work in a retrograde mode.

Objective: Our aim was to compare the effects of two light retrograde drainage options: a pneumatic and a manual one's.

Method: Retrograde pneumatic (a seven-compartment i-Press™ 10th serial; Electronique du Mazet, France) and manual drainage is successively and randomly carried out on 9 women (71 years old) with an old (14 years) persistent upper limb lymphoedema that appeared 7 years after radio-surgical treatment against breast cancer. All volume variations are recorded continuously with a plethysmograph (JSI, SU4) . Mercury gauges are fitted 4 inches (20 cm) above the elbow. The protocol of pneumatic drainage consisted of a standardised retrograde approach with constant pressure (40 mm Hg)(without regressive pressure) at a single to double-level of compression.

Results: By use of Kruskal and Wallis, one-way ANOVA on ranks, the effect of 40 mm Hg was similar (NS) when the drainage was applied manually (0.03 ml/100 ml/min) or using the pneumatic pump (0.03 ml/100 ml/min). After 15 min stopping management, improvement mainly persisted.

Conclusion: Whatever the technique used, there is no better edema reduction at 40 mm Hg : with the help of a same retrograde mode, light drainages give the same benefit.

WHAT TO EXPECT AFTER A SINGLE COURSE TREATMENTIN POST-MASTECTOMY LYMPHEDEMA IN LONG TERM FOLLOW-UP

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Introduction: Risk of failure of conservative treatment of lymphedema after breast cancer treatment has been reported to progressively increase during long term follow-up, reaching up to 60% failed interventions after five years. As therapeutic methods and maintenance phase strategies may vary for different treatment centers, we analyzed our long term results from our casuistry.

Methods: We studied arm volume reduction in 48 patients whose follow-up was at least 12 months obtained after decongestive phase, without additional MLD or bandaging. Age, initial volume, edema extension, infection and cancer recurrence were matched to final results to seek any correlation with poor prognosis.

Results: Considering failure as an increase of at least 10% of the measurements obtained at the end of the decongestive phase, no recurrence was observed in 75%(36/48) whereas in 25% of the patients (12/48) a new decongestive phase was indicated. Interestingly, we observed additional volume reduction in follow-up in 16 patients.

Conclusion: In conclusion, edema recurrence is not to be expected after a single course of complex physical therapy and indication of regular decongestive treatment should be evaluated for each individual patient.

MLD AS A COMPLEX INTERVENTION AND METHODOLOGICAL ISSUES IN THE ANALYSIS OF IT'S EFFECTIVENESS

MARTINEZ ALLENDE R.
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With only a few exceptions CDT is the treatment of choice for peripheral lymphedema. When the choice is another type of treatment, CDT constitues a complimentary method that will be part of patient's life forever.
An attempt to understand the relative value of MLD in the context of CDT, suggests that there are no statistically significant differences between the intervention and the control groups. Nevertheless, due to study limitations in design and sample size, most studies must be rated as "effectiveness not established".
Furthermore, these works, which can be considered well done, can be objected too. First, and hard to be said in public, is that, maybe, MLD may be performed incorrectly. Second, the cientific method establishes some conditions that are ok for the analysis of simple interventions, but wrong for complex interventions.
MLD, as surgery or ecographic diagnoses, is a complex intervention whose results depends highly on the operator capacity. In some author's opinion, for this reason, they are not susceptible to evidence based analysis.
The cientific method demands the randomization of patients and intervention assignation, and the variable of intervention's homogenity. To do to all the patients exactly the same can be, in some situations, a therapeutic mistake, some form of malpractice. In meloplasty, for example, to take the same amount of skin from all the patients' preauricular region could leave serious side effects. Some patients could have wrinkles, others even a hole and all angry! Therefore, to say that meloplasty is a useless procedure is a logical jump that comes with a serious metodological mistake.
In the same way, to do all patients MLD the same manner, for the same lapse, everytime, constitues malpractice.
Adaptability is an inherent characteristic of MLD, and is mandatory in a well done treatment. Each patient, in each session, deserves the proper treatment, that is a unique MLD. Homogeneization of the intervention's variable MLD constitues a methodological mistake.
In an attempt to find a solution to that situation, from a methodological perspective, including in analysis the variability that's part of MLD, the homogenity must be emphazised not in MLD but in the therapist's quality.

LINFOROLL: A NEW DEVICE FOR LYMPHŒDEMA TREATMENT. PRELIMINARY EXPERIENCE

MICHELINI S., PISSAS A., OLZEWSKI W., DIMAKAKOS E., FORNER-CORDERO I., CALDIROLA R., MICHELOTTI L.
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The need to use therapeutic methods scientifically correct and reproducible led them to manufacture this equipment dedicated to the lymph drainage in which the physical parameters to be used, operator dependent, can be universally standardized. This fact in the view of compliance with the current concepts of EBM. Manual techniques commonly used today, are too subjective and operator dependent: so not universally standardized.
Linforoll consists of a roller magnetically applied to a handpiece which is connected with a computerized system containing a program that transmits in real time the pressures exerted by the roller on the same underlying tissues. The device is calibrated so that the ideal pressure to be exerted is positioned about 60 millimeters of mercury, and provides, through lighting systems of 'alarm', any reduction or excess pressure that differ from those set as optimal. for each clinical case must be performed at least 10 sessions (with a variable time per session variable between 20' and 45'). At the end of the treatment is performed a multilayer bandage inelastic on the anatomical area concerned as for the traditional treatment protocols.
In the study were enrolled 106 patients suffering from primary and secondary lymphedema, 40 males and 66 females, located in the lower limbs, upper limbs, external genitals and face, both unilateral and bilateral, age ranging from 2 to 81 years old.
Exclusion criteria: cardiac failure, epatic failure, renal failure, arterial hypertension, particular psychiatric disorders to clinical judgment. Before the drainage must be carried out maneuvers "emptying" of the lymph nodes that are encountered in the individual anatomical areas (as by manual). The pressure exerted by the operator that rotates the roller on the skin surface of the patient must be constant. This was possible by observing the LED positioned on the handpiece, which must always coincided with a green light, throughout the maneuver rolling. During the maneuvers do not have to produce pain or redness of the skin.
The study aims to examine the volume of the anatomical region affected by edema and the tissular consistency.
The values are relevated at baseline and after 10 sessions of drainage. The volume is calculated automatically by means of a computerized processing based on the formula for the volume of a truncated cone, based on the detection of the circumferences of limbs affected by edema. The tissue texture should be detected at the same levels of the measurements of the circumferences of the limb (with the tonometer) with the foresight to detect mainly in correspondence of the anatomical areas in which clinically is more increased the local consistency.
After the treatment the Aa. observed a medium decrease of 22% of circumference of limbs and a medium decrease of 72% of tonometric parameters.
This preliminary study testify the effectiveness of the device and the availability according to the EBM.

COMPLETE DECONGESTIVE TREATMENT OF LYMPHEDEMA REDUCES THE RISK INFECTION OF THE LIMB-A CLINICAL STUDY

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[3] *Lymphology Unit of Angion Medicine, Center of Vascular Diseases, Athens, Greece*

Introduction: It is known that the patients with lymphedema have more possibilities to present infections at the extremity with lymphedema. As increasing the swelling and the inflammatory response in the affected limb, gradually decreasing the immune response capacity and the risk of microbial colonization and infection increases.

Aim: To study the effect of complete decongestive treatment in appearance of episode of infections in patients with lymphoedema.

Method and Material: We studied 36 patients (19 patients with lymphedema of the lower extremities and 17 lymphedema of upper limbs) who came to the clinic during the period 2009-2012. All patients had experienced at least one episode of infection to the limb during treatment. The 25 patients were to follow the treatment while 11 denied for several reasons. Patients who underwent complete decongestive treatment constituted the intervention group and patients who did not undergo treatment in the control group. The statistical analysis was performed with the program SPSS 19 for Windows.

Results: In group intervention involved 25 patients of which 7 men and 18 women aged 57,3 ± 6,7 years and in the control group 11 patients, of which 5 men and 6 women aged 56,1 ± 6,8 years. Five patients in the intervention group and three in the control group had received for a short time in the past medication for their infection, but they had stopped treatment at least 3 months before study entry. After 4 weeks of treatment, the complete decongestive treatment intervention patients showed less swelling in the affected limb with a mean reduction of edema by 60% ± 5 of the control group versus 3% ± 7 (p = 0,0000 simple t-test, CI 95%). Of the patients who underwent complete decongestive treatment only 3 patients had a total of 3 episodes of infection in the affected limb within 12 months of initiation of treatment versus control at the same time period, 11 patients experienced a total of 19 episodes of infection (p = 0,0000 X2 Yates's correction, CI 95%).

Conclusion: Lympedema is a bad prognostic factor for the appearance of infection. The earlier start his correct treatment of lymphedema the best patient prognosis. The complete decongestive therapy reduces the appearance of infection and improves directly the quality of life of the patients.

PRELIMINARY STUDY OF THE WEARING CIRCULAR OR FLAT KNITTING ARM SLEEVES ON HEMODYNAMIC OUTCOMES DURING A CAUSED EXPERIMENTAL ŒDEMA OF THE UPPER LIMB

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Background: Compression therapy is an essential component in the treatment of venous and lymphatic pathologies involving an oedema.

Objective: This study aimed to determine which type of compression arm sleeve (flat knitting and circular knitting) class II compression has an effect on the capillary filtration, on the swelling limitation of the upper limb in an experimental oedema situation.

Method: This experiment was conducted on a sample of six healthy women aged 20 to 25 years, who underwent an arm compression (70 mmHg) in order to create an experimental oedema. During this swelling's short period, the total forearm swelling (TFS), the percentage of maximum venous outflow in the first second (MVO) when the arm compression is removed and the capillary filtration rate (ml / min) were measured by an artisanal air plethysmograph (APG), without arm sleeve, with flat and circular knitted arm sleeves (randomised order)

Results: We could establish a certain influence by wearing a flat knitted compression on TFS and MVO during our experimental oedema situation. Wearing a flat knitted compression significantly limits the volume increase (19% of swelling reduction) of the forearm compared to the value of TFS without compression. There was a significant increase of the MVO when wearing flat knitted compression (around 21%) compared to the value of MVO without compression. And there was a significant increase of the MVO (around 13%), when wearing a circular knitted arm sleeve compared to the value of the MVO without compression. The results concerning capillary filtration are more contrasted.

Conclusion: The results confirm the importance of considering the type of knit of the compression sleeve and no longer solely the compression class.

Keywords: Compression sleeves, experimental oedema, air plethysmography, capillary filtration, maximum volume outflow.

EBM AND COMPRESSION THERAPY IN LYMPHŒDEMA MANAGEMENT

PARTSCH H.

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Compression is the single most important component of conservative therapy in lymphoedema. Up today this statement is more based on experience than on scientific data. Bandages, garments, Velcro-band devices and sequential intermittent pneumatic compression are used.

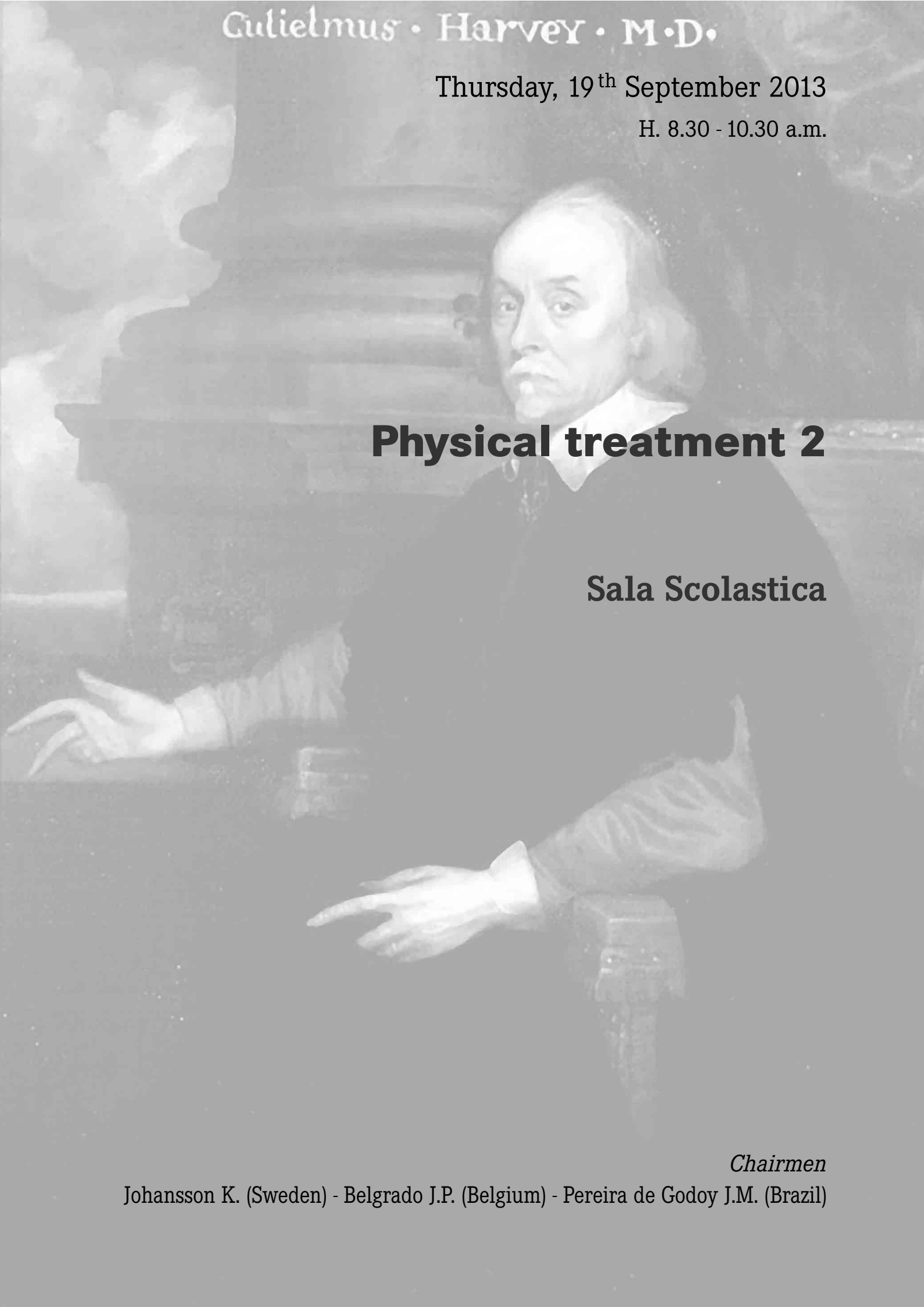
Clear evidence for beneficial compression effects is coming from some clinical studies and few experimental trials, which mostly concentrate on intermittent pneumatic compression.

The main outcome parameter in most clinical trials is volume reduction of the lymphoedematous extremity, while other patient-orientated parameters like mobility or quality of life are relatively rarely reported.

Most randomized trials comparing different kinds of compression therapy in lymphoedema are flawed by the fact that not only compression alone has been applied but the whole spectrum of decongestive lymphatic therapy (DLT).

The majority of the available data belong to grades of recommendation /evidence 2B or 2C, and at best, a small number belong to 1C or 2A.

Proposals for more experimental work are presented in which a dose−response relationship for various compression regimes should be evaluated in different stages of lymphoedema. This is not only important concerning the pressure and stiffness of bandages, stockings and Velcro-devices, but also regarding an optimization of the pressure profiles and inflation-deflation sequences of intermittent pneumatic pumps.



Thursday, 19th September 2013

H. 8.30 - 10.30 a.m.

Physical treatment 2

Sala Scolastica

Chairmen

Johansson K. (Sweden) - Belgrado J.P. (Belgium) - Pereira de Godoy J.M. (Brazil)

EXPERIENCE OF THE CLINICA GODOY IN THE INTENSIVE AND NON-INTENSIVE TREATMENT OF THE UPPER LIMBS

BRIGIDIO AMADOR FRANCO P., PEREIRA DE GODOY J.M., GUERREIRO GODOY M. de F.
Godoy Clinic, Department of Rehabilitation, São José do Rio Preto, Brazil

The size in primary or secondary arm lymphedema can be reduced to next to normal regardless of the severity of the swelling. Over the last few years, Godoy & Godoy have developed an intensive treatment program of 6 to 8 hours per day with the aim of producing large reductions in a short period of time. Using this approach it is possible to reduce the volume of lymphedematous arms by about 50% in five days of treatment. The minimum reduction has been 30% and the maximum, 70% of the volume. To achieve these reductions, an inelastic compression sleeve made of grosgrain, Mechanical Lymphatic Therapy (RAGodoy®) and Manual Lymphatic Therapy (Godoy & Godoy) are adapted to the pathophysiology of each case. In the treatment of elephantiasis, the excess of skin is the determining factor as to whether intensive treatment can be continued for a second week. If there is excessive skin, the compression sleeve must be used until retraction of the skin occurs befor e continuing with the intensive treatment. Thus, intensive treatment is adapted to the reality of each patient.

TREATMENT OF CHILD LYMPHEDEMA BY CERVICAL LYMPHATIC THERAPY (CERVICAL STIMULATION): GODOY TECHNIQUE

GUERREIRO GODOY M. de F., BRIGIDIO AMADOR FRANCO P., PEREIRA DE GODOY J.M.
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As few professionals are dedicated to the treatment of lymphedema in children, access to treatment centers is difficult. In recent years, Godoy & Godoy have developed a technique to stimulate the lymphatic system called Cervical Lymphatic therapy which allows a reduction and control of edema for most cases of child lymphedema. In the worse phase of lymphedema, with more advanced fibrosis and edema, an association with a compression mechanism (inelastic grosgrain stocking) is used. Currently 30 children, who were treated using this approach over the last 10 years, are being followed; the results show that the edema is under control. The technique of cervical stimulation is taught to any mother who is capable of learning and subsequently treating their own children. Thus stimulation was taught to 20 mothers with currently 10 of them using it as monotherapy and 10 others using it associated with grosgrain compression stockings. In the remaining 10 children o nly grosgrain compression stockings are being used due to the difficulty in teaching the mothers and the distance of their homes from the treatment center. This manner of treatment of children with lymphedema allows the reduction and control of the edema during their growth. Therapy is adapted in order to maintain the lives of children as normal as possible with normal activities for their ages.

AUTOINFLAMMATORY DISEASE ASSOCIATED TO LYMPHEDEMA (AISLE): A NEW GENETIC DISEASE RESPONDING TO ANTI-IL-1 TREATMENT AND PHYSICAL THERAPY

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Background: Autoinflammatory diseases are inherited conditions characterized by a seemly unprovoked systemic inflammation. The genes involved are often involved in the innate immune response. Herein we report the case of a 11 year old girls who from birth suffered from recurrent episodes of severe systemic inflammation andpolyserositis associated to the progressive development of a severe lymphedema.

Patient: We will describe the history of 11 y.o. girl patient suffering from birth (surgical cesarean at 33th week of pregnancy) by widespreadlymphostasis and pleural effusion (with respiratory distress). the patient had also lost her hearing at 9 months for the mutation of 35delG of GJB2 gene (currently the patient has a cochlear implant). Since birth she suffered by recurrent episodes of fever, severe peripheral edema with pleural and pericardial effusion treated with surgical drainage, antibiotic therapy, diuretics and steroids. During the years she also progressively developed a severe diffuse lymphedema. At the age of 8 years, the patient was admitted to the intensive care units for a severe inflammatory recurrence. Antibiotics were largely ineffective and only steroid treatment was able to control the severe inflammatory condition.In the following months the girl become steroid-dependent. For this reason the treatment with anakinra (interleukin-1 receptor antagonist) was started. This has allowed a complete control of theinflammatory manifestations , with a rapid withdrawal of steroid. The clinical picture observed in our patient was very similar to those of two recently described Trurkish cousins presenting the same association of resurrent episodes of inflammation associated to lymphedema. Homozigousity mapping performed in these twopatients allowed the identification of a possible causative gene called MDFIC, also known as HIC (Human I-mfa domain containing protein), a transcription factor modulated by IL-2 and expressed expressed by cells of the immune system (Gul et al A&R suppl 2011). Our patient carried the same homozygous mutation of MDFIC gene observed in the two Turkish patients. After discharge, the patient still had significant diffuse edema that severely affected her quality of life. Lymphoscintigraphic patterns of limbs confirmed a generalized lymphostasis . The young girl was treated therefore from the lymphological point of view with traditional CDP associated with a strict hypolipidic diet (supplemented with MCT oil). After three years of follow-up, this patient has a completely normal life, lymphedema is under control and performs daily physical activity (skating), continues common CDP with stricthypolipidic diet, she wearing compression stockings and she useanakinra

Conclusion: The infective/inflammatory complication is common in patients with chronic lymphedema and their clinical manifestation depends in equal measure on lymphostasis severity and by the virulence of the pathogen. What's real connection between the mutation of MDFIC and the lymphatic disease? In This case how a autoinflammatory reaction is triggered (AISLE)? The reduction oflymphostatis through the traditional therapeutic approach (CDP) in association with strict hypolipidic diet has allowed the remission of frequent acute clinical disease or the use of anreceptorial antagonist of IL1 can be of help in the control of acutesterile inflammatory lymphangitis?

PERCEPTIONS OF LYMPHŒDEMA TREATMENT IN PATIENTS WITH BREST CANCER. A PATIENT PERSPECTIVE

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Lymphoedema after breast cancer surgery is a chronic condition. The lymphoedema treatment consists of information/advice, compression, physical exercise, skin care and manual lymph drainage. Little is known about how the patients' experience, adapt and respond to lymphoedema treatment. Thus, the purpose of the study was to investigate and describe women's perceptions of the treatment for lymphoedema after breast cancer surgery.
Sixteen women with breast cancer related lymphoedema recruited from four hospitals and two rehabilitation clinics participated in the study. Semi-structured interviews were conducted and analysed using a phenomenographic method. Five qualitatively different categories of descriptions could be identified: uncertainty, disappointment, guilt and shame, safety and autonomy. The categories could be described based on a two dimensional structure, the patients' role (internal versus external locus of control) and the understanding of the lymphoedema as a chronic disease or a burden. The study has given a deeper understanding about different ways of perceiving and responding to lymphoedema treatment.
Based on where the patient stands in the patient role and to take responsibility in treatment and acceptance towards the lymphoedema as a chronic disease, the lymphoedema therapist can individualise treatment and counselling.

EFFECTS OF PHYSICAL ACTIVITY IN FEMALE CANCER SURVIVORS WITH SECONDARY LYMPHEDEMA

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Introduction: Few previous studies focus on the possible role for physical activity to improve lymphedema, but rather that physical activity does not worsen the lymphedema. Possibly physical training in itself can have an effect on the lymphedema, by improving the muscular pump-effect on the lymph flow. Further, we hypothesize that the hydrostatic pressure in a swimming pool can be similar to wearing a compressions sleeve or hosiery on land, which is the evidence based recommended maintenance treatment for secondary lymphedema, and often recommended also at physical activity to hold back the edema. A special focus in this study is therefore aqua training and its special effects because of the hydrostatic pressure by the water and easiness to move in water despite a limiting and heavy edema.

Method: In a controlled clinical intervention we included female cancer survivors with secondary lymphedema after breast or gynecological cancer. We compared aqua training to land training and standard care (compression, self-care and supporting manual lymph drainage) in a 10 weeks intervention. The aqua training was performed as aeorobics in a thermo neutral (28-29°) swimming pool. The land training was performed as aerobics sessions in a gymnastic hall. The number of participants was 90. Primary outcome variable was limb volume and secondary variables were daily function, wellbeing and body image. The study was performed in Stockholm, Linköping and Sundsvall, Sweden.

Results: At baseline, we found that almost 90% of the women had good daily function, but also 10% who had really bad daily function. 36% of the women had low levels of body-image. Well-being was low due to physical health, depression, anxiety and appearance. For 50% of the women the lymphedema was a constant reminder of the cancer. The effects on limb volume, daily function, wellbeing and body image will be analyzed when all participants have concluded the interventions. The results will be presented at the 4th world congress of the International Society of Lymphology.

Conclusion: Theoretically, training in water can have an additional hydrostatic effect on the lymphedema comparable to or better than compression sleeves and hosiery. Secondly, training in water can be more effective than training on land, since the body feels lighter in water. Thirdly, training in temperate water (28-29°) allows a high intensity training that is not possible in hydrotherapy pools (32-34°) and cools off the body and thus decreases the training-induced swelling. We hope our results will support these hypotheses.

BEST ELASTOCOMPRESSURE IN PRIMARY AND SECONDARY LYMPHŒDEMA

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Elastic compression, as worldwide well known, represents the main therapeutical approach in lymphedema in terms of efficacy in short times and it is the only absolutely indispensable therapeutic step able to ensure the best results.
The 2 phases of this approach are bandage and final garment. Both of them are in perfect mutual integration, above all as regard the research of maximal personalization, starting, obviously, from bandage. Today, in lots of lymphedema rehabilitation centers, is still taken in poor consideration the possibility of exit from standard and "scholastic" methods and materials in lymphedema treatments. In more then 20 years of experience our working group experimented lots of different variation in:

- Materials and combination of them,
- Technics of overlapping and combination of them,
- Variation of materials and technics during the evolution and valuation of limb responses.

We have extrapolated a specimen of 187 patients suffering from primary and secondary lymphedema of the limbs and face (3) taken among our larger casuistry, in which were applied unconventional materials and technics, but, for that matter was, at least, possible improve results. These variations regard:

- Underbandage only 23%,
- Choice of particular overlapping 37%,
- Mixed materials in the same limb/s 18%,
- All of previous aspects in the same patient 22%.

The aim of this paper is to describe in a most detailed way, some of our different extra-standard variation, both in bandage or in final garment choice, only to demonstrate that often, going out the schemes, is an advantage to obtain the best possible compliance in order to cope possible frequent future relapses gave by a low level of results.

HOW IS THE EFFECT OF TREATING SECONDARY LYMPHEDEMA AFTER BREAST CANCER WITH KINESIOTEXTAPE COMPARED WITH COMPLETE DECONGESTIVE PHYSIOTHERAPY?

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Background: Lymphoedema is the accumulation of protein-rich fluid in soft tissues as a result of an interruption of the lymphatic flow. Secondary lymphoedema (SE) is an acquired condition resulting from surgery, radiation, disease or trauma that damages the lymphatic system. The most common cause of SE is treatment for malignancy. One of the complications of breast cancer treatment is lymphoedema of the upper extremity. Lymphoedema may result in loss of functional ability, cosmetic deformities, physical discomfort, recurrent episodes of erysipelas and psychological distress. The most common treatment for SE in Denmark is complete decongestive physiotherapy including manuel lymphatic drainage, compression with low stretch bandages, skin care and exercises. The patients are bandaged 5 days a week and for 4-6 weeks. The treatment influences the patient's quality of life in a negative way, because they cannot live a normal life when they are bandaged. The treatment is expensive and often l eaves the physiotherapists with work related injuries to the shoulders etc. There is an established positive effect of using bandaging for lymphedema, but there is no established positive effect of using tape on this group of patients. Method This randomised controlled study was conducted in a 423-bed public hospital that offers acute, secondary, and some tertiary services. The study was performed on 12 patients who had developed lymphoedema after a breast cancer treatment. The patients were treated in Vendsyssel Hospital Therapy department between January 2012 and April 2013. The study was performed with the approval of the local ethics committee and informed assigned was obtained from each patient. The intervention group were taped twice a week for 4-6 weeks, and the control group was treated in the traditional manner by bandage 5 days a week for 4-6 weeks. Both groups were treated with manuel lymphatic drainage and skincare. The outcome is circumference of the hand, wrist, elbow, and deltoideus. Weekly measurements were made by an unbiased person. Focus group interviews were held to measure the patient's quality of life.

Results: The preliminary results show a comparable effect of bandage and tape, but according to quality of life, the patients who were taped, reported a higher level of quality of life. The final results will be presented at the 24th International Congress of Lymphology, Rome.

Conclusion: The conclusion will be presented at the 24th International Congress of Lymphology, Rome.

THE IMPACT OF AQUA LYMPHATIC THERAPY ON ARM DISABILITY, QUALITY OF LIFE AND PAIN IN WOMEN WITH CHRONIC BREAST CANCER RELATED LYMPHEDEMA – A RANDOMIZED CONTROLLED PILOT STUDY

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Purpose: Chronic lymphedema occurs frequently in breast cancer patients and is associated with significant morbidity and reduced quality of life (QOL). In this pilot study we have evaluated whether aqua lymphatic therapy (ALT) will reduce arm morbidity and disability in patients with breast cancer related lymphedema (BCRL).

Methods: Twenty five women with BCRL were randomized to either a home land-based exercise program alone (control group) (n=12) or weekly sessions of ALT in addition to a home land-based exercise program (ALT group) (n=13). Participants were evaluated prior to and following a 12-week intervention period. Outcome measures were arm volume, arm disability, hand-grip strength, pain, and QOL.

Results: At the end of study period there was no change in the lymphedematous limb volume in both groups. Hand-grip strength increased in the lymphedematous arm in both groups (mean difference of 3.1 kg and 4.1 kg in control and ALT group; p=0.008). The ALT group showed a significant reduction in pain intensity score (p=0.015) versus no change in the control group (p=0.68). Arm disability significantly improved in the ALT group (p= 0.016) while no change was noted in the control group (p=0.39). QOL significantly improved in the ALT group (p=0.021) but not in the control group (p=0.2).

Conclusions: Compared with the control group, ALT was shown to reduce pain and arm disability, increase hand-grip strength, and improve QOL after 12 weeks of treatment. ALT may serve as a safe alternative to land-based treatments for BCRL.

A NEW MODEL OF MULTI-COMPONENT NON-ELASTIC SLEEVE: PRELIMINARY RESULTS

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The treatment of lymphedema is based on five pillars: manual lymphatic drainage (MLD), intermittent pneumatic compression, multi component bandages, elastic sleeves, skin care.
Their integration leads to CPT (Combined Physical Terapy), as recommended by the Guidelines Italian and international.
Recent scientific comparisons confirm the strength of the CPT multi-component bandage.
Experimenting different ways, material and accessories of bandaging, we managed to optimize the efficiency and speed up the execution of multicomponent bandages.
To ensure the maintenance of the results, we still need to involve the patient into his treatment: perm anent wear of sleeves and self-bandaging at home in order to lead him to more autonomy.
During our daily work, we have observed that in the long run, the patient disencourages, because of operational difficulties to apply the bandages or by himself or by the family.
Therefore we realized, on an experimental basis, a multicomponent "easy to apply and wear"- system (multicomponent sleeve) that is well tolerated reproducing mechanical characteristics of multicomponent bandages.
It is customized when the edema has decreased to a lower level. The patient can regulate and adapt the sleeve with the help of Velcro®belts.
In the follow-up on short term, we observed both a better involvement and more satisfaction of the patient coming along with a maintenance of volumetric reduction of the limb.
We hope that this homemade multicomponent sleeve might represent in the near future a new mean of valid treatment of lymphedema.

OPTIMAL WEIGHT TRAINING PARAMETERS FOR THE MANAGEMENT OF BREAST CANCER RELATED LYMPHŒDEMA (BCRL): A SYSTEMATIC REVIEW

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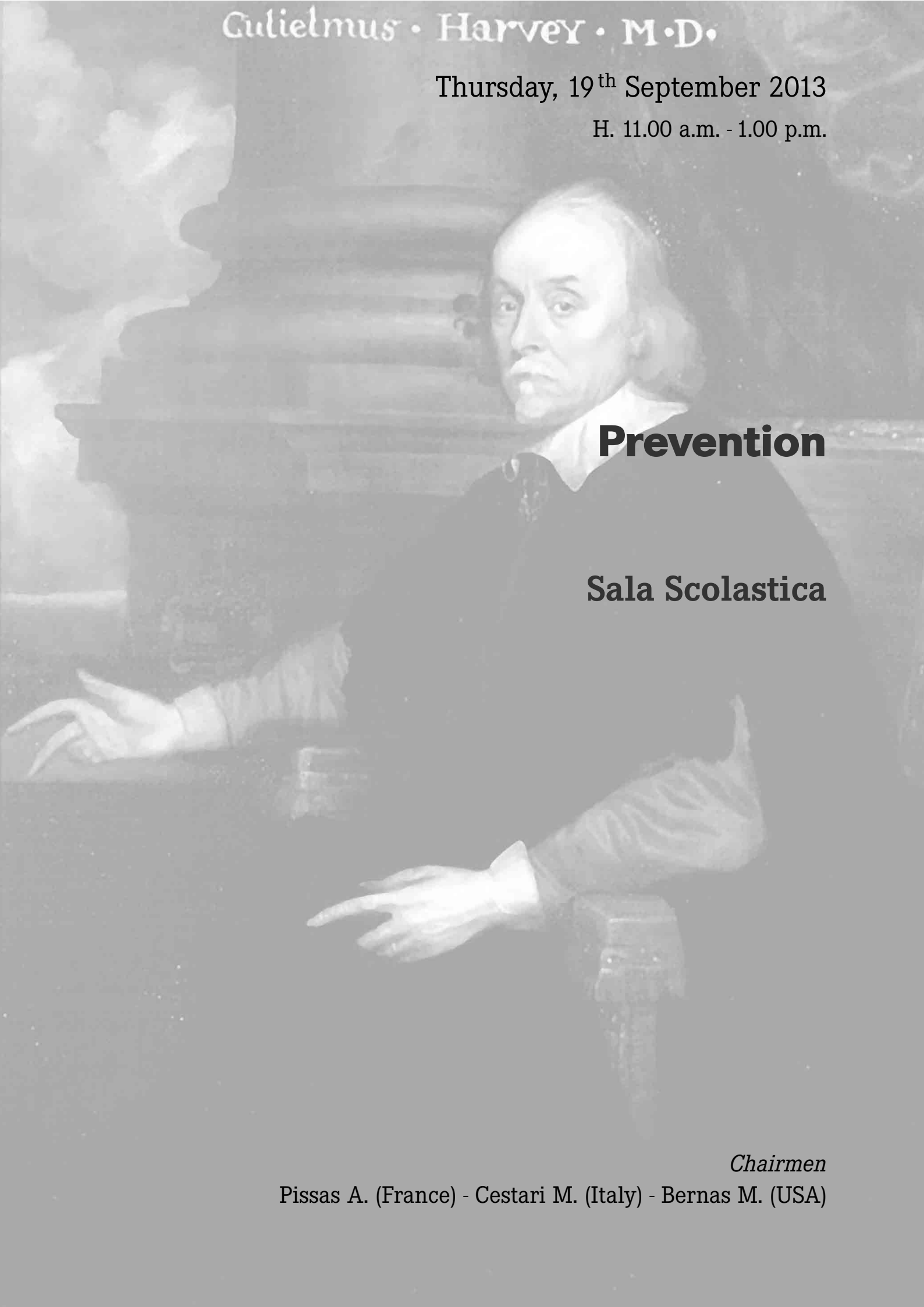
Background: Weight training has been increasingly recognized as a safe and effective adjunctive therapy for women with or at risk of lymphoedema post breast cancer treatment, but optimum parameters for weight training have yet to be summarised.
Objectives: This systematic review is set to explore and summarise the optimum weight training parameters that are safe and effective in women with or at risk of lymphoedema.
Search methods: Electronic database search was conducted in PubMed, EMBASE, PsycINFO, CINAHL, AMED, COCHRANE, PEDro, SPORTDiscus and Web of Science. Reference lists of articles and previous reviews were searched; additionally, researchers in the field were contacted.
Selection criteria: Randomized controlled trials comparing weight training with no treatment or other form of exercises in women with or at risk of breast cancer related lymphoedema were selected.
Data collection: Single author assessed trial quality and extracted data. Reviewer contacted study authors for additional information.
Main results: Eleven studies from eight trails involving 1091 women were included. Weight training exercise with low to moderate intensity (No weight to 60-70% of 1RM), slow progressive exercise (2% to 10% of 1RM) compared with controls, significantly improved the upper limb strength (Standard Mean Difference: 0.91 [95% Confidence Interval: 0.74, 1.08]) and lower limb strength (SMD: 0.70 [95% CI: 0.48, 0.92]) without increasing the arm volume or incidence of breast cancer related lymphoedema. There were no significant changes reported in the Body Mass Index (BMI) and Quality of Life (QOL) within the small amount of available information. Most commonly reported weight training parameters are 8-10 repetition/set and 2-3 set for each exercise three times a week for at least 8 weeks under supervision and further 16 weeks with or without supervision may be beneficial. Other consistent features are warm-up, cool-down and applied pressure garments during weight training exercises. The safety of high intensity weight training needs to be explored.
Conclusions: Weight training is a safe and beneficial exercise program for women with or at risk of breast cancer related lymphoedema. Supervision, pressure garment while weight training and low to moderate intensity, slowly progressing exercises for 3 days a week for at least six months may be useful.



Thursday, 19th September 2013

H. 11.00 a.m. - 1.00 p.m.

Prevention

Sala Scolastica

Chairmen

Pissas A. (France) - Cestari M. (Italy) - Bernas M. (USA)

EFFECTIVENESS OF LYMPHEDEMA PREVENTION AND REHABILITATION PROGRAM IN BREAST CANCER PATIENTS

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Background: According to current lymphology science, no definite cure has been introduced for lymphedema yet. So, improving preventive strategies for the affected arm is a health priority in post mastectomy patients for maintaining their Quality of Life. This study aims to evaluate the effects of an intervention for lymphedema prevention on physical, psychololological and functional aspects of life in post mastectomy patients.

Materials & Methods: An education and awareness rehabilitation program for postmastectomy lymphedema was installed by Seyed-khandan Rehabilitation Center and financial support of 3 Non- Governmental Organizations in Tehran since 2010. This two hour educational program is being hold monthly in a park in Tehran. It consists of educating self-care and Self Manual Lymph Drainage, answering to patient' questions, doing a group therapeutic exercise for lymphedema and serving breakfast. Effectiveness of this program was assessed by a questionnaire in 12 sessions.

Results: During the study period, 305 questionnaires were fulfilled. The mean age of attendances was 51.1 ± 8.5 years (ranging 26-75 years). Fifty two per cent of them were married, 72% were housewife and educational level of 92% of them was high school and more. The mean frequency of their attendance in program was 3.5 ± 3 times, while 31% of them had attended just in one session and 25% of them attended in more than 5 programs. About 97% of patients believed that this program would be effective in lymphedema prevention. Sixty percent of patients had no previous information about lymphedema. About 33%, 15.2%, 13.9%13.5%, 35.8%, 26.1%, 6.5% and 2.6% of patients reported improvement in lymphedema, anxiety, depression, sleep disorders, daily physical activity, energy level, nutritional status and sexual behaviours after participation in this program.

Conclusion: Data shows that this educational program has been effective in improving physical and psychological problems besides lymphedema in post mastectomy patients. Increasing awareness and persisting on exercise and social activities can be suggested for restoring and maximizing daily function and promoting quality of life in cancer survivors.

Key words: lymphedema, breast cancer, rehabilitation, prevention, Iran.

COMPARISON OF SYMPTOM BURDEN AMONG HEAD AND NECK CANCER PATIENTS WITH AND WITHOUT SECONDARY LYMPHEDEMA

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Background & Purpose: Patients with locally advanced head and neck cancer (HNC) are at risk for developing secondary lymphedema due to aggressive multimodality treatment regimens which damage the lymphatic system. Our previous study identified that 75.3% patients had secondary lymphedema after HNC treatment and lymphedema was associated with substantial symptom burden. Currently, no studies have been available to inform oncology clinicians about symptom differences among HNC patients with and without secondary lymphedema. Thus, the purpose of this study was to describe the differences of symptom burden among HNC patients with and without secondary lymphedema.

Methods: A cross-sectional, correlational design was used. A convenience sample of 144 patients who were >3 months post HNC treatment were recruited. Head and neck lymphedema was evaluated by a trained research nurse through physical examination. A self-reported tool (i.e., Lymphedema Symptom Intensity and Distress Survey-Head & Neck, LSIDS-H&N) was used to assess frequency, intensity and distress levels of symptoms among the participants. Content and face validity of the LSIDS-H&N has been reported in our previous study. Descriptive statistics, Chi-Square tests, and Mann-Whitney tests were used.

Findings: Compared to HNC patients without secondary lymphedema, patients with lymphedema were more likely to report heaviness, warmth, problems putting on ties or necklace, problems swallowing food (mashed, pureed, or thin liquids), feel worse when flying in an airplane, and swelling in head/face/neck/cheeks/mouth. If a patient reported having a symptom (in addition to prevalence differences), the patient with lymphedema reported greater levels of intensity and distress with the symptoms of swallowing solid foods, tightness in neck skin, feeling uncomfortable in one's neck, and lack of confidence in one's body ($p < .05$).

Discussion & Implications: Findings suggest that HNC-related lymphedema may substantially impact patients' symptoms. Oncology clinicians need to be equipped with HNC-related lymphedema knowledge, conduct physical examination to detect lymphedema, evaluate lymphedema-related symptom burden, and refer patients for lymphedema treatment. Additional studies are warranted to identify causations of lymphedema-related symptom burden. Interventional studies are needed to address head and neck lymphedema-related symptom burden.

Keywords: Secondary Lymphedema, Head and Neck Cancer, Symptom, Symptom Management.

THE EFFECT OF DOCETAXEL ON DEVELOPING EDEMA IN PATIENTS WITH BREAST CANCER. A SYSTEMATIC REVIEW

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Background: Docetaxel is extensively used in chemotherapy for the treatment of breast cancer, as well in adjuvant and in palliative settings. Until this time, no review was conducted to evaluate docetaxel-containing therapies versus docetaxel-free therapies on the magnitude of the risk of developing edema

Objective: In this systematic review we investigated the occurrence of docetaxel-induced edema in patients being treated for breast cancer.

Study Design: Systematic literature review.

Methods: We systematically searched PubMed and Web of Knowledge for studies on chemotherapy with docetaxel in the treatment of patients with breast cancer. We included clinical trials comparing docetaxel versus docetaxel-free chemotherapy, edema had to be reported and measured as a key outcome or an adverse effect.
The CBO (Central Accompagnement Organization) checklist was used to assess the methodological quality of the studies.

Results: Six randomized clinical trials were included. Five trials were of moderate methodological quality. All trials showed an increased rate of edema in the docetaxel- treatment arm. However because of the heterogeneity of the control interventions, no definitive conclusion can be drawn concerning the magnitude of the risk of getting edema from docetaxel compared to other chemotherapeutic agents.

Limitations: Because of the limited number of studies and the high number of different grading scales for the outcome measure, further research is needed before solid conclusions can be drawn regarding prevention of docetaxel-induced edema in clinical practice.

Conclusion: The results moderately suggest that adjuvant chemotherapy that includes docetaxel provides a significantly increased chance to develop docetaxel-induced edema.

RISK PROFILES AS A METHOD TO IDENTIFY HIGH RISK FOR SEROMA IN WOMEN WITH BREAST CANCER

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Background: Breast cancer survivors with seroma have an increased risk for lymphedema and other related impairments such as infection and delayed wound healing. Many risk factors are associated with the onset of seroma in women with breast cancer. However, these factors have not been classified in a clinically useful way to profile risk. Bayesian algorithms such as Classification Regression Tree (CART) analysis use binary recursive partitioning to create risk profiles from predictive modeling. We describe the use of CART in to examine the combined effect of subject characteristics, cancer related factors and cancer treatment factors to in generating risk profiles for associated with the incidence of seroma in women with breast cancer and risk factor profiles which decrease incidence of seroma.

Methods: Subject characteristics, cancer related factors, treatment related factors, signs and symptoms, presence of seroma, bilateral upper limb strength, range of motion (ROM), and limb volume (using perometry) were assessed in 166 women pre-operatively and at 1, 3, 6, 9, and12 months post-operatively. Seroma was defined as a 0=No seroma (n=141/84.9%), 1=Yes, asymptomatic (n=15/9.0%), 2=Yes, symptomatic with aspiration (n=9/5.4%), and 3=Yes, symptomatic with operative intervention(n= 1/0.6%). For the analysis subjects were divided into two groups: Seroma group (n=25/15.1%) and no Seroma (n=141/84.9) to examine the combined effect of subject characteristics, cancer related factors and cancer treatment factors in generating risk profiles for seroma. CART analysis was conducted using 24 variables associated with seroma, to identify factors at baseline and at 1-3 month post-op assessments that characterized the two groups.

Results: We identified 2 major and 2 minor risk profiles in our prospective cohort. Each profile includes a set of factors that when occurring simultaneously were predictive of seroma. Nine profiles were identified for subjects without seroma. These profiles may help guide risk reduction.

Conclusions: This information may assist in more tailored approach to risk reduction for seroma and lymphedema. Identification of those women at high risk of developing seroma for prospective surveillance and risk reduction interventions that may be instituted early in medical /surgical treatment may potentially prevent the progression of seroma to a chronic stage with delayed wound healing and other related impairments such as lymphedema.

ECHO-COLOUR-DOPPLER DIAGNOSTICS IN PRIMARY PREVENTION AFTER BREAST CANCER SURGERY. METHOD REVIEW

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It is known that when lymphatic vessels are in difficulty, veins do not remain indifferent because, as a kind of twinning exists between them, an increase of the calibre and the flow velocity it is noted.
With this awareness in the previous study, it was decided to analyze the venous system behaviour, in subclinical stage after monolateral breast cancer surgery: during this evaluation an asymmetrical calibre of cephalic veins, due to the increase of the homolateral side, was noticed in most cases, and consequently it was decided to focus the attention on this measurement.
With the patient laid supine on the bed and the upper legs alongside the body, the measurement of the compared calibre of cephalic veins was carried out in the arm, previously marked by the physiotherapist every ten centimetres, at the end of expiration. Furthermore, these measurements were compared to the lymphoscintigraphy exam previously carried out in all patients in order to investigate an eventual correlation: in both situations, sentinel node biopsy and lymphadenectomy, a homolateral increase of calibre of cephalic vein always corresponds to slower radiotracer flow (100% of the cases).
It was decided to review the method in a new study.
The lymphologist carried out the exam with the patient sit on the chair and arms comfortably pending along the body without movement, and measured the calibre of compared cephalic veins, at the end of expiration, by probe parallel along the lateral side of the tendon of pectoralis minor. Furthermore these measurements were compared to the lymphoscintigraphy, carried out in all patients with the same method of the previous study, in order to investigate eventual correlation.
The results, carried out with this different method, highlighted as in the previous study, how the increase of the calibre of homolateral cephalic vein have a correlation with the result of the lymphoscintigraphy in both situations, sentinel node biopsy and lymphadenectomy: the homolateral increase of calibre of cephalic vein always corresponded to slower radiotracer flow (100% of the cases).
In the ambit of primary prevention, the confirm of the hypothesis that the increased of calibre of homolateral cephalic vein correspond to a slower radiotracer flow, would be very interesting as this measurement is simple, fast and economical.

"SILENT" INJURY OF ANKLES AS AN UNDERLYING CONDITION IN PRIMARY LYMPHEDEMA

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Background by definition: Primary lymphedema is referred to as lymphedema praecox when developed before age 35; onset thereafter is called lymphedema tarda. Although some individuals with familial lymphedema-distichiasis syndrome have been related to mutations of FOXC2, a gene associated with venolymphatic valve function, the etiology of most primary lymphedema patients remains unexplained. Interestingly, they are almost always the case of lower extremity(s).

Materials and Methods: From more than 3,000 patients, about one hundred representative cases of primary lymphedema were reviewed with special emphasis on ankle joints, using photographic records and MRI analysis.

Results and Discussion: While almost all cases presented more or less swelling of ankle and upper segments, including shin, calf, and knee with/out thigh involvement, only two fifths had prominent lymphedema expressed concurrently in dorsum of foot, a tendency to involve more upward than downward. Ankle swelling c ould appear as minor as small eminence anterior/posterior to medial and/or lateral malleoli, grew larger masking the bony protuberance, and expanded progressively embracing the entire ankle. Tenderness was elicited of only some early patients. Serial imaging revealed lymphatic dilation of adjacent adipose tissue in association with fluid accumulation in joint spaces; the latter represented a complex of seven bones, namely, talus, calcaneus, navicular, first cuneiform, second cuneiform, third cuneiform, and cuboid, forming articulation with tibia and fibula upwardly, and four metatarsi downwardly. In contrast to normal structure where synovial fluid was barely visible under T2W/stir, these patients demonstrated varying amounts of fluid, from thick film to lacuna, or well-defined pooling. In some distinct situations, the sinus tarsi, a transverse tunnel between talus and calcaneus, was filled with brightened fluid, suggestive of profuse lymph being generated from within subtal ar joint and fed into surrounding fat layer. Occasionally osteochondral inflammation was found. Lymph therefrom migrated centripetally up the limb, coursed mainly along pretibial path, and came crossing over knee joint into thigh segment. The pathway herein largely divided as medial and lateral, compatible with the pattern seen in lymphedema profunda patients. Findings strongly suggest that increased production of lymph from ankle joint(s) surpasses transport capacity of lymphatics in primary lymphedema. Forerunning factors that initiate and promote pathologic process can be numerous, such as ankle sprain, micro trauma, overuse, overload, and slaengh food that aggravates symptoms. It is also suggested that the "loose ankles" should be properly stabilized to ensure the "primary" lymphedema would not recur after appropriate treatment terminated.

TISSUE DIELECTRIC CONSTANT (TDC) AND BIOELECTRICAL SPECTROSCOPY (BIS) IN THE ASSESSMENT OF EARLY ARM LYMPHEDEMA IN BREAST CANCER PATIENTS AFTER AXILLARY SURGERY AND RADIOTHERAPY

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Purpose: To compare the BIS and TDC technique in the assessment of early arm lymphedema (LE) in breast cancer patients after axillary surgery and radiotherapy (RT).

Material and Methods: Eighty breast cancer patients at risk of arm lymphedema were examined in a regular follow-up visit within one year after surgery and RT. The clinical diagnosis of lymphedema was based on 2 out of 3 criteria; 1) >5% excess volume measured by volume displacement method WDM and corrected for arm dominance, 2) palpation of increased subcutaneous thickness and 3) a patient's experience of arm tension. The affected and contralateral arms were measured with the TDC technique (MoistureMeterD, Delfin Technologies Ltd) specific to local tissue water in skin and upper subcutis and the BIS technique (SFB7, ImpediMed Ltd) assessing arm extracellular water. With the TDC technique local tissue water of both the upper arm and forearm were measured to the effective depth of 2.5 mm. The threshold limits of LE for the BIS were 1.066 and 1.139 for non-dominant and dominant arms, respectively and 1.200 for the TDC without arm dominance.

Results: Twenty-nine patients were clinically diagnosed of having LE (36.2%). The TDC technique detected 25/29 (86.2%) and the BIS technique 12/29 (41.4%) of these patients (p=0.001). TDC measurements revealed that 10/29 (34.5%) patients had LE only in the upper arm, 5/29 (17.2%) only in the forearm and 14/29 (48.3%) at both sites. According to the TDC technique 11 of 51 patients, not clinically diagnosed for LE, fulfilled the TDC criteria of LE. Of these 51 patients the BIS technique detected two patients fulfilling the BIS criteria of LE. These two patients were also detected by the TDC technique.

Discussion and conclusions: The difference between the TDC and BIS technique is statistically highly significant. The TDC technique also revealed that early LE affects the upper arm more frequently than forearm. The results also suggest that clinical examination may not be sensitive enough to detect incipient lymphedema since 11/51 (21.6%) patients fulfilling the TDC criteria of LE were not clinically diagnosed for LE.

LYMPHEDEMA AND STEWART TREVES SYNDROME, THE ROLE OF PHYSICAL THERAPIST

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Lymphedema is the worst complication secondary to lymphadenectomy after surgery for cancer.
The improvement in surgical techniques and medical treatment allows these patients a longer life expectancy.
Lymphedema is a chronic condition, however, and the patient must always take care of your limb to counteract the deterioration.
The physiotherapist expert plays a central role in the treatment and constant re-evaluation of these patients. He / she also knows that the worst disease in chronic lymphostasis is linfangisarcoma: Stevart Treves Syndrome.
The purpose of this study is to help the physical therapist to recognize early signs of this disease to report to the medical staff.
For this purpose was conducted a review of literature to learn about the current state of knowledge and to help the physical therapist to recognize the early signs of this pernicious disease.

BASELINE CHARACTERISTICS OF THE UPPER LIMB LIFT TEST AMONG WOMEN NEWLY DIAGNOSED WITH BREAST CANCER

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Purpose/Hypothesis: Objective measures of upper limb (UL) function specific to survivors of breast cancer (BCS) are limited. Motion, strength, and muscular endurance are measurable components of UL function. A clinical test that quantifies these components is needed. The purpose of this study was to quantify UL function using the Upper Limb Lift Test (ULLT) in BCS prior to surgical treatment intervention.

Participants: On hundred forty-three BCS (52.7 + 11.6 years with a body mass index of 26.7 ± 6.1 kg/m^3) completed the ULLT prior to BC treatment. Participants were analyzed in 4 age groups: 1 = <45 years, 2 = ≥45- ≤54, 3 = ≥55- ≤64, and 4 = ≥65.

Methods: Each participant completed the ULLT on each limb (right = RULLT and left = LULLT). The ULLT is a series of repeated shoulder elevations against resistance, moving a dumbbell anthropometrically scaled to the participant weight from a scaled height. Perceived exertion (PE) using BORG20 was measured post ULLT. Descriptive statistics of repetitions, total weight lifted (TWL), and PE were calculated for all BCS and by age group. A paired-samples t-test was used to analyze left and right differences in TWL. Differences between age groups were analyzed with one-way analysis of variance for repetitions and TWL.

Results: Mean (SD) repetitions lifted were 17±4 for RULLT and LULLT for all BCS, with a mean weight lifted of 6.4±1.4lbs. Differences between number of repetitions completed for both RULLT and LULLT were not significant between age groups (p=.7). Mean TWL for all BCS was 112±37lbs for the RULLT, and 110.8±38.6 lbs for the LULLT. No significant difference between TWL on either limb (p=.5) was found. The RULLT TWL was significantly different between age groups (p=.03) with Tukey's *post hoc* testing revealing significant differences between group 1 (99.5±26.8 lbs) and 3 (121.2±35.2 lbs) (p=.04); no significant differences between age groups were found for the LULLT. PE averaged 12.4±2.9 for all BCS. No significant differences in PE were found between age groups (p=.06).

Conclusion/Clinical Relevance: On average, BCS demonstrate similar levels of UL function measured by the ULLT across ages and between limbs prior to treatment for breast cancer. The ULLT provides an objective measure of UL function (motion, strength, and muscular endurance) which can be used throughout BC treatment to identify if impairments exist and guide rehabilitation strategies.

LYMPHEDEMA AND THE PATIENT WITH PAD: USE OF PHYSICAL SOURCES IN THE COMBINED TREATMENT AND IN REDUCING EDEMA

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Background: The circulatory system provides to the needs of the tissues with the contribution of nutrients, with the removal of waste products, transporting hormones thereby contribute to a general maintenance of an optimal microenvironment inside the cell survival and function throughout the tissue fluid. The perfect functioning of a biological system consisting of the macrocirculation, microcirculation, volume and quality of the blood volume or carrier and a complex system of tissue distribution and "filtration" capillary contribute to the good maintenance of the microenvironment interstitial. The flow in the capillaries is regulated by the pressure gradient, or by the pressure difference between the two ends of the vessel and then from the vascular resistance by the resistance the blood encounters along the vessel. The filtrate or transudate within 24 hours, under normal conditions, can reach several liters. A functional alteration of the microcirculation caused by altered permeability, by increased resistance, reduction of the pulsatility or altered by hyperaggregability flow of red blood cells can understandably alter the perfect biological mechanism that regulates the amount and the quality of the interstitial fluid. Available therapies have not induced a significant solution in cases of chronic accumulation of liquids as in the case of lymphoedema.

Aim of the study: We have tried to reduce the aggregation of red blood cells and affect the performance of the microcirculation with the aim to improve circulation in the peripheral tissues and reduce the accumulation of transudate and, ultimately, the edema.

Materials & Methods: We enrolled patients with type II diabetes mellitus (T2DM) with leg ulcers. We have arbitrarily divided into three groups (A, B and C). Group A was treated with pulsed electrostatic field; group B with the magnetic field low frequency and group C had control role. L 'HbA1c was not statistically different between the three groups. Were monitored the weight, blood pressure, systolic and diastolic pressure and heart rate.

Results: The physical sources, electrostatic field and magnetic field, showed have positive effects on the metabolism, reduction of body weight, reduction in peripheral resistance in groups A and B. There was also a significant reduction of systolic blood pressure and diastolic blood pressure in groups A and B. The techniques were well tolerated by all.

Discussion: The physical sources have an impact on the processes of tissue and spraying on the control mechanisms of capillary transudation into the tissues were well tolerated and show to have systemic effects. These results could be explained by improved tissue perfusion as demonstrated by the accelerated healing of wounds attributable to higher contribution of O_2 and nutrients of substance.

INDOCYANINE GREEN LYMPHOGRAPHY IS SUPERIOR TO LYMPHOSCINTIGRAPHY IN IMAGING DIAGNOSIS OF SECONDARY LYMPHEDEMA

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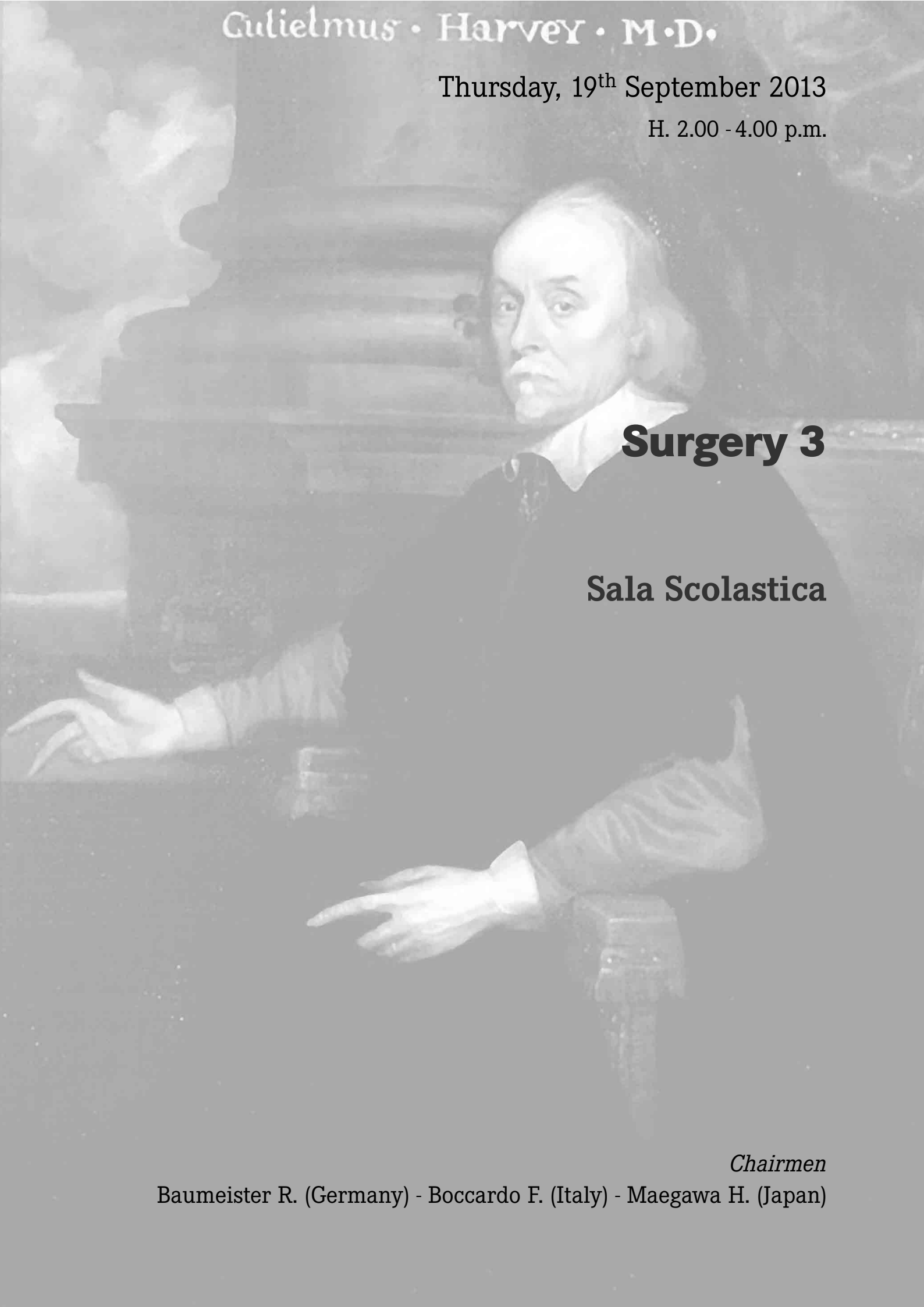
Objective: Lymphedema is commonly viewed as difficult to treat, but lymphaticovenous anastomosis applied early after onset can be curative in some cases. Therefore, early diagnosis of cancer-related lymphedema is important. Lymphoscintigraphy is currently the most common method used for imaging diagnosis of lymphedema, but indocyanine green fluorescence lymphangiography (ICG lymphography) is also increasingly used for this purpose. The goal of this study was to compare the accuracy of these methods for diagnosis of lymphedema.

Methods: This was a prospective comparative study, conducted at a general hospital in Japan. The subjects were 29 consecutive patients (all female; age range, 32-79 years) with lymphedema (58 limbs, including healthy ones) after gynecologic cancer care who underwent lymphedema treatment at The University of Tokyo and Saiseikai Kawaguchi General Hospital between April 2011 and December 2011. All subjects were referred to our department for lower extremity lymphoscintigraphy and ICG lymphography. The sensitivity and specificity of lymphoscintigraphy and ICG lymphography were calculated for all limbs and for diagnosis of early lymphedema in affected limbs (International Society of Lymphology stages 0 and I). In each analysis, receiver-operating characteristic curves were prepared to compare the accuracy of the two methods. Histopathological analysis was also performed.

Results: In receiver-operating characteristic analysis of 58 limbs, the area under the curve was 0.72642 for lymphoscintigraphy and 0.90943 for ICG lymphography. In 34 limbs with early lymphedema, the area under the curve was 0.55882 for lymphoscintigraphy and 0.81471 for ICG lymphography.

Conclusions: ICG lymphography was more accurate than lymphoscintigraphy for detecting lymphedema and was particularly useful for diagnosis of early lymphedema. This is clinically important since early diagnosis may permit curative treatment of lymphedema.

Fountain of the "Barcaccia" in Piazza di Spagna



Thursday, 19th September 2013

H. 2.00 - 4.00 p.m.

Surgery 3

Sala Scolastica

Chairmen

Baumeister R. (Germany) - Boccardo F. (Italy) - Maegawa H. (Japan)

IMPROVEMENT IN QUALITY OF LIFE AFTER LYMPHOVASCULAR GRAFTING

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Quality of life assessment studies are more and more important for the evaluation of treatment procedures. We adapted the SF 12 -short form health questionnaire to the specific needs of patients with lymphedemas and added two questions regarding the influence of the conservative treatment procedures. A ZUF-8 questionnaire was used in order to measure the amount of contentment with the surgical procedure itself.
In a cross-sectional study 212 patients where investigated according to the changes in quality of life, after reconstruction of an interupted lymphovascular system via autologous lymphatic vessel transplantation. All patients had undergone at least 6 month of complex physical decongestion treatment with a mean duration of edema treatment of 7 years.
Quality of life was assessed using the modified standard questionnaire examining the physiological and psychological status of the patients. The results document a significant improvement in quality of live comparing the preoperative status utilizing the chances of the conservative treatment and the postoperative status.
To improve the lymphatic outflow is the most important factor in treating lymphedemas.
To reach this goal the reconstructive lymphovascular microsurgical bypasses an interrupted lymphovascular system using the patients own lymphatic vessels. Main lymphatic trunks in front and behind the interruption are connected with the help of a bypass, a procedure which is routinely used in other parts of the vascular system. By that way lymphatic flow can be improved and also be restored. This method considers the normal lymphatic pressure, the specific ability of lymphatic vessels to propulse the lymph and takes advantage of the low coagulability of the lymphatic fluid.
Lymphatic vessels are harvested from the ventromedial bundle without touching lymph nodes in a length up to 30 cm's.
In armedemas the grafts connect ascending lymphatic vessels at the upper arm and lymphatic vessels at the neck, bypassing the axillary region. In unilateral edemas of the lower extremities, the grafts, remaining attached at the inguinal lymphnodes are transposed to the affected leg and anastomosed with ascending lymphatic main trunks.
The improved lymphatic outflow by the lymphatic vascular bypasses is assumed as responsible for the reduction in volume, increased mobility and at a great extent to the avoidance of wearing compression garments which is most important especially for patients suffering from arm edemas.

CHARACTERIZATION OF THE INFLAMMATORY RESPONSE AFTER MICROVASCULAR LYMPH NODE TRANSFER IN LYMPHEDEMA PATIENTS

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Background: Inflammation has a controversial role in lymphangiogenesis and in the development of lymphedema. In some settings inflammation induces lymphangiogensis through proinflammatory cytokine expression and macrophage recruitment. However, there is also evidence that a Th2 T cell dominant inflammatory response is crucial for postsurgical lymphedema development. Recent studies have demonstrated the potential efficacy of autologous microvascular lymph node transfer in the treatment of lymphedema patients. However, the biological background behind this technique has not been clarified.

Methods: Postoperative axillary seroma fluid samples were collected from lymph node transfer (LN, n=8) and combined breast reconstruction and lymph node transfer patients (LN-BR, n=8). For controls we collected similar samples from ordinary lower abdominal breast reconstruction (BR, n=8) and axillary dissection patients (ALND, n=8). Samples were taken on the 1st and 6th postoperative day (POD). Enzyme-linked immunosorbent assays were used to measure the concentrations of lymphangiogenic growth factors (VEGF-C and VEGF-D) and inflammatory markers (IL-1alfa, IL-1beta, TNF-alfa, MCP-1, IL-10, TGF-beta1, IL-4 and IL-13).

Results and conclusion:

ALND The ALND group had the highest concentrations of VEGF-D and IL-1beta in the seroma fluid on the first POD. The concentrations of VEGF-D and the proinflammatory cytokines IL-1beta, IL-1alfa and TNF-alfa were high on the sixth POD. IL-1beta and TNF-alfa have been associated with a proinflammatory Th1 T helper cell response.

BR The BR group had high VEGF-C and TGF-beta concentrations on the first pod and the highest concentration of IL-13 on the first and IL-4 on the sixth pod although these were quite low in all groups. IL-4 has been associated with a Th2 T helper cell response which also promotes a wound healing macrophage phenotype. IL-4 and IL-13 and a sustained Th2 phenotype have been associated with chronic lymphedema in human patients and also acute lymphatic stasis in animal models.

LN and LN-BR In the LN group VEGF-C and to some extent TGF-beta concentrations were elevated on the first pod while in the LN-BR group also IL-4 was elevated. On the sixth pod the cytokine profiles of these two groups resembled each other showing elevated IL-10. Overall this depicts an anti-inflammatory and regulatory phenotype. IL-10 initiates suppression of both Th1 and Th2 T cell polarization. Thus it seems that lymph node transfer induces an anti-inflammatory response that could favor the resolution of lymphedema. Also the profiles of VEGF-C and VEGF-D secretion are different when comparing ALND and flap reconstruction groups. Future studies are needed to clarify this further.

OUR KNACK FOR PERFORMING GOOD LVA - ONE HAND SUTURE TECHNIQUE AND INTRA-ADIPOSAL DISSECTION-

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These days minimum invasive surgical treatment for lymphedema such as lymphaticovenular anastomosis (LVA) has been prevailed. This is because of the advance of microsurgical techniques and instruments and small vessels sized around 0.5mm are stably anastomosed.
The simplicity and less-invasiveness contribute to the wide indications for both primary cases and secondary ones that occurs subsequent to breast, ovarian, uterus cancer etc.
A lot of excellent results by LVA procedure are reported, various ideas and innovations have been introduced globally.
But the details are so different among affiliations that there is no globally standardized procedure.
Even if surgeons have excellent skills for super-microsurgery, how to detect adequate lymphatic vessels and venules that matches well could be major problem in the practical procedure.
In our department more than 300 LVA cases are operated in one year and have good results.
Here we introduce not only our basic surgical technique, represented by 'one hand suture technique' and 'intra-adiposal dissection', but also our standard way of pre or post-operative compression therapy.
Though the definitive solutions for lymphedema treatment are not yet found out, we believe that the combination strategy of LVA and complex physical therapy has the potential to be the breakthrough and spread all over the world.
Lymphedema has been thought as a progressive disease and almost all the treatments that clinicians could do were performed in order to slow down the speed of the progression.
By the super-microsurgical technique, lymphedema treatment itself might be innovated to approach a new chapter historically.

PERIPHERAL VENOUS ANGLE PLASTY: A NEW LYMPHOVENOUS ANASTOMOSIS TECHNIQUE FOR LYMPHEDEMA - THE CONCEPT AND ITS RESULT

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Surgical treatment for lymphedema is challenging and not fully standardized but lymphovenous anastomosis is now gradually becoming more common. We have developed a novel lymphovenous anastomosis technique which focused on the hydrodynamic force to drain the lymph fluid more effectively. The key is to create the check valve at the anastomosing site, like merging point of the thorathic duct into venous angle in normal human anatomy. This procedure is named "Peripheral Venous Angle Plasty (PVAP)" and the surgical result was compared to the conventional lymphovenous anastomosis.
Method: ISL stage 1-2 lower limb lymphedema patients who received the two type of the lymphovenous anastomosis consecutive to the completion of the complex physiotherapy were evaluated. The PVAP procedure in brief, mark the great saphenous vein using ultrasonic eco and the lymphatic vessel using indocyanine green fluorescence lymphography (ICG-LG) on affected limb preoperatively and cross point of the vein and the lymphatic vessel was incised and suitable vein and the lymphatic vessel were detected. The lymph vessel was cutted off and the tip of the distal stump was cut opened and inserted into the saphenous vein from side hole and create the check valve. 11-0 nylon was used for sutures. Intraoperative ICG-LG was used to confirm that no venous reflux into the lymphatic vessel. The limb volume were compared pre and post op. 1Y.
Results: Since the PVAP needs a specific anastomosing procedure which the adventitia of the lymphatic vessel crops out in the venous lumen so the long term patency was supposed to be lower than the conventional anastomosis. In this study, the limb volume improvement of the PVAP group was as same as the conventional method group and the early stage patient shows the better result in the PVAP group. Not only the volume change, more detailed and standardized investigation through the follow-up period such as the clearance of the lymphatic flow or patency of the anastomosis site, softness change of the skin will be needed.

CONTROLLED COMPRESSION THERAPY AFTER LIPOSUCTION OF LEG LYMPHEDEMA – HOW TO KEEP CONTROL OVER TIME. THE STORY CONTINUES

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Background: Lymphedema can successfully be treated with liposuction and Controlled Compression Therapy (CCT). The aim of CCT is to increase compression until the volume of the lymphedematous leg is smaller or equal to the healthy one and to maintain the outcome.

Objectives: This study presents how CCT works in practice, leading to complete reduction, and how this works over time. The need of compression garments is discussed in relation to the patients' activity levels and the severity of the lymphedema.

Methods: Four patients, one male and three female, aged between 18 and 69 years were investigated. Two patients had primary and two secondary lymphedema. The excess volumes were measured preoperatively, and at 0,5, 1, 3, 6, 9,12 and 18 months postoperatively, then annually. Extra check-ups were planned when needed. At the check-up, the outcome was evaluated and complementary measures were added, if necessary. At each occasion the treatment strategy was identified.

Results: The treatment strategies used in CCT are: decrease circumferential measurements of compression garments, increase compressions class, use of several compression garments (multilayer), increase the amount of garments prescribed at the same time, and taking in existing garments. The choice of strategy depends on where increased compression is needed on the whole leg or part of it. It also depends on the patients' abilities to put on the compression garment and the patients' preferences and motivation.

Conclusions: Varying strategies can be used and combined to increase compression until complete reduction is achieved. This compression then needs to be maintained and evaluated at regular check-ups to keep a good result over time. If the excess volume increases the strategy needs to be adjusted in order to get the patient back on track.

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There are no conflicts of interest.

RECIPIENT AND DONOR SITE LYMPHATIC FUNCTION AFTER MICROVASCULAR LYMPH NODE TRANSFER

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Background and Objective: Recent studies have shown that autologous microvascular lymph node transfer from the groin area into axillas of the lymphedema patients may improve lymphatic drainage of the affected limb. The fact that the lymph node transfer is easily combined with breast reconstruction has made this technique attractive also for patients with early phase disease.

Methods: We have analyzed the results of 19 lymph node transfer patients operated on during 2007 – 2012. Postoperative lymphatic function of the affected arm and donor site lower limb was evaluated using semiquantitative lymphoscintigraphy (transport index) and limb circumference measurements.

Results: The transport index was improved postoperatively in 7/19 of the patients. 10/19 of the patients were able to reduce or even discontinue using compression garments. Arm circumferences were reduced in 12/19 of the patients. 6 of the 7 patients with preoperative erysipelas infections have not had infectious episodes postoperatively during 15 – 67 months follow-up. Neuropathic pain was relieved in 5/5 patients. None of our patients have developed postoperative donor site lymphedema symptoms.

Conclusion: Lymph node transfer is a promising technique which is easily combined with routine microvascular breast reconstruction and it seems to be more beneficial for patients with fairly mild lymphedema. Reconstructing the lymphatic anatomy of the axilla with a lymph node flap may offer possibilities that other reconstructive options are lacking. In the ideal situation, lymphatic, sentinel, as well as immunological functions of the lymphatic system are retained. However, a prospective randomized study and long-term follow-up on lymphedema patients comparing the effect of breast reconstruction and combined breast reconstruction and lymph node transfer, as well as the effects on donor site, are needed.

SURGICAL TREATMENT OF PATIENTS WITH LYMPHEDEMA OF THE SCROTUM AND PENIS

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Primary lymphedema scrotum and penis may develop at different ages and has approximately the same frequency distribution for men. According to the literature, the number of observations in these patients by different authors, usually small, ranging from isolated cases to 10-30. Recurrent erysipelas may cause a marked increase in the volume of the affected tissues, accompanied by lymphorrhea. Patients keep showing a significant decrease in quality of life, limiting, among others, and sexual function. Surgical treatment is often associated with blood loss and postoperative infectious complications, especially for a large volume of the affected tissues. Lack of adequate compression therapy leads to a further increase is the cause of relapse. The aim of the study was to investigate the immediate and long-term results of treatment of patients with primary lymphedema of the external genitalia.

We have been observed from 2001 to 2013 eight patients with primary lymphedema of the external genitalia, aged 14 to 52 years. Recurrent erysipelas and balanopostit occurred in 4 patients, 2 men at lymphorrhea, papillomatosis of the scrotal skin-one. The operation at the three men with primary lymphedema of the scrotum and penis and was a resection operation on the scrotum, and the circular excision of the prepuce, with one male surgical treatment was limited to a circular excision of the prepuce.

One man in the postoperative period marked by necrosis of the skin of the penis, the year he was undergone re-resection operation on the scrotum, resection of soft tissue of the penis. In connection with the formation of rough scar on the penis after 2 years of plastic surgery performed with excision of the scar and the formation of the penis, the displaced flap of the right iliac region. Other patients had no complications. Follow up results during one year was good.

Conclusions: Primary lymphedema of genitalia is rare disease of in men in Russia. Surgical treatment of primary lymphedema of external genitalia require surgery in patients with a significant increase of the affected tissues, recurrent erysipelas in remission. As the preoperative preparation for large volumes of affected tissues is advisable to use a complex decongestive treatment. Bandaging of the scrotum and penis is nesessary immedieately after surgery. In the early postoperative period is necessary to continue, to the selection of medical compression hosiery with distributed pressure in the perineal area.

EASE OF USE AND EFFECTIVENESS OF TWISTING TOURNIQUET DECONGESTIVE TECHNIQUE FOR GIGANTIC LYMPHEDEMA MANAGEMENT

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Compression therapy by Twisting Tourniquet Decongestive Technique (TTD) is truly innovative for lymphedema management. TTD was designed, tested, modified, and continually test-driven, so that the most easy-to-use practical form was accomplished in 2006. The mainstay of TTD relies on the findings that controlled compression-decompression maneuver can induce rapid reduction of swelling. We found out in the course of study that the combination of 15-min twist followed by 5-min release, continually 10-20 sessions a day generates acceptable results.

It is so powerful in rendering constricting force by hand-twisting rotation into a circumferentially compression around an axis. The compression pressure from TTD is thought to creating high resting pressure against the tissues and vessels that accelerates venous and lymphatic drainage.

From 2,555 patients who applied TTD for 5 days, we reported here the large number, 599 had passed the inclusion criteria, of which 287 were of upper and 312 were of lower extremity lymphedema, respectively. For upper extremities, the average edema severity before and after a 5 day of TTD was 63.7 and 34.3%, respectively. For lower extremities, the average edema severity before and after a 5 day of TTD was 62.2 and 31.6, respectively. TTD exhibited an average edema reduction rate at 49.5% and 54.3% that translated into edema reduction volume at 441 mL (range 65-1,789 mL) and 1,826 mL (227- 9,191 ml), respectively. We had 47 patients in 287 cases of upper extremity and 47 patients in 312 cases of lower extremity were gigantic grade (edema severity 100-300+%) of swelling. The largest arm in our patients is 263.7% swelling, and the largest lower limb is 368.9% swelling. For gigantic lymphedema of upper and lower extremities (severity grad > 100%), an average edema reduction rate were 42.9% and 44.4%, that translated into edema reduction volume at 772 mL (range 272-1,789 mL) and 3,458 mL (871-9,191 ml), respectively.

The attractive of TTD is so easily conducted, far more very powerful in edema reduction with less labor-intensive and exhibits striking results within a few days. It is applicable to patients even with advanced grades such as gigantic lymphedema having an extreme swelling volume of more than 100% to as much as 400%. We suggested that TTD is a proper technique for gigantic lymphedema patients that essentially perform the therapy by their self at home.

COMBINATION OF COMBINED DECONGESTIVE PHYSIOTHERAPY AND LYMPHATICOVENOUS SIDE-TO-END ANASTOMOSIS FOR TREATMENT OF BREAST CANCER RELATED LYMPHEDEMA

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Introduction: There are few reports on results of combination of combined decongestive physiotherapy (CDP) and lymphaticovenous anastomosis in upper limb lymphedema. We report outcomes of combination of CDP and lymphaticovenous side-to-end anastomosis (LVSEA) in upper limb lymphedema after breast cancer treatment.

Objectives: The aim of this study is to evaluate volume changes of the affected limbs and patency of the anastomoses.

Methods: Between 2006 and 2012 34 limbs of 34 patients who underwent pre-and postoperative CDP by one institute and LVSEA by one surgeon were evaluated. Lymphedema related to breast cancer. Volumes were calculated based on circumferential measurements at several points of the upper limb pre- and postoperativly. Moving average method was used for comparison of the volume at each period (100days). Patency of 114 anastomoses of the 28 patients was evaluated by ICG fluorescence lymphography more than 5 to 34 months (mean 9) after surgery.

Results: The mean volume of the affected limb was 1232ml at the initial visit, 1173ml during 1 to 100 days before surgery, and 1146ml during 1 to 100 days after surgery. There were statistical difference between the volumes at initial visit and the mean of a 100-days period before surgery (effect of CDP) and between the mean volumes of a 100-days period before and after surgery (effect of LVSEA). Out of 114 anastomoses 56(49%; 56/114) were detectable. Out of 56 detectable sites 25(38%; 25/56) were patent.

Discussion: The mean volume reduced by 59 ml by CDP and by 27 ml by surgery. Total reduction volume was 86 ml, which seems not to be a big improvement but about a half of the patients reduced CDP (free from compression garments). This is the highest goal in treatment of lymphedema. In lymphatico-microsurgery patency of the anastomoses has been unclear. In this study we revealed the patency rate of LVSEA in the upper limb lymphedema was similar to that in the lower limb lymphedema (Maegawa et al, JVS 2012).

Conclusions: Combination of CDP and LVSEA is effective to improve lymphedema in the breast cancer related patients. Further study is needed to improve patency rate in LVSEA.

PRIMARY AND SECONDARY CHYLOUS ASCITES: DIAGNOSTICS AND THERAPEUTICAL OPTIONS

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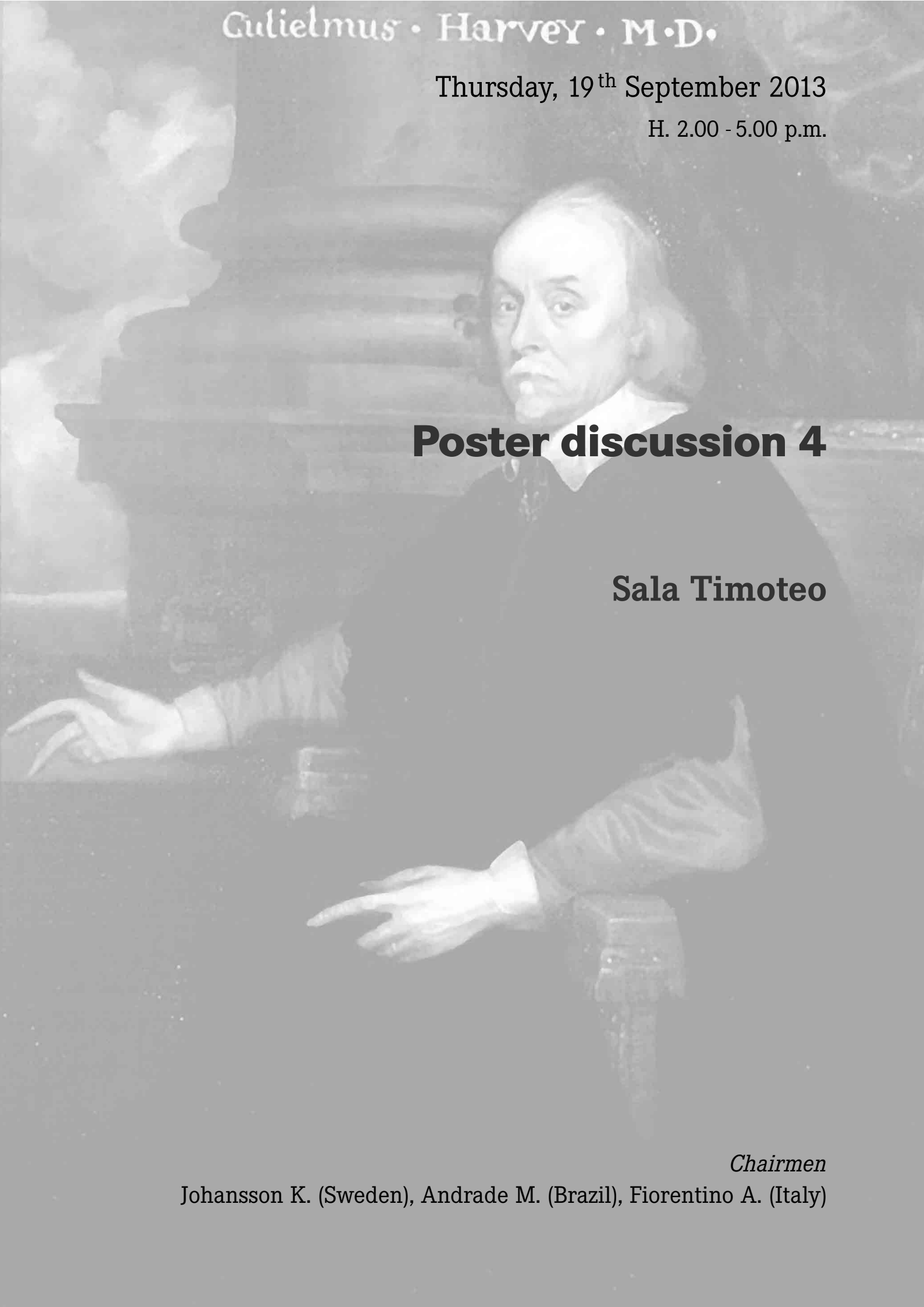
The most common cause of chylous ascites is congenital lymphatic abnormalities in children and malignancy involving the abdominal lymphatics and lymph nodes in adults. Also postoperative injury to abdominal lymphatics may result in chylous ascites. Acute abdominal pain with peritonitis due to sudden extravasation of lymph into the peritoneal cavity is a rare condition that is often mistaken for other causes of acute abdomen. The diagnosis of spontaneous chylous peritonitis is rarely suspected preoperatively, usually misdiagnosed with diverse common surgical emergencies. A variety of treatment options have been proposed for the management of chylous ascites. However, their effectiveness in idiopathic or primary form is variable. No gold standard treatment has been defined so far. Preoperative accurate diagnostic assessment includes lower-limb lymphoscintigraphy, lymphangio-MR, but lymphangio-CT remains the main investigation. Between September 2009 and April 2012, forty-eight patients (37 males, 11 females) with lymphatic leakage in form of chylous ascites, 3 of whom with acute occurrence of the pathology (chylous peritonitis), underwent a complete diagnostic assessment, based on which a proper therapeutical strategy was performed. All of these cases were refractory to conservative treatment (total parenteral nutrition and somatostatin analogue). Surgery, performed after a fatty meal, included laparoscopic and laparotomic approaches, LASER techniques, and microsurgical reconstructive procedures. No recurrence of chylous ascites occurred in all patients except one, in whom a peritoneal-jugular shunt (Denver's valve) was placed to treat recurrent ascites. An accurate diagnostic assessment and a proper therapeutical approach demonstrated to be effective in refractory chylous ascites.



Thursday, 19th September 2013

H. 2.00 - 5.00 p.m.

Poster discussion 4

Sala Timoteo

Chairmen

Johansson K. (Sweden), Andrade M. (Brazil), Fiorentino A. (Italy)

LIPEDEMA. IS ÆSTHETIC CELLULITE AN AGGRAVANTING FACTOR FOR LIMB PERIMETER?

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The case of a 31-year-old female patient is reported who had a family history of leg edema and telangiectasia. Since her adolescence, she observed leg edema in the evening and night. She also complained of leg pain during the menstrual period and of the worsening of cellulite in the thigh region. The patient was submitted to ten 60-minute treatment sessions (three times per week) using the following therapeutic resources: mechanical and manual lymph drainage (Godoy & Godoy). At the end of the treatment program, the patient presented with perimetric reductions of up to 4 cm around the abdomen, 3 cm around the thighs and 1.5 cm below the knees. The aim of this study was to demonstrate reductions in perimetric measurements in patients with lipedema and cellulite.

ADAPTED PHYSICAL ACTIVITY AND LIPEDEMA: OUR EXPERIENCE

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The adapted physical activity (APA) today is part of the concept of total care of the patient suffering from lipedema. The illness, which in advanced clinical stages causes complex disabilities affecting the large joints of the limbs, the muscles, the nervous system (exaltation of pain decrease in the threshold) needs of constant monitoring and complementary therapies as radiofrequency, the radial shockwaves, to mesotherapy, the manual lymphatic drainage and bandaging.
A therapeutic protocol based on physical programmed exercises, repeated daily, allows these patients to control body weight and, at the same time, to maintain the trophism limb muscle and the functionality of the large joints.
In this preliminary study were examined 35 females (aged between 23 and 58 years old) at second and third clinical stage of lipedema. All subjects underwent 3 session/weekly of adapted physical activity at home and repeat the same exercises every day to home.
After a month of APA the results show: average pain reduction of 150% (Pain scale), mean increase in joint functionality (ROM) of 23%; increase in strength and muscular endurance by 25%.
The study demonstrates the importance of the APA in improving the quality of life of patients with lipedema and suggests us use these protocols even in the context of other unabiliting peripheral vascular disease (first of all the primary and secondary lymphedema).

LYMPHŒDEMA AND TERMALISM

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This paper discusses the beneficial aspects of the lymphatic treatments currently in use in hydrotherapy.
After a brief historical outline of the pathogenesis of lymphoedema both primitive and secondary, we will describe the modern therapeutic strategy of this disability consisting decongestive combined intergrated treatment (TDCI) in a thermal environment taking into account the healthy physical and biochemical components of water and its effects on the human body.
After dealing with the direct impact of thermalism hydrotherapy on the lymphatic circle both in a collective or individual treatment, it is important to focus our attention on a particular aspect of this treatment that is the psychological impact it has on the sick people who assume a more positive attitude towards the disease and have a different approach to interpersonal relationships.

GAINING GOOD OUTCOMES IN A COST EFFECTIVE MANNER WHICH EMPOWERS THE PATIENT. MEETING THE CHALLENGES OF SELF-BANDAGING

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Introduction: Bandaging, garments and MLD play an important role in the management of lymphoedema. These treatments are normally undertaken by a therapist. This is acceptable and expected, but patients, in rural/remote areas and those in developing countries, or who are isolated from therapists can be empowered to undertake more of their own management if they want. Already we encourage them to exercise, don/doff garments, take care of their skin, undertake simple MLD, but warn them off bandaging, even though its more effective than compression hosiery. Of course there is a danger when bandaging is not the right pressure or pressure gradient, or the wrong bandage is selected, but bandaging is still acknowledged as a key component of lymphoedema management. (ILF Position Document on Compression Bandages 2012). Bandaging is usually well accepted by patients but they regularly complain about its bulkiness and the fact that they prevent them from free movement and bending. Self-bandaging is often perceived as a lengthy and a difficult learning process. A major risk is applying too much pressure or not the right pressure gradient.
Aim: The objective of this study is to evaluate a new prototype of bandage designed for self-bandaging. Its characteristics are easy and fast to apply, doesn't require significant special training, mechanically limited stretch (to avoid risks of applying too high pressure); not bulky like traditional bandages and has a combination of high working and high resting pressure

Methods: The prototype bandage will be applied to the limbs of 10 women in this exploratory trial with early to middle stage (fluid rich stage) lymphoedema of the arm following breast cancer treatment.. There will be a two week wash where no active treatments or bandaging were used. The contra lateral limb will serve as a control. Perometry will be used to determine limb circumferences and volumes, Bio-impedance spectroscopy will be used to measure whole limb fluid content, Dielectric Constants used to measure point fluids. Lym QOL will assess subjective changes. Undergarment pressure monitoring will determine upper and lower arm under-bandage pressures. Limb measurements will be taken at baseline, then at one, three hours and after their overnight use and then at the end of one week of use. Bandaging will be in addition to the normal patient management regimen.

Results and Discussion: This study is in progress and the outcomes will be presented at the congress. It is speculated that the ability of the patient to add a further self management task to their current regimen of home based management will lead to improved objective and subjective outcomes. Self management is of critical importance when trained therapists are not available in rural, remote areas and in developing countries but also an option for those who would like more control.

SATISFACTION GAINING CONTROL OVER THE HABIT OF WEARING EFFICIENT COMPRESSION GARMENT FOR A WOMAN WITH SECONDARY ARM LYMPHŒDEMA

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Introduction: Wearing a compression garment is a basic, but often stressful treatment for women with lymphoedema following breast cancer treatment. The problem of gaining control over the habit and efficiency of compression garments was initially observed among several patients and resulted in this evaluation for one woman over a year.

The aim: The aim of study is to compare two different approaches towards gaining control over the habit of wearing efficient compression garment. One year of traditional habit of getting new garment every third month, and one year with new garment after third month and altered garment by sewing after wear and reduction of efficiency.

Methods: A single case study, a woman registered as a patient at the Lymphodema Unit participated. The woman used compression garment regularly and has performed self-care with lymph drainage. Between 2011 and 2012 the woman has used bandage at night with custom made sleeve of Mobiderm, a sort of padded material, twice a week and Mobiderm without bandage other nights of the week. Since 2012 she has changed that to only use the custom made sleeve of Mobiderm every other night of the week. A local lymph and physiotherapist has given lymph drainage once every two weeks during the whole year. To evaluate the use of compression garment here called a devise and the service around the assessment, the Quebec User Evaluation of Satisfaction with assistive Technology was used. A Visual Analogy Scale was used to compare the differences between the two years.

Results: A significant satisfaction was the medium score for wearing the compression garment was 4, 57 out of 5.00 possible, 5, 0 for service and 4, 72 for wearing compression garment and service together. 1 represent not satisfied and 5 represent not satisfied. From all the variables the woman chose durability, comfort and effectiveness as the three most important. The two questions supplemented to evaluate one year of traditional habits of wearing compression garments the woman scored 32 mm. To evaluate one year of altered compression garment by sewing after wear and reduction of efficiency the woman scored 90 mm. 58 mm of a difference.

Conclusions: To offer this method by evaluating two different years of approach, can improve for women with lymphoedema to gain control over the habit of wearing efficient compression garment in comparison with wearing old garment.

NAVIGATING THE EXTENDED SURVIVORSHIP CONTINUUM: BREAST CANCER PATIENTS' PERSPECTIVES FROM DIAGNOSIS THROUGH 84 MONTHS POST-TREATMENT

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Introduction: This qualitative study explores breast cancer survivors perspectives' regarding their survivorship experiences from diagnosis through 84 months post-treatment for breast cancer.

Methods: The sample (n=350 from diagnosis through 30 months and n=219 from 36 months through 84 months) included women with newly-diagnosed breast cancer (stages I-IV) undergoing treatment at a Midwestern university-affiliated cancer center. Participant treatment protocol history included surgery, radiation, chemotherapy, and/or hormonal therapy. Semi-structured interviews using the Lymphedema and Breast Cancer Questionnaire (LBCQ) were administered to participants at time of diagnosis, post-operative, every 3 months during the first year, and every 6 months thereafter through 84 months. Grounded theory methodology was used to analyze participants' perspectives regarding their experiences of breast cancer survivorship and lymphedema.

Results: Themes elicited from the data are categorized as 1) lymphedema symptom experiences and management practices, 2) health promotion and disease prevention practices, and 3) psychosocial considerations. Participants throughout the 84 month study period consistently attribute positive worldview, positive spiritual and religious experiences, and social support as essential to their overall survivorship experiences. Survivors report using complementary alternative therapies and faith-based healing as adjunct therapies for symptom management. Breast cancer survivors with lymphedema reflect a continued need for on-going lymphedema educational support from health care providers regarding lymphedema risk reduction, surveillance, and symptom management.

Conclusion: Qualitative data show that breast cancer survivors perceive positive psychosocial variables (i.e., worldview, spirituality, and social support) as having the greatest impact on their breast cancer and lymphedema outcomes throughout the extended survivorship continuum. These findings are consistent with a psychoneuroimmunology (PNI) model of health. Furthermore, survivor perspectives offer evidence that a spiritual transformation occurs during breast cancer survivorship. Implications for future research include exploring the therapeutic benefit of a spiritually-based PNI intervention for managing post-treatment-related symptoms including lymphedema, as well as studying the physiological changes associated with spiritually-based PNI therapies. This project applied archived data obtained from research studies at the University of Missouri supported by Grant Numbers 1 R01 NR05342 and 1 R01 NR010293 (Armer, PI) from the National Institute for Nursing Research, National Institutes of Health; MU PRIME fund, University of Missouri; and Ellis Fischel Cancer Center research gift funds.

POLE WALKING FOR WOMEN WITH BREAST CANCER-RELATED ARM LYMPHEDEMA

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The benefit of exercise for breast cancer treated women is well documented. However, studies of cardiovascular fitness training for women with breast cancer-related arm lymphedema are rare. The purpose of this study was to investigate the effects of intensive pole walking on arm lymphedema in women treated for breast cancer. Thirty-five women with unilateral lymphedema were included and twenty-three completed an eight week exercise intervention consisting of pole walking 3-5 times per week, for 30-60 minutes, at 70-80% of their maximum heart rate, preceded by a two week control period. Measurements of arm lymphedema (water displacement method), body weight, cardiovascular fitness (sub-maximal bicycle ergometer test), and subjective assessments (DASH; heaviness and tightness using VAS; well-being) were performed before the control period and before and after the exercise intervention. The results show a significant reduction in total arm volume of the lymphedema arm (p=0.001), in lymphedema absolute volume (p=0.014) and lymphedema relative volume (p=0.015). Significant decreases of heart rate (p=0.004), DASH score (p=0.053) and rating of tightness in the arm (p=0.043) were found. Positive and negative influences on well-being were reported. The conclusion of this study is that pole walking is feasible for breast cancer treated women with arm lymphedema.

LYMPHEDEMA QUALITY OF LIFE INVENTORY (LYQLI) – TEST OF VALIDITY AND RELIABILITY

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Introduction: Lymphedema has a significant impact on quality of life and several questionnaires have been developed for either upper or lower limbs. However, there has been a lack of instruments designed for measuring Health related quality of life (HRQOL) in patients with all kinds of lymphedema. Recently a general questionnaire; Lymphedema Quality of Life Inventory (LyQLI) has been developed. The LyQLI is vertically arranged on an A4, including five pages. The first page has a short description of the questionnaire and how to answer it, related to the past four weeks. The next part contains three pages with 41 items divided into three dimensions; physical (12 items), psychosocial (16 items) and practical (13 items). The last page consists of two questions whether the past four weeks had been as usual or not and one question about overall impact on HRQOL related to lymphedema and one about general quality of life.

Purpose: The aim of present study was to test LyQLI for reliability and validity in Sweden.

Method: Two-hundred patients with different kinds of lymphedema were included and LyQLI was sent to the patients twice, together with SF-36 for measurement of general health.

Results: One-hundred twenty-six patients (lymphedema of the lower limbs/upper limbs/others 55/40/5%) completed the test-retest. Median respondent time for test-retest was 10 days. Reliability: ICC in the physical and psychosocial dimension were 0.88 ($P < 0.01$) and in practical the 0.87 ($P < 0.01$).Cronbach's alpha was 0.88/0.92/0.88 for each of the three dimensions respectively. Criterion validity: The correlations were low or moderate for the mean score in the three dimensions in the LyQLI and the eight domains in the SF-36. Floor-ceiling: The skewness characteristics show that there is a tendency to a small floor effect.

Conclusion: The new questionnaire, LyQLI, is valid and has a good reliability. It can be used in clinic and for cross-sectional studies. Further studies of LyQLI is needed to investigate the responsiveness in interventional and longitudinal studies.

INDICATORS OF HUMAN LYMPH IN NORMAL AND SURGICAL PATHOLOGY

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Russia

The development of any disease, which is encountered in surgical urgentologi is subjected to violation of the composition of the lymph, which depends on the nature and the extent of the pathological process.

Purpose: To determine composition of the lymph and the changes in surgical pathology.

Materials: The work is based on a survey of 188 patients (89 men and 99 women) with a different surgical pathology (48 - with thoracic lymph duct drained out, 140 - catheterized lymphatic vessel on the tibia.
The research revealed that the density of lymph an average of 1018 g/l. Reaction lymph alkaline pH is 8.77. The viscosity of the lymph is 1.67 mPas. The freezing point is 0,619°C. The volume of the circulating lymph is 1368.0 mL, the pressure at rest ranged from 0.17 to 0.97 kPa. Limfoplazma contains protein, on the average of 36.5 g/l, albumins-22.9 g/l. Globulin is 12.9 g/l, albumin-globulin ratio is equal to-2.Lymph of thoracic duct contains fibrinogen 2.0+0.09 g/l, it coagulates forming a loose cluster, consisting of strands of fibrinogen.
The main electrolytes lymph are sodium (125.4 mmol/l), potassium (3.5 mmol/L), calcium (2.2 mmol/L), magnesium (0.9 mmol/L), chloride (95.0 mmol/l). Protein in an alkaline environment of the lymph acts as an anion.Water is 950.0 g/l.
The chemical composition of the central lymph: ammonia-30.0+1.0 mmol/l, residual nitrogen-11.1+0.3 mmol/L, urea - 4.8+0.004 mmol/L, creatinine-0.03+0.007 mmol/L, bilirubin -17.0+1.0 mmol/L, total lipids-2.75+0.003 g / l, lipoproteins-4.5+0.01 g / l, triglycerides-1.0+0,04 g/l, non-esterified fatty acids -4.0+0.02 mg/l, cholesterol-4.0+0.04 mmol/l.
The number of leukocytes in the central lymph normally is 4100+450 in mcl, no red blood cells, platelet count not more than 30,000 in mcl., wbc in the central lymph: lymphocytes-91%, eosinophils-2%, neutrophils-1%, monocytes-5%, histiocytes-1%.
The release rate of lymph from the lymphatic vessel in the lower leg was 0.001 ml/h to 2.0 ml/h, and the concentration of protein - from 0.3 to 2.2 g/l. At night, the rate of lymph flow decreased to 0.001 ml/h. In the morning the lymph flow rate increased, reaching a peak at 12 a.m (2.0+0.1 ml/h). By 1 p.m the lymph flow rate was reduced to 1.10 ml/h. A second increase in the rate of lymph occurred after 3 p.m, reaching its peak at 8 p.m-1.52+0.05 ml/h. A changing of these parameters may serve as differential diagnostic and prognostic signs of pathological processes in the human body.

ACTIVITY LIMITATIONS, STRATEGIES AND LIFE SATISFACTION AFTER BREAST CANCER SURGERY - A COMPARISON AFTER DIFFERENT KINDS OF AXILLARY SURGERY

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Breast cancer surgery often involves axillary surgery to stage the nodes for lymphatic spread. Formerly ALND (axillary lymph node dissection) was the standard axillary treatment. Today SLNB (sentinel lymph node biopsy) often is the treatment of choice as it is believed to reduce arm morbidity. The aim of this study was to explore activity limitations, symptoms and life satisfaction of breast cancer operated women in relation to axillary treatment.
Questionnaires were sent to 99 women operated for breast cancer, 88 (89%) responded. Although the result showed a higher degree of symptoms among women operated with ALND compared to women operated with SLNB or SLNBS (SLNB with sampling) there was no significant difference between groups regarding activity limitations. Heaviness and fatigue in the affected arm were present to the same extent regardless of the choice of axillary surgery. Strategies used were planning work, household shores and leisure, taking frequent pauses and taking help from others. The women's satisfaction with life in general matched that of a referee group in a normal population Swedish women, except in the domain sexuality where satisfaction was substantially lower than that in the referee group (p=0.019). Neither activity limitations nor symptoms co-variated with women's general life satisfaction. This study indicates that also women operated with SLNB and SLNBS experience activity limitations in daily life and may risk developing lymphedema. These women too benefit from occupational therapy interventions.

PREOPERATIVE PREPARATION FOR THE THIRD HIP REPLACEMENT SURGERY OF A PATIENT WITH GRADE II LEG LYMPHEDEMA

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The objective of this study is to report on intensive treatment to reduce the volume of a lymphedematous leg in the preoperative preparation for a third hip replacement surgery. The patient, with grade II leg lymphedema, was treated using Mechanical Lymphatic Therapy and Manual Lymphatic Therapy associated with a grosgrain compression stocking.
The case of a 75-year-old patient is reported. The patient, with leg lymphedema, arrived at the Clinica Godoy for treatment in June 2012. At 45 years old (1982), the patient complaining of pain in the left hip had been to an orthopedic surgeon who indicated hip replacement surgery. One year later the patient performed the same surgery in his right leg. At this time, slight edema of the ankles in particular of the left leg was noted.
At the age of 68 years old (2005) the patient replaced the left hip prosthesis. In 2011, the edema had spread to the entire left leg, and the joint pain had increased in intensity; using the Analog Pain Scale of 0-10, the patient reported that, on-and-off, it increased to 8. He returned to the orthopedist who indicated a third left hip surgery to replace the prosthesis, however he recommended treatment of the edema by a vascular specialist prior to surgery. The patient was diagnosed as having lymphedema of both legs in the Clinica Godoy. He was evaluated by bioelectrical impedance, which calculated volumes of 5.52 and 7.24 liters for his right and left legs, respectively.
Five consecutive days of intensive treatment was proposed including Mechanical Lymphatic Therapy (RAGodoy®) for 8 hours/day and a grosgrain compression stocking for 24 hours/day with adjustments in size every day. By Day 5, the patient had a significant improvement in the volume of both right (4.45 liters) and left legs (5.57 liters). Monitoring was by routine assessments and guidance about the use of the grosgrain socking and walking to maintain the results. After total reduction of the ede ma, the patient was submitted to surgery to replace the prosthesis.

ENDOLYMPHATIC HEMOSTATIC THERAPY OF ACUTE GASTRO-DUODENAL EROSIVE HEMORRHAGE OCCURRING ON THE BACKGROUND OF CARDIOVASCULAR DISEASE

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Introduction: Increasing the degree of cardiovascular disease severity in recent years has led to an increase of acute gastric mucosal ulcers and duodenal ulcers, and consequently an increase of their hemorrhagic. These hemorrhages are often quite intense and existing methods of emergency gastrointestinal hemorrhage of non-ulcer nature do not always satisfy physicians. Thus mortality of such category of patients having the above type of hemorrhage may reach 6,5-11,3%. The most important in the outcome of the disease is the possibility to prevent hemorrhage backset by reaching maximum stable hemostasis. In particular in 35% of cases of hemorrhage backset mortality was about 12-15% among patients having hemorrhagic erosive gastritis.
Objective: Improving the efficiency of treatment gastro-duodenal hemorrhage which occurs on the background of cardiovascular disease with the help of using endolymphic hemostatic therapy based on the monocyte-macrophage mechanism of hemocoagulation. Interrupted monocyte-macrophage hemostasis occurs in case of acute gastro-duodenal erosive hemorrhage that developed on the cardiovascular disease background . This results in a decrease of hemostatic potential of monocytes , macrophages and lymphocytes in the lymph bed. The endolymphatic administration hemostatic agents is needed in this case to effect control over hemorrhage from acute peptic ulcer and to realize hemorrhage backset secondary prophylaxis. The advantage of this method is based on the fact that by introducing the endolymphatic hemostatic substances hemostatic potential in monocytes, macrophages and lumphocytes is enhanced up to clinically significant values and this potential is delivered by these cells to hemorrhage locus . Hemostatic implementation occurs directly in hemorrhage locus under the influence of the factors involved in the activation and running the monocyte-macrophage mechanism of hemocoagulation. Actually we witness stable blood coagulability outside the focus of tissue destruction that does not affect its rheological properties while applying the above technique. This circumstance allows to reduce the risk of complications connected with a hypercoagulable state and more efficiently and overwhelmingly use the whole spectrum of hemostatic drugs and techniques. The proposed method of intralymphatic therapy can improve the results of treatment of patients suffering from acute gastro-duodenal hemorrhage from stomach ulcer and duodenum mucous membrane, impeove treatment period, reduce the number of complications connected with hypercoagulability, reduce mortality rate.

PROPHYLACTIC ANTIBIOTIC PRESCRIBING FOR CELLULITIS IN LYMPHŒDEMA

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Prophylactic antibiotics may be an important weapon in preventing recurrent cellulitis attacks in lymphoedema patients[1]. A consensus document was produced by the BLS in 2006, updated in 20101, to standardise prophylactic antibiotic prescribing in the UK. Antibiotics were recommended for lymphoedema patients suffering from ≥2 episodes of cellulitis in any 12 month period. The antibiotic advised was penicillin V (erythromycin if penicillin allergic) for 12 months, becoming lifelong if further episodes developed on prophylaxis. St George's Hospital Lymphoedema Service forms an important referral destination for patients with lymphoedema in the UK. An audit in 2009 demonstrated that 84% of patients with cellulitis were recommended treatment in accordance with the consensus document. The aim of the current audit was to complete the audit cycle and re-audit prophylactic antibiotic prescribing in lymphoedema patients seen at St George's Hospital.
In this preliminary study, 108 patient records were randomly selected. Those patients seen between July 2009 and May 2013 were included in the study (n=85; 28 men, 57 women; age 56±20 years, mean±s.d., 46 primary, 39 secondary lymphoedemas). 23 patients developed an episode of cellulitis during the study period, with a total of 37 clinic appointments requiring a decision to be made regarding prophylactic antibiotics.
In 12/14 cases prophylactic antibiotics were commenced in accordance with consensus guidelines. 16/23 cases were correctly advised not to take prophylactic antibiotics following only a single episode of cellulitis. In total, 28/37 (75.7%) cases followed the consensus document guidelines. Of the 9 remaining cases, 7 were prescribed antibiotics when guidelines suggested they were not indicated and 2 were not given antibiotics despite meeting criteria. Guideline recommendations for choice of antibiotic were followed in 16/19 episodes.
In conclusion, there has been a reduction in compliance with the consensus document from the previous audit, although guidelines are being followed in 75% of cases. The reasons for this are not yet known but could be a result of reduced guideline awareness amongst new staff or could represent a difference of opinion regarding cellulitis management between the prescriber and current guidelines. An education programme of staff regarding the consensus document and its application in individual cases may improve compliance for prophylactic antibiotics prescribing.

1. British Lymphoedema Society. Concensus document on the management of cellulitis in lymphoedema. http://www.thebls.com/concensus.

PREDICTIVE FACTORS IN THERAPHEUTIC RESPONSE OF BREAST CANCER TREATMENT RELATED LYMPHEDEMA

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Intro: CDT is the first choice in lymphedema's treatment. Despite the good responses, not every patient reach the best results, that is the normalization of the arm volume.

Objectives: To analize the predictive factors of therapeutic response en breast cancer treatment related lymphedema

Methods: Randomized controlled trial of lymphedema response to CDT in 66 woman, patients of the INCA (Instituto Nacional de Câncer, Rio de Janeiro, Brasil). The patients were asigned to two groups: A. intervention group (CDT: skin care, MLD Vodder, compressive therapy – multilayer bandage, excercises); B. Idem wo/ MLD. The treatment was performed 3 times a week, till the complete reduction of arm volume. (Phase I). Reduction in percentage of volume excess (RPEV) was considered outcome. For evaluation of predictive factors social, demographic and clinical characteristics were colected and a descriptive analysis was made. One-way anova test was performed for media comparation.

The trial was aproved by the Ethical Comitee of INCA.

Results: From the 66 woman initially selected, 7 (10.6%) were exclude. Treatment was perform for 24 days (± 12.38). Volume excess at the begining was 776.16ml (± 490,82) and 494,51ml (± 315,95) at the end. This represent a reduction of 281,65ml (± 196,32), p=0.0001.
Relatively the volume excess was 44,20% (± 26,83) at the begining and 29,18 (± 17,09) at the end, that means a volume excess reduction media of 15,02% (± 13,21) (p=0,001).
At the begining of the lymphedema therapy, patients with incomplete range of motion (p=0,010) and lymphoestatic fibrous (p=0,009) showed a statistically significant reduction in REPV. The presence of arm paresthesia was associated with worst therapeutic response (p=0,024). The previous oncologic treatments and clinical variables did not affect the limb volume reduction.

Conclussion: The clinical conditions at the begining of the treatment are asociated as predictive factors with the treatment response.

THE COMPLEX TREATMENT OF PATIENTS DISEASED BY LYMPHEDEMA OF LOWER EXTREMITIES WITH APPLICATION OF GRAVITATION THERAPY EQUIPMENT

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There was made an observation of 52 patients (19-64 years old), of which: 13 patients – with the primary lymphedema of lower extremities – and 39 with the secondary disease; stage I was found out at 9 patients, stage II at 26 and stage III at 17 persons.
During the treatment the complex of methods was applied, incl. medicamental support, intermittent pneumatic compression, laser therapy, magnetotherapy, ultraviolet blood irradiation and photodynamic therapy. The gravitation influence was made at a tester of artificial gravitation (patent of Russia N° 99968, 16.06.2010) with the speed of 29-34 revolutions per min. The quantity of sessions equaled 10-12 and the length of each one – 8-10 min.
The results showed that in case of complex treatment all patients paid attention on subjective positive results: disappear or reduction of sense of heaviness and bursting of affected extremity. In case of measuring of extremity circumference it was noticed its reduction, especially considerable for most of the patients with stages I and II. In accordance with ultrasonic scanning of soft tissues of extremity, after the treatment in addition to reduction of their thickness it was observed the structure changes such as disappear or reduction of hypoechoic lumps of hypodermic layer. As the exceptions there were the patients with fibrous changes of soft tissues and most of them were at stage III of lymphatic edema. The results of fulfilled laser biophotometry, computer termography showed the increase of microcirculation in distal part of extremities. Based on the results of lymphotropic test and lymphoscintigraphy there was noticed the ascension of a resorption function of lymph o utflow for 34% of patients at stages I and II. Thus, the effectiveness of application of the gravitation therapy as a part of complex treatment of patients with lymphatic edema of extremities mainly depends on the stage of the disease. In case of initial changes of tissue of extremities, that mainly typical for stage I and II of lymphedema, the tendency for fluctuation and reduction of an edema is higher than for stage III. Apparently, it is attributed with increase of lymph outflow that depends on increased lymphization and stimulation of activity of lymphangions as an answer for gravitation influence. In case of growth of diffusive fibromatous changes of soft tissues to stage III of disease, the stimulation of lymph outflow during the gravitation therapy is less effective.

SURGICAL TREATMENT OF PATIENTS WITH LYMPHEDEMA OF THE SCROTUM AND PENIS

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Primary lymphedema scrotum and penis may develop at different ages and has approximately the same frequency distribution for men. According to the literature, the number of observations in these patients by different authors, usually small, ranging from isolated cases to 10-30. The relevance of this problem is caused by several factors. Recurrent erysipelas may cause a marked increase in the volume of the affected tissues, accompanied by lymphorrhea. Patients keep showing a significant decrease in quality of life, limiting, among others, and sexual function. Surgical treatment is often associated with blood loss and postoperative infectious complications, especially for a large volume of the affected tissues. Lack of adequate compression therapy leads to a further increase is the cause of relapse. The aim of the study was to investigate the immediate and long-term results of treatment of patients with primary lymphedema of the external genitalia.
We have been observed from 2001 to 2013 eight patients with primary lymphedema of the external genitalia, aged 14 to 52 years. Recurrent erysipelas and balanoposthitis have been occurred in 4 patients, lymphorrhea – in 2 patients and papillomatosis of the scrotal skin – in one. Three patients was undergone resection operation on the scrotum and circumcision, in one patient surgical treatment was limited by c circumcision.
One man in the postoperative period marked by necrosis of the skin of the penis, the year he was undergone re-resection operation on the scrotum, resection of soft tissue of the penis. In connection with the formation of rough scar on the penis after 2 years of plastic surgery performed with excision of the scar and the formation of the penis, the displaced flap of the right iliac region. Other patients had no complications. Follow up results during one year was good.
Conclusions. Primary lymphedema of genitalia is rare disease of in men in Russia. Surgical treatment of primary lymphedema of external genitalia require surgery in patients with a significant increase of the affected tissues, recurrent erysipelas in remission. The complex decongestive treatment before surgery is appropriate in patients with large volume of affected tissues. Bandaging of the scrotum and penis is nesessary immedieately after surgery. In the early postoperative period is necessary to continue this one to the selection of medical compression hosiery with distributed pressure in the perineal area.

THE EXPERIENCE OF LYMPHOLOGICAL OUTPATIENT UNIT OF *ASSOCIAZIONE LOTTA AL LINFEDEMA* (ASSOCIATION TO FIGHT LYMPHEDEMA)

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Associazione Lotta al Linfedema was founded in Udine in March 2009.
Statutory objectives are the improvement and dissemination of knowledge related to functioning and disorders of lymphatic system, as well as all the related issues, with particular emphasis on rehabilitative, medical and social aspects.
Among the services offered by the Association there is a Lymphological Outpatient Unit, which provides visits for people with lymphedema or suspected to have it. Its activity started in 2010.
The poster displays data of three years of this activity, relating to visit modalities, distribution of the problem in relation to body location, etiology, severity and kind of diagnostic and therapeutic prescriptions.

LOCAL IMPEDANCE MEASUREMENT FOR THE ASSESSMENT OF ŒDEMA IN PATIENTS WITH SECONDARY LOWER-EXTREMITY LYMPHŒDEMA

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Objective: Patients with ipsilateral lymphoedema frequently perform self-care that concentrates on the affected leg. In some patients, however, oedema may also be expected to develop subsequently in the unaffected leg. We investigated whether bioelectrical impedance (BI) can be used to assess the state of local fluid accumulation and predict the status of oedema in the unaffected leg.

Methods: The subjects were 70 patients who had either been examined in the lymphoedema clinic at A University Hospital, or who had been examined as outpatients between September and November 2012 in the Department of Gynecology at A University Hospital and had undergone intrapelvic lymph node dissection during gynaecological surgery. All patients consented to participate in this study. The parameters investigated were age, height, weight, oedema stage, circumferences of both legs, and BI. BI was measured by using four electrodes 1 cm apart, with measurements performed at two sites: one in the centre of the calf and one on the inner thigh above the patella. Staging was determined by a therapist with reference to the International Society of Lymphology staging system. Analysis was performed using the Kruskal-Wallis test for differences in measured values between stages, and the Jonkheere-Terpstra test for trends according to stage progression. This study was approved by the Ethics Commi ttee of the institution concerned.

Results: The subjects of the analysis comprised 24 Stage 0, 21 Stage I, 22 Stage IIa, and 16 Stage IIb patients. In terms of basic attributes, age differed significantly between the different stages, but there was no difference between them in terms of height, weight, or BMI. The circumference of the affected leg differed between stages (calf, $p = 0.001$; thigh, $p < 0.001$), and increased in accordance with stage progression (calf, $p < 0.001$; thigh, $p < 0.001$), but no such difference was evident for the unaffected leg. BI, however, differed significantly between stages for both the affected and unaffected legs (affected leg: calf, $p < 0.001$; thigh, $p < 0.001$; unaffected leg: calf, $p = 0.001$; thigh, $p = 0.010$), and also increased in accordance with stage progression (affected leg: calf, $p < 0.001$; thigh, $p < 0.001$; unaffected leg: calf, $p < 0.001$; thigh, $p = 0.002$).

Conclusion: Our results suggest that it may be possible to use BI as an early predictor of oedema. Oedema may develop in the unaffected leg even if there is no change in its circumference.

ARM DERMAL BACKFLOW (ADB) STAGE: INDOCYANINE GREEN LYMPHOGRAPHY FOR PATHOPHYSIOLOGICAL EVALUATION OF ARM LYMPHEDEMA

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Background: Arm lymphedema treatment is challenging, and emphasis should be put on early diagnosis and prevention of lymphedema secondary to breast cancer treatment. Indocyanine green (ICG) lymphography is becoming a modality of choice for evaluation of lymphedema. This study aimed to demonstrate characteristic findings of ICG arm lymphography, and develop a new severity staging system.

Methods: Twenty patients with secondary arm lymphedema after breast cancer treatment underwent ICG lymphography. ICG lymphography findings were recorded and analyzed according to corresponding clinical stages and duration of edema. Based on changes in ICG lymphography findings with progression of lymphedema, a new severity stage, arm dermal backflow (ADB) stage was developed and compared with clinical stages.

Results: The ICG lymphography findings were classified into two large groups: linear pattern (LP) and dermal backflow (DB) patterns. The DB patterns could be subdivided into splash, stardust, and diffuse patterns. The DB patterns were found more frequently than the LP in the proximal upper extremity. The DB patterns also increased significantly in prevalence overall as the duration of lymphedema increased. The ADB stage was linearly correlated with clinical stage.

Conclusions: ICG lymphography is a safe and convenient evaluation method for lymphedema, allowing pathophysiological assessment of lymphedema. The ADB stage is a simple severity staging system which demonstrates a significant correlation with clinical stage. ICG lymphography may come to play an important role in early diagnosis of secondary arm lymphedema.

ANTIBIOTIC CHOICE FOR TREATMENT IN CHRONIC POSTOPERATIVE OSTEOMYELITIS OF EXTREMITIES

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Purpose: The problem of postoperative osteomyelitis is very important. However the most pathogens are resistant with traditional antibiotic therapy. We use successfully lymphotropic antibacterial therapy at these patients to improve results and overcome resistance. It is necessary to use the drugs blocking the motility of lymphatic vessels and so creating temporary pharmacological block of lymph flow. There are modern antibiotics ampicillin/sulbactam, cafoperazon/sulbactam and imipenem/cilastatin but its direct effect on lymphatic and venous vessels motility is unknown. Some braking action of antibiotics can decrease the tone in venous wall and lead to venous valves failure so triggering venous insufficiency.

Methods: It was investigate the primary antibiotics effect on a part of portal vein and mesenteric lymphatic vessel of white rats. In experiences the standard technique for registration of contractive activity of smooth muscles was used. Amplitude and frequency of phase rhythmical reductions of preparations were registered. On the basis of these data the relative parameter "intensity of functioning of system" (IFS) equal to work of average amplitude of fluctuations on frequency of phase fluctuations of object in a minute and expressed as a percentage was calculated. Preparation IFS before influence of antibiotics was accepted to 100%. Used antibiotics were divorced in three concentrations (minimal inhibitory concentration, maximal serum concentration for intramuscular introduction and concentration that was created in a zone of introduction of the antibiotic). In total it was made on 45 influences on 15 lymphatic and 15 venous vessels.

Results: At impact on the lymphatic vessel of the maximum concentration of antibiotics, phase activity of the vessel was completely blocked (IFS = 0%). When using the smaller concentration, the most expressed brake effect showed imipenem/cilastatin (IFS = 19,2±1,8%) whereas influence ampicillin / sulbactam and cefoperazon/sulbaktam reduced IFS to 80,1±2,4% and 32,3±4,1% respectively. At impact of the maximum concentration of preparations on the vein, IFS of the vessel decreased on the average to 50%. Preparation washing from antibiotics within 10-20 minutes, led to a complete recovery of the phase motility that showed the absence of toxic action of the used concentration in research objects.

Conclusion: So all this antibiotics should be used for lymphotropic antibacterial therapy in patients with postoperative osteomyelitis. However, expressed brake action of preparations on venous vessels motility, these antibiotics should be used carefully in patients with the venous insufficiency.

EFFICACY OF COMPLETE DECONGESTIVE THERAPY (CDT) ON EDEMATOUS RAT LIMB AFTER LYMPHADENECTOMY DEMONSTRATED BY REAL TIME LYMPHATIC FLUID TRACING

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Purpose: Although complete decongestive therapy (CDT) is considered to reduce the volume of lymphedema, there is no concrete evidence to sustain its efficacy. The purpose of the present study was to find new evidence of CDT based on visualizing the changes of lymph fluid accumulating in an edematous limb using indocyanine green (ICG) fluorescent lymphography in real time.

Methods: Twelve lymphedema rats were divided randomly into two groups. On the first day, ICG was injected into an edematous limb of rats, and no-intervention and CDT was applied to groups 1 and 2, respectively, for two weeks. ICG lymphography and circumferential measurements were done every two days in each two-week observation.

Results: A fluorescent flow to the ipsilateral axillary fossa was identified in all rats. In addition, network-like and dermal backflow patterns were observed in the lower legs and thighs. While manual lymph drainage was applied in the CDT group, the flow moved more rapidly through this pathway than that in the no-intervention group. An area of high-intensity fluorescent signals concentrated around the injection sites diminished in the CDT group more than that in the no-intervention-group after two weeks. Circumferential lengths of the edematous limbs were longer than the non-edematous limbs in both groups 1 and 2 on the day of ICG injection. The no-intervention group 1 showed no significance differences during 14 days, whereas the CDT group 2 exhibited very significant differences.

Conclusion: These results suggest that CDT has beneficial effects in lymphedema treatment.

VASCULARIZED GROIN LYMPH NODE TRANSFER IN COMBINATION WITH SUPERFICIAL CIRCUMFLEX ILIAC PERFORATOR FLAP IN HEAD AND NECK RECONSTRUCTION

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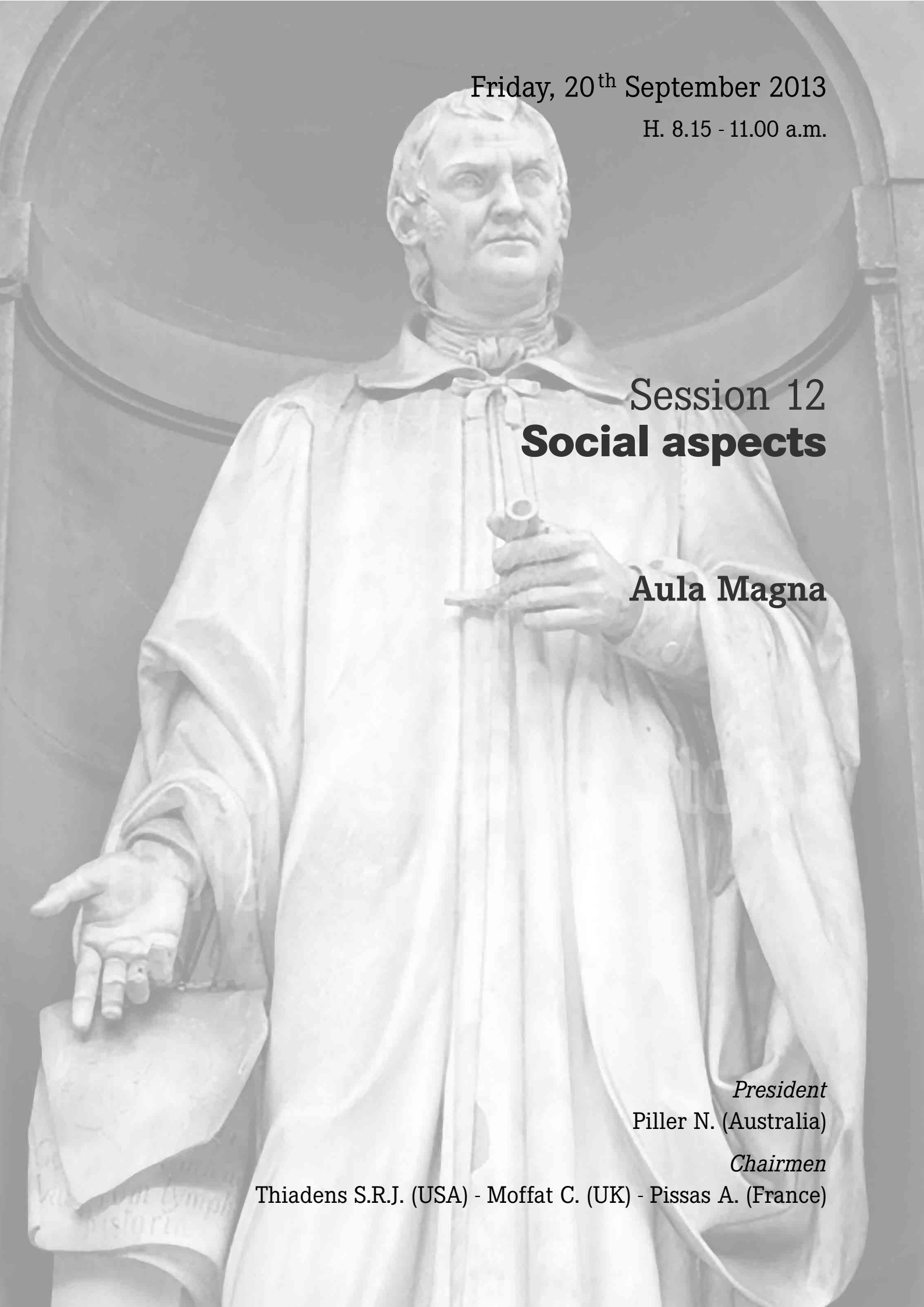
Vascularized lymph nodes (LNs) transfer has been increasingly popular for the treatment of lymphedema. Groin LNs transfer is probably the most commonly performed method. In most reports, groin LNs were harvested within a groin flap, contained in subcutaneous fatty tissue in a nonselective way. Recently, impairment of donor-site lymphatic circulation which might lead to donor-site lymphedema has been reported. Thus, care should be taken to choose and limit the number of LNs to be harvested in the flap. Superficial circumflex iliac perforator flap was first reported in 2004, in which the ”perforator flap” concept was introduced into the conventional groin flap. Since groin LNs are clearly visualized during dissection of vascular pedicle, it is easy to selectively include LNs and control the number of LNs to be harvested. We introduced vascularized groin LNs transfer in combination with SCIP flap for head and neck reconstruction.
Three cases of vascularized LNs transfer in combination with free SCIP flap for head and neck reconstruction were performed. All cases were primary reconstruction after cancer ablative surgery. To prevent donor-site lymphedema, the number of harvested LNs was limited up to three. Postoperative course was uneventful in all cases and flaps survived completely. Survival and active function of the transferred LNs was confirmed using the ICG near-infrared camera. No patient has developed lymphedema in the head and neck region as well as in lower limbs.
The advantages of LNs transfer in combination with SCIP flap are as follows;

1) Prevention of lymphedema can be expected. Although facial lymphedema sometimes occurs after neck dissection, it can be prevented with this LNs transfer with free flap;
2) These LNs can trap the cancer cells and may prevent distant metastasis. Since these flaps are inset adjacent to the surgical margin of the cancer defect, early detection of the cancer recurrence might be possible and therefore might serve as a sentinel lymph node.

Although the significance of the LNs transfer with free flap in head and neck reconstruction remains unclear because of the paucity of the cases, we believe that this method will be an option for vascularized LNs transfer in head and neck reconstruction.



Friday, 20th September 2013

H. 8.15 - 11.00 a.m.

Session 12
Social aspects

Aula Magna

President

Piller N. (Australia)

Chairmen

Thiadens S.R.J. (USA) - Moffat C. (UK) - Pissas A. (France)

INNOVATIONS; WHY ARE WE SO TARDY IN ACCEPTING THEM?

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Many of our treatment strategies are embedded in the history of our knowledge of the lymphatic system, Some have been carried down for so long we have forgotten their true origins, Others are commonly used but lack having a critical scientific eye cast over them and can lack appropriate levels of evidence supporting their use, and yet, we use them without further question.

Many of us treat and manage those we see on the basis of what we learnt. Continuing professional Development programs are meant to update us but we go to them because we have to. New ideas and knowledge are regularly presented, but rarely applied once we return to our practice. We settle back into what we know, what we have support services for and what we are comfortable with. Consumers tend to be the same, happy and content, no change just keep on doing what we have always done but often no real improvement in terms of subjective or objective improvements. That is no change! Is that good enough? Should we not be looking for improvement?.

There thus can be little incentative to change. Further, if we add to this issues of patient re-imbursement for garments, bandaging and treatment change is even less likely to be seen positively

Yet at each of our meetings we will see new ideas and new strategies from manufacturers, scientists and clinicians, new surgical interventions, new garment ideas and bandages, new equipment that consumers or health professionals can use, new tools for early detection of lymphoedema, new means of early detection.

So few of us change; Why? Possibly we have not reached the critical "tipping point" for change. But what is that? It's putting in our faces that what we are doing at the moment may not be well evidenced, looking for but not finding high enough levels of evidence for new ideas, treatments, contradictory meta analyses, or critical reviews of the literature or just views and opinions of others, the health system?

We often listen but not lead. So what are your tipping points for change? This session will present your possibilities and allow you to reflect on them. Change should lead us forward, change can be for the good, but we need to be comfortable and informed.

FACTORS ASSOCIATED WITH SYMPTOMS AND INFECTION OCCURRENCE AMONG INDIVIDUALS WITH SECONDARY EXTREMITY LYMPHEDEMA

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Purpose: Secondary extremity lymphedema is the most common type of lymphedema in the United States, which largely results from cancer and its treatment. Currently, a limited number of studies have been available to examine risk factors related to symptoms and infections in individuals with extremity lymphedema. This study examined factors associated with symptoms and infections among individuals with secondary extremity lymphedema.

Methods: Data were collected from a web-based survey supported by the National Lymphedema Network from March 2006 through January 2010. A total of 1206 participants reported having secondary upper or lower extremity lymphedema. Multivariate and logistic regression analysis was used to examine the factors associated with symptoms and infection among individuals with extremity lymphedema.

Findings/Implications: Distressing symptoms were more likely reported by individuals with lower income (p=.005), no insurance coverage (p=.030), history of surgery (p=.024), history of infection in the affected extremity (p=.020), no self-care (p=.011), and lower extremity lymphedema (p=.037). Individuals with a history of surgery (p<.001), radiation therapy (p=.043), reporting the symptom of heaviness of the affected extremity (p=.016), and with lower extremity lymphedema (p=.004) had an increased likelihood of episodes of infection. Select factors of level of income, insurance coverage status, surgery treatment history, self-care status, and anatomical site of lymphedema were associated with symptom burden among individuals with secondary extremity lymphedema. Symptoms and infection were significantly correlated. Longitudinal studies are needed to identify causative risk factors for symptoms and infection in individuals with secondary extremity lymphedema.

Keywords: Secondary Lymphedema, Risk factors, Symptom, Infection.

QUALITY OF LIFE OF PATIENTS WITH LYMPHŒDEMA

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Aim: Lymphoedema is increasing in western countries, because of increasig incidence of malignant diseases and their treatments. The quality of life of those patients is depended of oedema, but we don't know, how big is the problem.

Methodes: Patients with lymphoedema of the arms and legs fil the same questionary with 10 questions about their life before and after one year of therapy of lymphoedema.

Results: Before therapy: at 24% of patients oedema have no influence of their quality of life; at 16% of patients the influence is small; at 22% of patients the influence is moderate; at 27% of patients the influence is big and at 11% influence of oedema is very big on the quality of their life. After one year of therapy of oedema (first decongestive therapy with short-strech bandages, than with compression garments) patient again answered the same questions. In 47% oedema has not influence on quality of life; at 32% the influence was small; at 17% was moderate influence; at 2% big and at 2% remaine still very big influence of oedema on quality of life of those patients.

Discussions: The influence of lymphoedema on quality of life dependent of duration of oedema before starting the therapy, dependent of therapy, the stage of lyphoedema and the part of the body were lymphoedema was.

DEVELOPMENT OF A QUESTIONNAIRE FOR MEASURING HEALTH-RELATED QUALITY OF LIFE IN ALL LYMPHEDEMA PATIENTS; LYMPHEDEMA QUALITY OF LIFE INVENTORY (LYQLI)

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Introduction: A questionnaire for patients with all kinds of LE has been developed and tested for validity in Australia. The instrument consists of four dimensions: physical, emotional, social and practical, with in total 61 items. Each item has three sub-items concerning 1) health related quality of life (HRQOL), 2) daily life changes, and 3) how difficult any changes have been. The instrument also includes questions regarding quality of life in general, for a grand total of 188 questions.

Purpose: The aim of the present study was:

- Adaptation of the Australian Lymphedema Quality Of Life Inventory (LQOLI) for Swedish conditions
- Test for reliability and validity of the Swedish version of the Lymphedema Quality Of Life Inventory (SLQOLI)
- Reduction of the large SLQOLI into a smaller and easier to use, Lymphedema Quality of life Inventory (LyQLI).

Methods and Statistics: Adaptation of LQOLI was done by translation from English to Swedish and back. Content validity was tested by a group of experts (n=11). Content and face validity was tested by a group of patients (n=16).

Test-retest of SLQOLI was made in 100 patients. SLQOLI was distributed twice, together with SF-36.

Reduction of the dimensions of SLQOLI was based on factor analysis together with experience from an expert group (n=11). Factor analysis was also performed to identify related items to be reduced or reassembled. Spearman's rank correlation coefficient was used to analyze if the second and third sub-item in the questionnaire was correlated to the first one. Face validity was tested in an expert group (n=11).

Results: Adaption resulted in the Swedish instrument SLQOLI with good content and face validity.

Test-retest of SLQOLI was completed by 58 patients. The test-retest reliability was moderate as well as the criterion validity.

Reduction: The SLQOLI was reduced into the LyQLI, from four dimensions to three (physical, psychosocial and practical). The number of items was reduced from 61 to 41 and the open-ended question was removed. Three sub-items was reduced to one.

Conclusions: The new questionnaire, LyQLI, was reduced from 188 questions to 45 and the content and face validity is good. Further studies to evaluate reliability and responsiveness need to be conducted.

THE PREVENTION OF LYMPHŒDEMA / CHRONIC ŒDEMA: A GLOBAL HEALTH ISSUE?

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The ILF aims to raise awareness of the problem of lymphoedema and its treatment worldwide. The potential for the prevention of lymphoedema and its consequences are part of this focus.
Currently the literature mainly concerns the the prevention of secondary lymphoedema following breast cancer treatment eg with modifications to surgical and radiotherapy treatments, postoperative exercises and the use of compression and MLD. Other types of lymphoedema are relatively neglected. There is also confusion around the use of the word "prevention". This presentation aims to clarify the terminology, briefly review current examples of research and consider areas for future research.
Prevention can be broadly divided into 4 levels:
1. Primary: methods to avoid the occurrence of lymphoedema.
2. Secondary: methods to diagnose and treat lymphoedema in its early stages to prevent significant morbidity.
3. Tertiary: methods to reduce lymphoedema-related complications and restore function to reduce the impact of the condition.
4. Quaternary: methods to avoid the results of unnecessary or excessive interventions.

Examples in the literature include:
1. Primary: sentinel node biopsy in breast cancer treatment.
2. Secondary: the early detection of lymphoedema after breast cancer treatment by pre- and post-operative monitoring by perometry and bioimpedance.
3. Tertiary: the use of prophylactic antibiotics for recurrent cellulitis.
4. Quaternary: the cost effectiveness of treatments.

Area for future research include:
- the possible prevention of primary lymphoedema,
- the possible use of exercise/compression to prevent immobility-related oedema,
- the place of anastomotic surgical approaches in various types of Lymphoedema.

The prevention of lymphoedema in all its forms remains a significant global health challenge and requires further research.

THE EFFECTIVENESS OF THE PATIENT EDUCATION FOR LYMPHEDEMA PREVENTION IN THE EARLY POSTOPERATIVE PERIOD FOR GYNECOLOGICAL CANCER

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Introduction/Background: In Japan, lymphedema management instruction/ counseling has been covered by health insurance for lymphedema patients since April, 2008. Postoperative cancer patients can receive one counseling session during hospitalization. Although the patient education for lymphedema is one of the important factors to reduce the onset of lymphedema, it is not clear how effective early postoperative patient education is in preventing lymphedema entirely.

Aims of the study: The aim of this study was to examine the effect of early preventive patient education for lymphedema for patients who had undergone lymphadenectomy for gynecological cancer.

Objectives and Methods: Six hundred two gynecological cancer patients who received lymphadenectomy after 1995 were enrolled in this study. We excluded the cases of death, recurrence, deep vein thrombosis and these with severe complications leading to edema. We examined two groups of patients; those wh o had undergone cancer treatment before March, 2008 (Group A) and those after April, 2008 (Group B), focusing on the following points; periods of time from operation to onset of lymphedema, from onset to initial diagnosis and from operation to initial diagnosis, as well as the clinical stage of lymphedema at initial diagnosis.

Results: 1) We reported the following for each of Groups A and B respectively: periods of time from operation to onset: 27.0±33.9 (Mean±SD) (Months) (median 14M), 9.9±16.6 (M) (median 4M); periods of time from onset to initial diagnosis: 29.6±34.2 (M) (median 14M), 2.0±2.4 (M) (median 2M) and periods of time from operation to initial diagnosis: 62.4±50.6 (M) (median 49M), 11.4±7.1 (M) (median 5M). They shortened significantly (p

LYMPH SCIENCE ADVOCACY PROGRAM (LSAP): A TRAINING PROGRAM FOR ADVOCATES ABOUT RESEARCH AND EDUCATION FOR LYMPHEDEMA

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Background: In the last decade a select group of patients have come to the forefront in various disciplines and now have a voice in the scientific world. It has become evident that patient advocates play a role in moving the field of lymphology forward. In response the National Lymphedema Network (NLN), created the LSAP program in 2000 to educate advocates in the basic science of LE and related disorders during the bi-annual NLN Conferences. The aim of the LSAP Program is to engage and motivate patients and caregivers to action in issues of treatment and research of the lymphatic system

Methods: Participants are selected from submitted nominations and represent a diversity of backgrounds The program is limited to 5 new participants each cycle, and highlights 1) individualized guidance on topic areas, 2)Introduction to the Research process 3) mentors and scientific guidance 4) Opportunities to participate in discussion groups with expert lymphologist. 5) Participate in tree webinars prior to the conference

Results: Presently there are 14 (total 28 graduates) active LSAP graduates. They all participated in the 4.5 day NLN International Professional Conference (2000-2012), and returned an evaluation survey and review for Lymphlink, NLN quarterly newsletter. Participants gained a unique perspective and understanding about the research process, and created ideas and partnerships for new approaches and research. There was a strong commitment from graduates in addressing advocacy in research, legislative and educational means.

Conclusion: Over the last 2 decades we have seen tremendous progress in education, awareness, research and advocacy of LE and lymphatic disorders. A key component has and continuous to be the collaborative effort among all stakeholders. i.e., therapists, physicians, researchers, industry and very important the voice of our patient advocates.

The LSAP program has shown to be an integral part of the advancements of lymphology.

THERAPEUTIC EDUCATION FOR CHILDREN WITH LYMPHŒDEMA AND THEIR FAMILIES - EXPERIENCE OF THE INTERNATIONAL LYMPHŒDEMA FRAMEWORK

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Constitutional lymphoedema is a rare condition that causes disabling deformities. Children may find it particularly difficult to cope with. This life-long disease has social and psychological impact on children growing up with lymphoedema and on parents and other members of the family. On the other hand, the long-term nature of lymphoedema requires a person-centred, rehabilitative approach to support self-management and maximise independence and quality of life. Such long-term therapeutic approach for children with lymphoedema should take into account all these socio-psychological and care dimensions. A pilot International Lymphoedema Framework (ILF) study was carried out with families from Canada, Sweden, Danemark and France during a one-week summer camp in order to experiment a Self-management Therapeutic Education Program for children, young adults with lymphoedema and their families. A presentation of the experiment and of the one-year results will be dis cussed during this presentation made on behalf of the International Lymphoedema Framework.

UPDATE ON THE AMERICAN LYMPHEDEMA FRAMEWORK PROJECT'S SYSTEMATIC REVIEWS

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Introduction: A national initiative developed under the leadership of recognized clinical experts and investigators in the field of lymphedema (LE) in the US in 2008, the American Lymphedema Framework Project (ALFP) is a collaboration of healthcare providers, researchers, patients, educators, advocates, third-party payers, and industry representatives. As such, the ALFP aims to assess and promote appropriate health care services for patients with all forms of LE and advance the quality of care in the US and worldwide. One of the ALFP's main goals has been to help develop and maintain best practices supported with evidence-based LE treatment guidelines through a series of 13 systematic reviews.

Methods: A research librarian assisted with searches of 11 major medical databases using search terms from the International Lymphoedema Framework's Best Practice for the Management of Lymphoedema, plus expanded terms. Experts sorted relevant literature for inclusion and exclusion; included articles were sorted into topical areas for data extraction and assessment of evidence level using published grading systems and consensus process. Information on study design, sample, outcomes, intervention, results, and study strengths/weaknesses was extracted from each article.

Results: From almost 6000 screened articles, articles were selected based on defined eligibility criteria for final review (n=1303) and categorization (n=659) by topic experts. Articles were rated according to a classification system evaluating methodological quality with consistent inter-rater reliability. Findings from the published literature reviews, including the first in the series of 13 to be published in keeping with the ALFP commission, will be reported. Surgical treatment of LE (Annals of Surgical Oncology); exercise (Journal of Cancer Survivorship); self-management (Nursing Research); palliative care (Journal of Palliative Medicine); intermittent compression pumps (Lymphology); complete decongestive therapy (Physical Medicine and Rehabilitation); psychosocial issues (Psycho-Oncology); and economic and health policy (Lymphology) reviews are now in print (n=8). Wounds/skin and alternative therapies manuscripts are in review. The remaining topical reviews (assessment, risk-reduction, complex cases) are in final stages of preparation. A special January 2103 issue of Seminars in Oncology Nursing summarizes the clinical application of the published systematic reviews.

Conclusions: There is a paucity of rigorously conducted research studies related to treatment of patients with and at risk for LE. In order to provide evidence-based practice guidelines, it is critical to design and test strategies using relevant patient-reported outcomes. It is also imperative to bring the scientific findings to the level of understanding and application by our therapists, clinicians, patients, and families.

THE INTERNET IS NOT A FAD OR TREND – IT IS A CONSTANT IN OUR LIVES, ALL ASPECTS OF OUR LIVES. AND YES THAT INCLUDES OUR HEALTH AND HEALTHCARE!

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The questions about the internet and healthcare has more to do with how patients use the internet (education search & self-diagnosis), the conversation between the patient and healthcare professional in relation to the internet, and the use of the internet to deliver best practices and access to care.
This abstract presentation will ...

1. Give an overview of how health care consumers (the patient) utilize the internet for health matters;
2. Provide a guide on how a collaboration approach can be established between the healthcare professional and patient in relation to using the internet for healthcare matters;
3. Be a catalyst for innovative approaches to providing accessible care to patients.

VOLUNTERS IN BREAST CANCAR RELATED LYMPHŒDEMA

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The physical rehabilitation, in the philosophy of A.N.D.O.S., is not the end of our business, but the tool that allows us to work to achieve the comprehensive rehabilitation of the woman. The A.N.D.O.S. was born in Trieste as a Rehabilitation Center mastectomy and remains today the largest association that focuses on the rehabilitation of women operated on for breast cancer. The presence of technical volunteers, vital to making physical rehabilitation, is our distinguishing feature criticized by other associations who took care of the problem, this has become for us in the long run, a strength which today sees us winning. The A.N.D.O.S., at the beginning, he had a 'one mission: taking care of the physical problems of the woman who at the time were much more relevant today: Periarthritis shoulder joint, Winged Scapula, Scar retractile, Outlet thoracic syndrom, Dysthesia and paresthesia, Syndrome breast phantom, Radiodermatitis actinic, Lymphedema,
In the treatment of lymphedema lymph drainage is the treatment of choice. The current technique is different from the previous one in that, while starting from the back, always takes place in a centripetal direction. Even the pressure (low pressure) has the distal-cranial.
Volunteer who performs manual lymphatic drainage during the session “touches” the woman, or rather, touches, caresses it could be said, at a time when you feel different and physically inadequate to his role as “woman”. The emotional range of massage has a symbolic meaning or the contact is or prelude to the awareness of the body, illness, self-acceptance or experience disease or openness to the other, the relationship or regain of feeling.
So, physical rehabilitation is intended as a tool to achieve the acceptance of the self through comprehensive rehabilitation and reconstruction of their symmetry. The rehabilitation in the path of the disease is based on: Taking Charge, Listening, Physical Rehabilitation (movement, swimming, Manual lymph drainage and mechanical, yoga), Psychological rehabilitation (individual and group, self – help), Social Rehabilitation (relationship problems, return-to-work, protection coroner), Rehabilitation playful (trips, events, dance). We will try our rehabilitation project is nothing more than an outstretched hand to which we may affirm, by the terrible time of communication of the diagnosis for his entire life, as you can take or leave as children do with their mother. In the knowledge that there is always that you can support even just for a chat that you may incur while your is falling into the vortex of deep depression. The purpose of the rehabilitation of the A.N.D.O.S. is: 1) add prospects to life, 2) help to look at the big future horizon, 3) stimulate interest also unexpected or unthinkable, 4) find in each of the key that unlocks the treasure of emotions that she is locked in her.

WHICH COMPLIANCE BETWEEN THE PATIENT’S NEEDS AND RESOURCES?

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Lymphedema is a chronic disease that can lead to a variable degree of clinical features. The patient’s needs will depend on this, and the health services should provide resources in order to prevent the appearance of lymphedema, in the case of secondary lymphedema, to prevent aggravation of the disease, complications as lymphangitis, elephantiasis...
The general needs of the patient include prevention of secondary lymphedema, accurate diagnosis of the disease, decongestive lymphatic therapy to reduce volume of the limb, maintenance treatment, evaluation of disability, and rehabilitation of psychological, social, working aspects.
In many countries, the provision of care for patients with lymphedema is inadequate, often as a result of underdiagnoses of this disease, the belief that the condition is rare, and that has no treatment. Medical centers specialized in the management of Lymphedema are scarce in Spain, and trained staff is not always available. Patients with lower limb lymphedema are diagnosed very late when they are in an advanced stage of the disease. Most hospitals do not offer their patients the Intensive treatment with Decongestive Lymphatic Therapy, or they do it only with Intermittent Pneumatic compression, without Manual Lymphatic Drainage, or without Multicomponent Bandages. Maintenance treatment with Compression garments is supplied only once a year, and often the patient cannot find flat-knitted garment in orthopedic stores. Information for self-care and prevention of lymphangitis attacks is not always available.
What can we do? How to manage patients with lymphedema with limited resources? Is prevention a useful tool? Which patients should be sent to a specialized Lymphedema Unit and which can be treated in a more general center? Do all the patients with lymphedema need Decongestive Lymphatic Therapy? Do all the patients need Manual Lymphatic Drainage? Can bandages be effective for the reduction of the limb in some cases of lymphedema? Are all the garments equally effective in maintaining the volume of the limb? Is a garment useful when it has been worn daily for one year? What can the patient do for himself?

Friday, 20th September 2013

H. 11.15 a.m. - 12.15 p.m.

Session 13

ISL Consensus Document

Aula Magna

President

Manokaran G. (India)

Chairmen

Brorson H. (Sweden) - Bernas M. (USA) - Michelini S. (Italy)

NOTES