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THE CARDIOVASCULAR SYSTEM BY THE GREEK PHYSICIAN, "FATHER OF MEDICINE" HIPPOCRATES OF KOS

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Objective: Hippocrates is considered to be the father of medicine (Kos 460 BC- Larissa 375 BC). He was a descendant of Asclepius. He received his first medical knowledge from his father, Heraclides, who was also a physician and later was a student of Gorgias and Democritus. After completing his medical studies, he practiced medicine in the Greek island Kos. However, he also made many trips to several parts of Greece. His collection of books is called the Hippocratic Collection and includes 60 books. He did not perform autopsies for religious reasons and his knowledge came mainly from the study of anatomy in animals and during various surgeries. He claimed that the human body contains 4 juices, which must be in balance for the person to be healthy. These juices were blood, yellow and black bile and phlegm. The blood represented the warm and liquid juice.

Material-Method: Analysis of the existing literature.

Results: According to Hippocrates, veins contained blood and air arteries, which is why he originally named arteries the trachea and bronchi. He believed that blood was produced in the liver and then distributed through the veins to the body. It reached the heart along with the spirit, which was transported there through the pulmonary veins or arteries. From the heart, the spirit was distributed in the body through the arteries starting at the left ventricle. Anatomically, Hippocrates knew of the aorta, the vena cava inferior, the great vessels of the cervix, thorax, and abdomen, as well as the ventricles of the heart and the lunar valves. Hippocratic physicians had also reported sudden death, while reporting obesity as a risk factor for coronary heart disease. He was the first to report and describe the palpation of the pulse. He found differences in the pulse of patients depending on their age, but also during illness, such as fever. He also had an arrhythmia in one of his patients. Finally, through the clinical examination, he found the point of the Hippocratic fingers (Clubbing of the fingers) that appear in cardiopulmonary diseases.

Conclusion: Hippocrates had studied the cardiovascular system.

GASPARE ASELLI'S SERENDIPITY

Maccio A.

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Objective: Aselli was born in Cremona in 1581. He graduated in Medicine at the University of Pavia when still very young. He became famous for his text De Lactibus sive Lacteis Venis Quarto Vasorum Mesaraicorum genere - Novo Invento (1627), where he described his experience on the anatomical dissection of lacteal vessels in the intestines of a dog. These anatomical structures had already been widely described before him (by Hippocrates, by Erasistratus, by Pliny the Elder, by Galenus, etc.). But why then should we refer to Aselli as the father of lymphology?

Material-Method: Because it was, in fact, with his text that a real movement of criticism and anatomo-functional debate began on circulation. That is how, at the beginning of the 17th century, a new way was opened towards a correct understanding of the physiology of lymphatic vessels.

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Results: The term "serendipity". Is defined as the capacity or fortune to make unexpected and happy discoveries, perhaps by correctly interpreting a phenomenon, while you are looking for something else.

Conclusions: So, when Gaspare Aselli came across 'lacteal veins', he was actually studying the liver and blood circulation, but his talent helped him not to underestimate the observations he made on that occasion and this, through critical reasoning, gave birth to a scientific intellectual movement that eventually shed light on the anatomy and function of lymphatic circulation.

THE ROLE OF GENETICS IN OUR ERA AND THEIR IMPLICATIONS ON LYMPHEDEMA & LYMPHATIC DISEASES CLASSIFICATION

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Objective: Genetics have a basic importance on this topic.

Material-Method: Authors present their results.

Results: Immunohistochemistry & related gene with molecular studies confirm the authors' hypothesis.

Conclusions: Genetics and related sciences have a basic importance to understand the hidden truth of all kinds of the lymphatic diseases.

NEW GENETIC ACQUISITIONS IN PRIMARY LYMPHEDEMA AND LIPEDEMA AND CLINICAL IMPLICATIONS

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Primary lymphedema is a phenotypic manifestation frequently caused by genetic mutation. The genes currently recognized as responsible for the disease are different and the same mutations affect in a diversified and often complex way. There are familial, sporadic and syndromic forms of lymphedema. The genes most frequently called into question as responsible for both familial forms and syndromes which are VEGFR3 or FLT4 and FOXC2.

Inheritance can be autosomal dominant, autosomal recessive, or X-linked recessive. Genes involved in the predisposition to secondary lymphedema from surgery have also been reported [6, 7].

Lymphedemas are commonly divided into "non-syndromic" and "syndromic" and can be transmitted in a dominant way (if the mutation is present, the overt disease is also always present) or recessive (in which the condition can remain subclinical).

In relation to Lipedema, the first mutated gene has been identified to date. It concerns the AKR1C1 enzyme which plays an important role in the metabolism of progesterone (and this would explain the onset of the disease in women). Other

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genes (AKR1C2 and others) are being studied as possible further causes of the disease, similarly to what is already known for primary lymphedema.

Genetic testing is appropriate whether the patient meets the diagnostic criteria for the disease; If the diagnostic sensitivity of the test is greater than or equal to that reported in the literature for other published tests and If the test is prescribed by the geneticist or the lymphologist expert (general surgeon, vascular surgeon/ angiologist, dermatologist, physiatrist).

TOPICAL TACROLIMUS 0.1% FOR TREATMENT OF CUTANEOUS MICROCYSTIC LYMPHATIC MALFORMATIONS

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Objective: Microcystic lymphatic malformations as described in the international literature form a subgroup of low-flow congenital vascular malformations (VM) resulting from irregular embryological development. Microcystic lesions normally manifest as an accumulation of lymph- and blood-filled vesicles that, when externalized, cause skin maceration, with the consequent pain and potential infection resulting in the impairment of the patient's quality of life. There is still no consensus on a standardized algorithm, nor clear guidelines for the successful treatment of this type of lymphatic malformation, and the treatment options employed often result in ambivalent and transient outcomes with a high rate of recurrence. The topical formulation of tacrolimus is a well-known FDA-approved anti-T cell agent that was recently identified as a potent activator of ALK1, which is involved in several processes and functions, including angiogenesis. The following work attempts to determine whether the topical administration of tacrolimus may be an effective therapy for cutaneous microcystic lymphatic malformations, as considering it as the possibility to directly target microcystic lesions as a complement to systemic treatment.

Material-Method: We studied four (n=4) patients with cutaneous microcystic lymphatic malformations: three (n=3) male (age: 13, 15, 18) and one (n=1) female (age: 30). Two of the patients presented lesions on their backs, one patient on the left hand and one on the left lower limb. All four patients received treatment with topical tacrolimus 0.1% twice a day for 10 weeks. A previously selected area of application was determined. Weekly clinical follow-ups were conducted along with close doctor-patient contact.

Results: All patients displayed a satisfactory response after treatment. Lymphorrhea and bleeding were interrupted in all cases, and the esthetic aspect of lesions improved in two patients. To date, the rest of the patients presented no clinically significant changes to the size or extension of the lesion.

Conclusions: Topical Tacrolimus treatment is a promising and reasonable option for microcystic lymphatic malformations. We encourage its use, considering it a safe and effective alternative or complementary therapy to systemic treatment. Further studies are required to specify its use for this pathology.

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COMPLEX LYMPHATIC ANOMALIES: UPDATE ON A MONOCENTRIC REGISTRY

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Objective: Complex lymphatic anomalies, such as Generalized Lymphatic Anomaly and Gorham-Stout Disease are extremely rare conditions with overlapping clinical presentations, that affect multiple organs. Paradoxically they lie within the group of simple vascular malformations according to the International Society for the Study of Vascular Anomalies classification, but exhibit poor treatment outcomes with classical treatments, high morbidity and fatality rate and an overall poor prognosis. Their etiology remains poorly understood, but somatic mutations in the RAS- and PI3K/mTOR-signaling pathways have recently been implicated and anecdotal use of novel targeted treatments shows promising results.

Material-Method: 32 consecutive patients with complex lymphatic anomalies across all ages were recruited in a registry (2015-2020) in the University Hospital of Freiburg. Data regarding clinical presentation, diagnostics, treatment and outcomes were prospectively collected in case report forms completed by the caregiver.

Results: The phenotype of complex lymphatic anomalies and their subentities is described. Simple descriptive statistics were used to describe the phenotypic features of the sample.

Conclusions: Complex lymphatic anomalies are very rare, thus literature on the topic is scarce. Their overlapping clinical presentation makes differential diagnosis difficult. The characterization of this case series aims to contribute to the phenotypic description of these rare diseases. Further understanding of their pathogenesis is crucial in order to make use of precision medicine approaches and provide optimal medical care.

DYSFUNCTION OF INITIAL LYMPHATICS OF THE ARM AND UPPER BODY QUADRANT CAUSES CONGENITAL ARM LYMPHEDEMA

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Objective: To explore the pathology underlying primary lymphedema.

Material-Method: Twenty-seven patients with unilateral congenital arm lymphedema who visited our clinic from 1 January 2014 to 30 May 2019 were enrolled. The patients' clinical signs, indocyanine green (ICG) lymphography, skin tissue immunohistochemical (IHC) staining, and whole-exome sequencing (WES) of blood were evaluated.

Results: Among the 27 patients, 18 and 9 were diagnosed with stage II and III lymphedema, respectively. No lymphatic vessels were visualized in the affected arm in 25 of 27 (93%) patients who underwent ICG lymphography; likewise, no lymphatics were found in the territories of axillary lymph node drainage in the trunk, irrespective of any anomalies of the axillary lymph nodes. In only two (7%) patients, an unclear lymphatic trunk gradually appeared in the dorsum of the affected hand. The number of initial lymphatics was increased in the skin specimens of all nine patients in whom lymphatics were not demonstrated by ICG. Among 14 tested patients, we found compound heterozygote variants in

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the PIEZO1 gene in only 1 (7%) patient. Two missense variants, c.4072C>T; p.Arg1358Cys and c.5033C>T; p. Ala1678Val, were identified and found to have been inherited from the father and mother, respectively. No other pathogenic or likely pathogenic variants of currently known lymphedema-related genes were identified in the remaining 13 patients.

Conclusion: Segmental/regional dysfunction of the initial lymphatics causes congenital arm lymphedema and may have implications for clinical treatment.

THE ROLE OF LYMPH VALVES IN THE PATHOPHYSIOLOGY OF LYMPHEDEMA: EMBRYOLOGY AND SURGICAL ANATOMY

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Objective: Many aspects in the pathophysiology of lymphedema remain enigmatic to this day. A better understanding of the disease could aid in the development of novel therapeutic approaches for patients. This review article focuses on the role of lymphatic valves in the pathogenesis and pathophysiology of lymphedema, taking into account the exact molecular mechanisms that take place with the deletion of certain genes and transcription factors, as most of them have partially been elucidated during the last years.

Material-Method: Our search strategy was conducted in the Medline biblio-graphical database and yielded 20 articles as a final result.

Results: Many genes and molecules have been studied in recent years as to their affiliation to lymphedema formation, in both mouse model studies and human cell cultures. One of the most recently studied groups of such molecules is the connexin family of gap-junction proteins, leading to controversial results.

Conclusion: The article offers a summary of the methods used in experimental models of both knockout mice and human cell cultures, and includes specific directions for future research in the field of lymphology.

S1PR1 INHIBITS LAMINAR SHEAR STRESS-DEPENDENT VEGF-C SIGNALING

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Objective: During the growth of lymphatic vessels (lymphangiogenesis), lymphatic endothelial cells (LECs) at the growing front sprout by forming filopodia. Those tip cells are not exposed to circulating lymph, as they are not lumenized. In contrast, LECs that trail the growing front are exposed to shear stress, become quiescent and remodel into stable vessels. The mechanisms that coordinate the opposed activities of lymphatic sprouting and maturation remain poorly understood.

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Material-Method: We used biochemical assays and mouse models to investigate the role of shear stress during lymphatic vascular development.

Results: Here we show that the canonical tip cell marker Delta-Like 4 (DLL4) promotes sprouting lymphangiogenesis by enhancing Vascular Endothelial Growth Factor C (VEGF-C)/VEGF Receptor 3 (VEGFR3) signaling. However, in lumenized lymphatic vessels laminar shear stress (LSS) inhibits the expression of DLL4, as well as additional tip cell markers. Paradoxically, LSS also upregulates VEGF-C/VEGFR3 signaling in LECs, but sphingosine 1-phosphate (S1P) receptor 1 (S1PR1) activity antagonizes LSS-mediated VEGF-C signaling to promote lymphatic vascular quiescence. Correspondingly, S1pr1 loss in LECs induced lymphatic vascular hypersprouting and hyperbranching, which could be rescued by reducing *Vegfr3* gene dosage *in vivo*.

Conclusions: Our findings suggest a new paradigm in which LSS induces quiescence and promotes the survival of LECs by downregulating DLL4 and enhancing VEGF-C signaling, respectively. S1PR1 dampens LSS/VEGF-C signaling, thereby preventing sprouting from quiescent lymphatic vessels. These results also highlight the distinct roles that S1PR1 and DLL4 play in LECs when compared to their known roles in the blood vasculature.

PROFILING OF CIRCULATING T CELLS IN PATIENTS WITH LYMPHEDEMA REVEALS UPREGULATION OF IMMUNE CHECKPOINT MOLECULES

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Objective: Lymphedema is a debilitating progressive condition owing to the accompanying cellulitis and angiosarcoma, which suggest immune dysfunction associated with lymphedema. However, the immune status of peripheral T cells during lymphedema remains poorly understood.

Material-Method: Using the peripheral blood T cells of patients with lymphedema and age-matched healthy controls (HC), we compared the profile of various functional T cell subsets in this study. Peripheral blood samples were collected from 14 patients with lymphedema and 11 HC. All patients underwent the surgical resection of cancer with dissection of lymph nodes and were free from relapse.

Results: Assays of PD-1, Tim-3, and Lag3 expression on CD4+ T cells showed a significantly higher population of the lymphedema than in the HC, the mean at 32.1 vs 22.2 % ($p = 0.03$), 2.69 vs 1.44 % ($p = 0.02$), and 0.72 vs 0.43 % ($p = 0.02$), respectively. Treg in CD3+CD4+ T cells was significantly higher in lymphedema than HC, at 5.49 vs 3.45 % ($p = 0.04$). The proportions of naïve CD4+ and CD8+ T cells were lower in lymphedema patients than in HC (30.2 vs 46.0 % ($p = 0.01$) and 7.5 vs 13.4 % ($p = 0.04$), respectively).

Conclusions: These observations suggest the distinct immunosuppressive status of patients with lymphedema, which might be related to the development of the accompanying cellulitis and angiosarcoma. This study might put new insights into the late complication after the lymph node dissection as cancer treatment.

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SENESCENCE OF LYMPHATICS: CURRENT KNOWLEDGE AND PERSPECTIVES

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Objective: The lymphatic system is affected by the aging process like the other anatomical structures. Little is known about the effects of senescence of lymphatic system. The authors' objective was to collect from the existing literature what has been demonstrated regarding this process. and its consequences, and to outline possible future clinical researches.

Material-Method: A literature search was performed on Pubmed and Web of Science. An initial list of 1060 publications was obtained. The 57 papers relating to senescence / aging of the lymphatics are those studied for this review.

Results: Various alterations have been demonstrated. Among these were reported: the reduction in the frequency and amplitude of contraction of the vascular muscles; dilation and reduction of the number of cutaneous lymphatics and decreased complexity of the vascular network; alteration of the glycocalyx and junctional proteins, with consequent vascular permeability; reduction of the muscles upstream and increase of those downstream of the lymphatic valves, with possible alteration of the valve biomechanics; reduction and disorganization in the distribution of podoplanin within the lymph nodes;mild fibrosis of the connective scaffold and alteration of the structure of the lymph nodes;

Conclusion: The review of the literature on the senescence of lymphatics has made it possible to identify numerous alterations, which impact the anatomy and functionality of these structures, with important implications also on immune processes. This knowledge will allow us to better understand the degenerative processes that occur in lymphedema, as well as the edema that develops in elderly people.

SMOOTH MUSCLE CELL REGENERATION WITHIN HUMAN LYMPHATICS AND LONG-TERM FOLLOW-UP AFTER LVA FOR UPPER LIMB LYMPHEDEMA

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Objective: We first introduce autonomic contraction of lymphatics in the clinical field and described smooth muscle regeneration within lymphatics of human lymphedema. The present investigation was series carried out to study the relation between ultrastructural findings of lymphatics and long-term results after mLVAs in upper limbs. So far, there was no reports on this subject.

Material-Method: A series of 5 patients with upper limb lymphedema were treated with single or mLVAs. As for upper limb, The average number of LVA was 4.8, and followed up for average of 7.3 years after surgery. A total of 12 biopsied lymphatic channels were obtained from various levels of limbs and the specimens were observed ultrastructural changes.

Results: Evaluation of surgical effects was made mainly by photos and criteria of judgement was decided as 5 categories: 1. Functional recovery, 2. Excellent, 3. Improved, 4. Constant, 5. Worse. Regarding the operative effect in the arms, 4 cases showed excellent and one with constant. As for the legs, 3 cases showed improvement or more, and 2 were constant. There was no correlation between preoperative severity and results of mLVAs. It was found that

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remaining function of lymphatics could be estimated by ultrastructural observation, especially for smooth muscle cells. endothelial cells, and proliferation of collagen fibrils.

Conclusions: mLVAs are essential for treatment of lymphedema. The postoperative prognosis can be estimated not by the preoperative history and symptoms, but ultrastructural pathology of lymphatics, which seems to be the most reliable evaluation.

LYMPHEDEMA OR LIPEDEMA: THIS IS THE PROBLEM

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Objective: In clinical practice even today there are diagnostic errors between Lymphedema and Lipedema which delay the correct clinical classification of the patient who is frequently directed to incongruous and non-exhaustive treatments. This occurs mainly in bilateral forms of the lower limbs and especially in female patients.

Material-Method: We observed 148 female patients with Lipedema at clinical stage I and II, aged between 18 and 66 years, with bilateral edema of the lower limbs onset with a time interval between 4 and 47 years. All patients had undergone clinical examination, Doppler ultrasound of the lower limbs (2 to 7 examinations, mean 3.7) and soft tissue ultrasound examination of the thigh and leg. 83 patients had undergone lymphoscintigraphic examination (on average after at least one year from clinical onset). All the patients had been studied by their general practitioner and by at least one specialist from different branches (angiologist, vascular surgeon, orthopedist, physiatrist, internist, plastic surgeon, dermatologist). At our observation the patients had come with the following diagnoses: Lymphedema of the lower limbs in 68 cases, suspected Lipedema in 53 cases, Flebedema in 13 cases, Cellulitis in 7 cases, Chronic or post-traumatic inflammatory lymphostasis in 7 cases.

Results: From a careful analysis of the clinical and instrumental pathways, the study highlighted clinical error in 95 cases (64.1%), error in the lymphoscintigraphic report in 39 cases (46.9%), error in ultrasound examination (omitted tissue compression maneuver or erroneous interpretation of the suprafascial compartment) in 101 cases (68.2% of cases) and error in the ecoDoppler interpretation of the circulation of the lower limbs in 11 cases (7.4% of cases).

Conlusions: The analysis of the data still shows a lack of knowledge of the pathology of Lipedema, often confused with other clinical pictures, resulting in a lack of adequate therapeutic response and general misrecognition of the disease which also leads to false epidemiological interpretations.

LIMPRINT: A MULTICENTRE, INTERNATIONAL EPIDEMIOLOGY STUDY

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Objective: The acronym LIMPRINT stands for Lymphoedema IMpact and PRevalence- INTernational Lymphoedema Framework and presents the aim of the study, which is "To determine the impact and prevalence of chronic oedema within health services at a national and international level using a common methodology". Many of these people would not have been previously identified or be receiving treatment prior to screening during the study.

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Method-Material: An international panel developed the methods which included a core tool with 13 domains that was used in all sites supplemented with additional data collection on : wounds, cancer, disability, health related quality of life and swelling. Sites used an electronic platform and had support form an international steering group.

Results: To date 9 countries with 41 sites have participated with over 13,000 participants. Findings from this will be presented during this presentation including new analysis on the impact of wounds, obesity and cellulitis.

Conclusions: LIMPRINT has demonstrated the power that international collaboration can have on generating data from large studies that are required to demonstrate the importance of Lymphoedema and chronic oedema as a neglected public health problem. ILF are now commencing studies in low resource countries (Uganda, South Africa and India) in whom we know the profile and impact will be quite different.

LYMPHEDEMA MAY BE CAUSED NOT ONLY BY LYMPHATIC OBSTRUCTION BUT ALSO BY LOSS OF LYMPHATIC CONTRACTILITY

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Objective: Early stage of lymphatic insufficiency in human limbs can now be observed on ICG lymphography. It differs from "lazy" contractions to total stop and passive lymphatic filling by external massage. Lymphatics contraction (pulse) capacity as frequency, pressure amplitude and stroke volume can be measured. After inflammation, trauma and lymph hypertension tissue fluid is not entering lymphatics, forms a spot, collectors are filled with dye only after compression. The aim is to evaluate foot and lower calf collector contractions and lymph flow capacity in initial stages of lymphedema, and evaluate semi-quantitatively on fluorescence level curves.

Method-Material: Fifty patients with lower limb lymphedema stage I underwent ICG lymphography procedure in a horizontal position with 3 minutes foot flexion followed by one hour walk. Time of dye entry to foot lymphatics, appearance of foot lymphatic outline, lymphangion contraction rate, appearance of calf lymphatic, and diffusion of dye across the non-contracting collectors were recorded. The obtained curve pulse waves and area of fluorescence changes in time were analyzed (ICcalc, Pulsion Medical Systems, Munich).

Results: Low pulse frequency (below 6/min) and amplitude were usually observed in one or two lymphatics with other dilated non-contracting collectors as well as distal spread of ICG, compared with healthy limb (fluorescence 30% vs 15%). A variety of individual images was observed but common to all was slowing down of dye flow.

Conclusions: Evaluation of contractility of foot and calf lymphatics is now possible on ICG lymphography. This enables early diagnosis of lymphatic insufficiency and initiates prophylactic procedures.

RARE CAUSES OF FACE LYMPHOEDEMA

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As in other epifascial areas of the body also face swelling can originate in both primary or secondary lymphatic insufficiency. Therefore, detailed medical history, meticulous clinical examination and lymphoscintigraphy of the affected area are the key instruments for right differential diagnosis. Although diagnosis of the face lymphoedema which originates in secondary lymphatic insufficiency is usually easy and should not cause severe problems, patients after therapy of head

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and neck malignancy come for the treatment of lymphatic insufficiency in the stage of fibrosis. Completely another situation is in case of primary lymphatic insufficiency of the face when medical professionals do not take it in account at all.

The lecture presents results of diagnosis and treatment in patients with Melkersson-Rosenthal syndrome and Lymphedema-distichiasis syndrom.

From the differential diagnosis point of view lymphoscintigraphy is an important part of the diagnostic and therapeutic plan. Radiocolloid injection into the soft tissues affected by swelling or lipohypertrophy can prove lymphatic insufficiency and thus allow causal treatment of one of its typical symptoms - lymphoedema.

The use of facial compression sleeve at night in combination with lymphatic drainage bring significant subjective relief for the patients. Since pain attacks accompanied with chills and fever can be caused by Streptococci, there is a possibility to suppress these inflammatory attacks by administration of depot penicillin.

IDENTIFICATION OF KEY ANATOMICAL STRUCTURES FOR SAFE POPLITEAL NODE DISSECTION: A RARE CASE SERIES & METICULOUS REVIEW

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Objective: Metastasis to the popliteal nodes is an extremely rare clinical entity that is poorly reported in the literature, and subsequently the appropriate surgical maneuvers for safe popliteal node dissection are not elucidated. After the successful performance of popliteal lymphadenectomy on 28 patients with metastasis to the popliteal basin, the key anatomical structures that guarantee a safe surgical technique are adequately described.

Material-Methods: During the period 2000-2021, 28 patients proceeded to our institution for popliteal node dissection due to the presence of metastasis from the primary region to the lymph nodes of the popliteal fossa. Lymphoscintigraphy was performed to all of the patients. The rare surgical procedure of the popliteal lymphadenectomy was successfully performed to all these patients.

Results: Surgeons modified the classic Z-incision to a vertical one, allowing better exposure of the structures of the popliteal basin and more mediate approach of the common peroneal nerve. Identification of the common peroneal nerve and of its origin guarantees the safe detection of the superficial tibial nerve and the avoidance of its traumatic division or of the injury of the popliteal vessels beneath it. The popliteal node dissection was uneventful to all patients.

Conclusions: Surgeons' thorough knowledge concerning the approach of the key anatomical structures that can guide them during the removal of the popliteal nodes is fundamental for the performance of popliteal lymphadenectomy without hazardous impacts.

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

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Objective: 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-Method: In the unit of treatment of edema they took in charge 3950 patients from 1985 to 2020. 2625 patients with upper limb edema and 1325 with lower limbs edema: 680 primary lymphedema; 645 secondary. In 10 cases there was an association with genital edema. Since 1997 and the XVIe ISL Congress in Madrid and the XXIV e congress in Roma 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. We can 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. It is easy to remember also the first idea of KAPOSI concerning pachydermia and hypertrophia of subcutaneous skin.

Results: On 680 primary lymphedema 80% concerned women and were associated in 30% of cases with lipodystrophia or phlebedema. In those 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?

Conclusions: The authors rediscover the same results the same reflexions than in 1997 in Madrid and in Roma in 2013 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 disappeared 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?

THE INCIDENCE OF FEMALE GENITAL OEDEMA, IDENTIFIED THROUGH ICG IMAGING AND EFFECTS OF PHYSICAL AND PSYCHOSOCIAL HEALTH

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Objective: Female genital oedema (FGO) is an underdiagnosed condition. ICG imaging allows for visualisation of labia and perineal oedema. Evaluation of results of ICG imaging has identified an incidence of labia and perineal oedema of 61% in secondary and 38% primary lymphoedema. Objectives were to identify the incidence of FGO and its impact on lifestyle, to increase patient information and offer early treatment with ongoing education of therapists, ensuring confidence and improved patient quality of life.

Material-Method: As part of routine assessment, patients were asked prior ICG imaging if they considered they had FGO. We collated the symptoms experienced and their affect on lifestyle, intimacy, sexuality and health. FGO was confirmed though ICG imaging. Unique imaging protocols were followed to ensure the greatest possibility to visualize FGO. Responses were collated, ICG images were taken, reported and informed of. Solutions for management were discussed and implemented.

Results: Results demonstrate that the incidence of FGO is higher than previously documented. Our results show 61% in secondary lymphoedema and 38% primary. ICG was seen to areas of the genitalia, mons pubis and the perineum. Location appears to be dependent on surgery, radiotherapy dose/type, and lymphatic status.

Conclusions: It is important to drive a change through education and awareness of FGO, to all HCP's and medics

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regarding identification and early intervention, ensuring equity of treatment like that of breast oedema in breast cancer survivors. Evidence gained through assessment allows for a change in practice for early intervention, ultimately improving quality of life.

HIGH LEVEL OF LIPIDS RETENTIONS IN STAGNANT TISSUE FLUID/LYMPH MAY BE RESPONSIBLE FOR ADIPOCYTE HYPERTROPHY AND HYPERPLASIA IN LYMPHEDEMA

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Objective: Advanced obstructive lymphedema is characterized as excess of interstitial fluid with proteins and overgrowth of fibroblasts and adipocytes. Albeit the proliferation of fibroblasts and collagen deposition has been documented, the mechanism of adipocyte hypertrophy and hyperplasia remains obscure. The question arises whether excess lipids in the tissue fluid/lymph in lymphedema are not a source of those accumulating in adipocytes. So far, no studies in this direction have been reported. Our aim is to measure the concentration of lipids in normal and lymphedema lower limbs tissue fluid/lymph and estimate how much can be retained under the condition of no lymph flow.

Method-Material: Thirty-five patients with lower limb lymphedema stage II-III served as tissue fluid/lymph donors. Edematous subcutaneous tissue was punctured, and tissue fluid was harvested. The concentration of the wide spectrum of lipids and apolipoproteins was measured.

Results: Total cholesterol 40±25 (serum 140±65), HDL 20±20 (42±12), LDL 10±12 (90±20), triglycerides 24±20 (32±18), APO1A 10±10 (140±80), APO B 6±2 (75±20), lipase 6±4 (22±4) mg/dL. Evidently high tissue fluid/level of cholesterol and triglycerides.

Conclusions: Present data confirm the previous ones that with the extracellular fluid volume of a lower limb 2.3L, the total mass of cholesterol is this compartment would be 460mg/dL and triglycerides 420mg/dL Retention of such evident mass in the tissue fluid/lymph under the condition of lymph stasis creates conditions for increased lipid absorption by adipocytes.

PEDIATRIC LYMPHEDEMA TREATMENT

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Primary and secondary lymphedema in children is relatively rare, but has significant and lifelong burden of having to manage chronic swelling and prevent secondary complications. Pediatric lymphedema may affect the extremities, trunk, genitals, head-face and rarely the internal organs, and cause life-long physical, psychological and social problems. There is no cure for this lifelong condition, but complete decongestive therapy (CDT) comprising skin care, manual lymphatic drainage, multilayer bandaging, exercise, pressure garments and self-care education, is the gold standard of lymphedema treatment. CDT reduces the volume, decrease the incidence of complications (like pain, infection, wounds) and improve quality of life. The CDT principles resemble to those for adults but some modifications may be needed in manual lymphatic drainage, compression degrees of bandaging and pressure garments. In addition

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self-care management techniques are the cornerstone of the therapy and long-term well-being. Children growing up with lymphedema can struggle during key developmental stages and have to struggle with low self-esteem, and social and lifestyle restrictions. This can be even harder for the families who are desperate to understand what is happening to their child, and who are seeking for true diagnosis, information and suitable management for their child's condition. Therefore, pediatric specific management strategies should include teaching parents and adolescents to take active role in the management, encouraging normal physical activity and the inclusion of psychosocial support among children. During the life-long maintenance phase, compliance and adherence of children to self-management is essential to provide adequate symptom control in this chronic progressive condition.

AN ETHNOGRAPHIC STUDY OF A CHILDREN'S CAMP FOR LYMPHOEDEMA

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Objective: The aim of this study was to explore how self-management is taught, learnt and experienced during a three-day educational Lymphedema Camp for parents of children with lymphedema in Turin, Italy.

Method-Material: Participants (professionals, parents and children) were observed during camp activities and interviewed informally and formally in focus groups. The embodied nature of the experience expressed by both professionals, parents and researchers became the analytical focus for understanding the felt tensions in the teaching and learning of self-management to families.

Results: The affective sensibilities associated with the uncertainties involved in teaching and learning self-management skills were palpable given that: young people are now expected to take up strict time-consuming self-management regimes (often via the support of a parent) where 'evidence based' outcomes are uncertain or may not match the outcomes wanted by a young person (varying in age and therefore ability or willingness to engage); or where there are tensions within the family; and the variety of different professionals involved means techniques varied but where these professionals also lacked the necessary skills training to guide them in how to teach self-management.

Conclusions: An analytical focus on the distress, doubt, fear, loneliness, guilt and moralism felt by professionals, parents and the researchers support us to identify the character of the problems associated with performing best practice care guidance where there is a lack practical support or resources for how self-management in this population should be achieved to avoid tensions between professionals and families more training on this is required.

COVID-19 PANDEMIC AND LYMPHOEDEMA: WHAT COEXISTENCE?

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Objective: Lymphoedema is a chronic disease with an evolutionary course without a suitable management. For this reason we have decided to analyze the coexistence of lymphoedema with Covid-19 pandemic.

Material-Methods: During the 2020 lockdown there was the complete suspension of the rehabilitative treatment, public and private, and therefore the patients did not have a response to their disease. In our centre, only the lymphologist examined patients with urgent clinical needs, after a triage call, but the team was always available to provide advice through phone-video calls.

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In the post-lockdown, according to the intermittent government restrictions, we started again the rehabilitative treatments (environmental-personal hygiene rules, protective devices, U.V. air filtration, phone triage). For patients in follow-up, in this Covid-19 pandemic, the vademecum has always talked about self-management that we have always included in the rehabilitative project as a therapeutic education (self-assessment of oedema, skin care, breathing exercises, manual self-drainage, home pressotherapy, self-bandaging, management of the elastic brace, respect of behavioural-rules, correct diet, physical activity).

Results: In the first phase, clinical worsening in patients (26%), was due to psychological distress, family problems and economic concerns that induced less-non attention to self-management previously learned. Psychological distress for the fear of contagion, still leads some patients to postpone rehabilitative treatment.

Conclusions: During the lockdown there was the suspension of the rehabilitative treatment, but urgent clinical evaluation and phone-video calls really limited the clinical worsening. Following this, we are carrying out the rehabilitative treatment in environmental, team and patient safety.

COVID-19 AND LYMPHEDEMA PATIENTS: FIRST RESULTS AND CONCLUSIONS

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Objective: CoViD-19 has affected people around the world, including people with lymphedema, both primary and secondary (with oncological history as well). From the beginning it was not clear should we consider these patients as a group of high risk of CoViD-19 severe course, how should we approach for vaccination and what is happening with lymphedema if a person got infected. The aim of the study was to answer on these questions and to make a guideline for lymphedema patients.

Material-Methods: A systematic literature review - PubMed, Medline, Cochrane, and ALF, ILF, LE&RN, LSN, RUSSCO, ESMO, ASCO were observed. Also we made analysis of our lymphedema (primary and secondary) patients clinical cases (256), to find out what were the morbidity rate of CoVid-19, the mortality rate, the effects on the lymphedema, the vaccination effects, and compared to common statistics and to their family members without lymphedema.

Results: The morbidity rate in lymphedema patients was not higher than in average population, the mortality rate, severe cases were lower than in population. Lymphedema was not becoming worse during the infection if person continued to follow regular LE recommendations. Vaccination was not causing severe side effects in LE lymphedema (if no other severe chronical conditions).

Conclusion: Lymphedema itself was not a risk factor of CoVID-19 severe course or higher mortality risk. CoVid-19 was not a cause of lymphedema aggravation if person continues to follow recommendations. Lymphedema should not be a contraindication for vaccination, should be administered to a limb without lymphedema.

THE IMPACT OF COVID-19 PANDEMIC LOCK-DOWN ON PATIENTS WITH LYMPHEDEMA

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Objective: The COVID-19 pandemic poses a challenge to the management of lymphedema. The aim of this study was to assess general health conditions and to evaluate the problems and concerns of lymphedema patients in regard to access to care and provision of management and control follow-ups, during the lockdown period between March-June 2020.

Material-Method: A web-based online-survey which included questions about demographical/clinical properties, compliance- to-restrictions and self-management complications, needs, difficulties on access to health care as well as presence of psychological-symptoms, was applied.

Results: Two-hundred-and-three patients replied. Majority of them (73.4%) were between 30-60 years-old and had high school/university education (67%). The duration-of-lymphedema was more than 3years and site was commonly extremities as grade2 in 70.5% patients. Majority of them adhered to stay-home warnings(88.7%). Most of them reported weight-gain (63.1%) and skipped self-care methods(81.8%). 17% of them had wound and/or cellulitis. 40% of them needed to apply health-centers to renew pressure garment but could not reach. More than 70% of patients had sleep-disorders and anxiety/stress. Majority of patients used social-media and television to get information related with COVID-19 and the exposure time was commonly more than 2 hours.

Conclusion: The COVID-19 lock-down had a great impact on lymphedema patients' healthcare not only from medical but also from the psychosocial aspects. All these implications have to be identified and dealt with properly to avoid concerns and consequences for future pandemic-lock-down. Lymphedema services should be well prepared to deliver virtually, enable effective care and share knowledge in order to meet their needs.

COVID -19 INFECTION INDUCED DERCUM'S DISEASE (ADIPOSA DOLOROSA)

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Objective: Dercum disease is a rare disorder of unknown etiology that presents with painful subcutaneous fatty growth of various sizes. We present 2 cases of Dercum's disease development following Covid-19 infection.

Method-Material: Case 1 is a 31-year-old woman with stage I lipedema with new onset of multiple subcutaneous painful nodules at different areas of her body 3 months following Covid-19 infection. Case 2 is a 66-year-old diabetic woman with history of left upper extremity swelling, painful nodules in the left breast, left arm and abdomen 5 months following Covid-19 infection.

Results: Clinical diagnosis was confirmed with ultrasound study visualizing multiple "blush-like" hyperechogenic subcutaneous fatty nodules of different sizes.

Conclusions: Ultrasound study objectively measure the severity of the disease. Early diagnosis and early treatment may prevent further damage of the Dercum's disease.

THE MAGNIFICENT DESCRIPTION OF THE CARDIOVASCULAR SYSTEM BY THE GREEK PRE-SOCRATIC PHILOSOPHERS ALCMAEON OF CROTON AND EMPEDOCLES

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Objective: The Pre-Socratic philosophers (6th- 5th century BC) with main representatives the Milesians (Thales, Anaximander, Anaximenes), the Pythagoreans (Pythagoras), the Eleates (Xenophanes, Parmenides, Zenon, Melistos), the Atomics (Leucippus and Democritus), Empedocles and, finally, Anaxagoras were historically the first scientists who disconnected man from the myth and pointed out the value of research and logic.

Material-Method: Analysis of historical archives and bibliography

Results: In the past, both the Assyrians, the Babylonians, and the Egyptians considered the heart to be a basic organ of life and the seat of the intellect: every mental disorder comes from alterations that occur in the heart. On the contrary, according to Alcmeon, the seat of mental functions is the brain, while the heart is related to the veins, arteries and blood. He had probably performed anatomical experiments with animals, while he knew that blood was circulating in the arteries. Empedocles (495 - 435 BC) was born in Agrigento, Sicily. He was the son of Meton or Archinomus, a high-ranking member of the local government. Apart from being a philosopher, Empedocles was a very capable politician, orator, doctor, engineer and researcher. From his works we conclude that in addition to general Physics, he possessed important knowledge of Physiology and Medicine, Physiology, Anatomy and Embryology, while it should be noted that his work is characterized by meter speech, ie in the form of poems. Remarkable is the theory of the genesis of organic beings, which is developed on the basis of evolution, which made him an ancestor of Darwin.

Conclusion: According to Empedocles and Alcmeon, the essence of life, the "innate heat", is based in the blood and diffuses throughout the body, as blood moves through the complex vascular system, starting from the heart, which is therefore the center of system of this. Empedocles' theory is the first scientifically substantiated record of man for the phenomenon of blood circulation, which was based on a purely theoretical approach without the possibility of an experimental approach, which confirms the genius of the Greek philosopher.

MECHANISM HOW SECONDARY LYMPHEDEMA BECOME HEALED

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Objective: If the conservative treatment is given until the edema disappears and is stopped, the edema recurs mostly. How does it come?

Material-Method: Secondary lymphedema patients are investigated before and after the hyperthermia treatment (Lymphol.43,Suppl.218-220, 2010). Number of the investigated patients are mentioned in each examination.

Results: 1. CRP and histological T cell infiltration are decreased after the treatment. 2. Adhesion melecules become decreased after the treatment. 3.Free fatty acid becomes decreased after treatment and oral n-3 fatty acid is given during & after the treatment which makes the physiotherapy more effective. 4. Decreased anatomical epidermal barrier becomes the less after the treatment. 5. Tescin (Katoh V et al) found in the lymphedematous tissue increases TGFbeta. 6. Increased heat shock protein produced by the hyperthermal therapy decreases inflammation.

Conclusions: Decreased inflammation caused by Hyperthermia therapy helps healing of secondary lymphesema by decreasing. Inflammation.

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AMYLOID-β REDUCES CONTRACTION FREQUENCY OF SUPERFICIAL CERVICAL LYMPHATIC IN MICE

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Objective: Amyloid-β (Aß) accumulation is a common finding in Alzheimer's disease. Aß is removed from the brain via a glymphatic / lymphatic route, traveling through deep and superficial cervical lymphatic vessels (sCLV) to cervical lymph nodes. It is unknown if Aß itself alters sCLV function, potentially affecting its own removal and the development of Alzheimer's dementia. We hypothesize that sCLV function will be reduced by acute Aß and in the 5x-FAD mouse model of Alzheimer's disease.

Method-Material: sCLV from wild-type and 5x-FAD mice were excised and cannulated in a pressure myography system. Contraction frequency, ejection fraction and fractional pump flow (FPF, calculated as Frequency x Ejection Fraction) were measured as intralumenal pressure (cmH2O) was increased from 2, 3, 5, 7, 10. sCLV were exposed to 5 μM intralumenal Aß for 15 minutes prior to the experiment for the acute Aß condition.

Results: Exposure of sCLV isolated from wild-type mice to acute Aß significantly decreased frequency, particularly at intraluminal pressures > 2 cmH2O, without affecting ejection fraction or FPF. Similarly, sCLV from 5x-FAD mice showed a lower frequency than those isolated from wild-type littermates, without changes in ejection fraction or FPF.

Conclusions: Amyloid-exposed sCLV demonstrated a similar reduction in frequency in acute Aß exposure and in 5x-FAD mice. No differences were observed in ejection fraction and FPF, suggesting a small, albeit statistically not significant, increase in ejection fraction may compensate for reduced frequency. We predict that in vivo sCLV function is likely unchanged by acute Aß or in 5x-FAD mice.

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IDENTIFICATION OF PROTEOMIC PROFILE AND NOVEL PROTEINS CAPABLE OF BINDING CALCITONIN RECEPTOR-LIKE RECEPTOR IN PRIMARY HUMAN DERMAL LYMPHATIC ENDOTHELIAL CELLS

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Objective: Calcitonin receptor-like receptor (CLR) is a G protein-coupled receptor (GPCR) that is expressed in human skin and primary human dermal lymphatic endothelial cells (HDLECs). CLR-mediated signalling in lymphatic system is implicated in some skin-related diseases, including lymphoedema and melanoma. However, the pharmacological properties of CLR expressed in human cells and the CLR-mediated signalling remain poorly characterised. Consequently, CLR potential as a target for therapeutic intervention remains unclear. The aim of this study was to conduct whole proteome profile analysis of HDLEC and identify proteins capable of binding CLR.

Material-Method: HDLECs were cultured to 80% confluency and lysed in radioimmunoprecipitation assay (RIPA) buffer, containing protease and phosphatase inhibitors. CLR was immunoprecipitated from total protein lysates using an in-house rabbit anti-human CLR polyclonal antibody (LN-1436; Nikitenko LL et al., *J Cell Sci.*, 2006) captured with

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protein G magnetic beads. CLR depletion efficiency was examined by immunoblotting. All experiments were performed in quadruplicates. Proteome profiling was carried out using total protein lysate or on-bead trypsin digestion, followed by label-free liquid chromatography-tandem mass spectrometry (LC-MS/MS). Data processing, bioinformatics and statistical analysis was conducted using MaxQuant and Perseus software platforms.

Results: Complete depletion of endogenous CLR from whole cell lysates was achieved. From 4902 proteins identified by LC-MS/MS analysis in primary HDLEC, 23 were co-immunoprecipitated with CLR (fold change >1.8; adjusted p-value=0.025).

Conclusions: Our study is the first to identify a cohort of potential binding partners for CLR expressed in primary HDLEC, together with a comprehensive proteomic profile for these cells.

STIMULATION OF SYNTHESIS AND LYSIS OF EXTRACELLULAR MATRIX PROTEINS IN LYMPHEDEMA TREATMENT

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Objective: Fibrotic diseases pose a problem for overall health due to the chronic, progressive nature, the lack of a cure and the fact that such conditions are largely refractory to current medical and surgical treatment practices. Objective: The aim of the present study was to report the physiological stimulation of the synthesis and lysis of extracellular matrix proteins during the treatment of primary lymphedema.

Method-Material: A clinical trial was conducted involving the analysis of changes in type I and III collagen fibers and elastic fibers as well as changes in the thickness of the epidermis and dermis in 10 histological fields. Samples were taken from the skin before and after intensive treatment with the Godoy Method® adapted to the treatment of fibrosis. The selection of samples was random. The slides were stained with orcein, hematoxylin & eosin, picrosirius red and Gomori's reticulin stain. Weibel's multipoint method was used for the morphometric evaluation. The data were compared using the t-test with a 95% confidence interval.

Results: Significant changes were detected in all aspects of interest (thickness of the epidermis and dermis, type I and III collagen fibers and elastic fibers).

Conclusions: The present findings demonstrate the physiological stimulation of the synthesis and lysis of the main components of the extracellular matrix, such as type I and III collagen fibers and elastic fibers as well as a reduction in the thickness of the epidermis and dermis in cases of fibrosis through the adequate stimulation of the lymphatic system.

THE RELATIONSHIP BETWEEN EXTREMITY VOLUME, BODY AWARENESS AND LOWER EXTREMITY FUNCTION IN PATIENTS WITH UNILATERAL LOWER EXTREMITY LYMPHEDEMA: A PILOT STUDY

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Objective: In patients who develop lymphedema (LE) in the lower extremities, body awareness may be affected as well as limb volume and functionality. The aim of this study was to investigate the relationship between extremity volume, body awareness and lower extremity function in patients who developed LE in the lower extremities.

Material-Method: Twenty-two patients (17 women, 5 men, age: 45.63±17.07 years, body mass index: 30.94±8.14 kg/m^2) with unilateral lower extremity LE were included in the study. Extremity edema was evaluated with circumference measurement, and the volume of the affected limb was calculated with the Frustum model. Body awareness was assessed with the Body Awareness Questionnaire and lower extremity function was assessed with the Lower Extremity Functional Scale (LEFS). Pearson's correlation test was used for statistical analysis.

Results: 40.9% of the participants had primary LD (n=9), 31.8% had secondary LD (n=7), and 27.3% had phlebolymphedema (n=6). The volume of the affected extremity was 11454.04±5410.08 cm3, the body awareness questionnaire score was 96.09±13.20, and the LEFS score was 42.20±22.01. While there was a negative correlation between extremity volume and body awareness (p=0.009, r=-0.541), no correlation was found between extremity volume and lower extremity function (p=0.305, r=0.229).

Conclusions: As a result, it was determined that body awareness was negatively affected as the extremity volume increased in patients with unilateral lower extremity LE. However, a relationship between extremity volume and lower extremity function could not be obtained.

CYST OF MAJOR THORACIC DUCT-A RARE CASE REPORT AND LITERATURE REVIEW

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Objective: The aim of this study is the presentation of a rare case of an aberrant cyst of thoracic duct.

Material-Methods: A 42-years-old male patient presented with mild swelling and pain at the left neck area with worsening of symptoms with food administration. The clinical examination confirmed the occurrence of a small swelling to the left neck area. The diagnostic control included neck ultrasound, CT scan and neck MRI and esophagus imaging with double contrast X-ray. The final diagnosis was cyst of major thoracic duct. The patient underwent surgical intervention.

Results: During the operation, a presence of cystic mass was identified in the region of major thoracic duct to the point of insertion to the left subclavian vein. It was done a left neck incision with dissection of left jugular vein kai carotid artery, recognition of neck portion of esophagus, dissection of left subclavian vein and vagus nerve. The hospital stay was 2 days without complications. The pathology report demonstrated cystic mass.

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Conclusions: The cyst of major thoracic duct is a rare situation. It can cause pain and swelling to the neck. The surgical excision is the treatment of choice. It's appropriate the dissection of all major vascular and other anatomic structures. It's crucial a cooperation of a surgical team with experience to the neck surgery and with excellent knowledge of surgical anatomy of this region. The standard technique allows excision of the mass at the point of insertion to the subclavian vein.

COMPLEX DECONGESTIVE THERAPY IN CHILDREN WITH LYMPHEDEMA

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Objective: Primary lymphedema (PL) in children is a challenge for children and parents. It can present at any age and requires individualized approach in management and treatment. The common problem of PL in children apart from diagnostics, is treatment options, including self-management, that should be done mostly by parents.

Material-Method: a systematic literature was conducted. Moreover, an analysis of our PL patients clinical cases (42), observed for 4 years was performed, to find the connection between severity of lymphedema symptoms and early/late start of CDT and the involvement of parents in the treatment process, and to understand what is the best way to adjust and supplement classic CDT for children of different ages.

Results: If CDT started more than 2 years after lymphedema onset, its results were not as good as when CDT started during the first year. The children, whose parents are performing CDT on regular basis (apart from clinical CDT) and comply to compression garments, show the best long-term results when compared to children who receive CDT in clinic only and wear compression garments. Orthopedic assessment and correction are crucial for muscle pump development and function. Psychological support is essential in management of these children and parents.

Conclusion: After noticing PL onset, CDT should start as soon as possible. After 1st CDT phase in clinic it should be done by parents on regular basis. Children with lymphedema should be observed by orthopedic specialists to choose the best option of orthopedic problems correction. Both children with lymphedema and parents need psychological support.

PHYSIOTHERAPY INTERVENTION IN THE CHILD WITH LYMPHEDEMA

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Objective: Primary lymphedema in children is rare and is an abnormality of the lymphatic system. Its prevalence is 1.15 estimated at 100,000 minors. Swelling usually appears from birth, although it can rarely develop later. Lymphedema in children is likely to coexist with other secondary causes, which if detected do not rule out primary pathology in the lymphatic system and occur in people under 20 years of age.

Method-Material: Lymphatic drainage is a massage technique that aims at the natural stimulation of the lymphatic system. Its main purpose is to stimulate the lymph nodes, in order to facilitate the circulation of lymph fluid. Lemphedema is divided into four stages. In stage 0 there is swelling in the lower extremity. At stage 1 the swelling is evident in an analysis with the lifting of the limb. At stage 2 the curriculum in edema is no longer fermented does not decrease with the elevation of the limb and the appearance of hardening of the limb diamate. At stage 3 the third result that lymphedema is classified in the picture during the phase times and applications elephantiasis.

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Results: Conservative treatment includes epidural therapy (MLD/CDT) with lymphatic massage and bandaging, hydromassage, compression balloons, elastic bandage and elastic garment (glove-sock). Lymphatic drainage aims at the smooth flow of lymph, resulting in the elimination of toxins, the strengthening of the immune system, the increase of metabolism and in skin rejuvenation.

Conlusions: According to world guidelines the treatment with the best results is the complete decongestive therapy. It is recommended to exercise in the pool, and engage in sports. In extensive lymphedema the surgical approach by a specialized doctor to reduce it. Early diagnosis, prevention, self-management training and psychological support are the key elements that must be included to return to normalcy.

EARLY IDENTIFICATION OF 6-7 YEARS OLD CHILDREN WITH DEVELOPMENTAL COORDINATION DISORDER IN THE 1ST CENTRE OF EDUCATION AND COUNSELLING SUPPORT IN GREECE

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Objective: Motor skills and cognition have lately been studied simultaneously, due to the positive correlation between abilities and development. Recently, there is suggestions that children with Developmental Coordination Disorder (DCD) have their executive functions (EF) affected. The purpose of this study was to examine the effect of early identification of 6-7-years-old children reporting difficulties with organising and planning monitored with the Neuro-Kinaesthetic Assessment (NKA).

Material-Method: Twenty-six children were examined during a 3-month period in the Centre of Education and Counselling Support with the NKA reporting difficulties in motor coordination (gross and fine) by their teachers' reports. NKA dimensions include nervous system maturity, movement examination, spatial orientation, tactile examination and rhythm. A control group of twelve children considered as school matured were also examined randomly during a 4-month period. Neither group of children have received any kind of intervention at the time of the assessment. Two examiners were reporting at the same time on NKA for interobserver agreement.

Results: Reliability of NKA was measured with re-examination method counted for r=.74. Reliability between examiners was measured from r=.76 to r=.89. Results showed that the average total NKA assessment percent of the school mature group was 71.28%, while that of the DCD children group was 47.42%.

Conclusions: The authors suggest the importance of physical therapy early interventions in general schools and the understanding of EF in children development.

THERAPY FOR FETAL CYSTIC HYGROMAS

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Objective: Cystic hygromas are congenital malformations of the lymphatic drainage system and typically form on the neck, clavicle, and axillary regions. They are caused by formation defects of the lymphatic vessel and surrounding veins, resulting in lymph accumulation in the tissues[1]. Enlarged fetal cystic hygromas can be life threatening and are

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frequently concurrent with other complications and structural anomalies[2]. The most common forms of removal are surgical incision, simple drainage, and cauterization[3]. Surgical excision requires extreme care to avoid damage to the facial nerves. Postoperative complications can result in recurrences, scar formation, lymphatic leaks, hemorrhage, and infection. The study objective is to review and analyze existing standards of care for fetal cystic hygroma and explore options for novel therapy.

Material-Method: Comprehensive literature review.

Results: While there have been some reported cases of intrauterine therapy, only a small number of successfully completed drainage procedures have been reported, and most patients require structural correction afterbirth and the disease is not cured.

Conclusions: Fetal animal models are needed to explore novel intrauterine treatment of this devastating and debilitating disease.

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PHYSIOLOGICAL PRINCIPLES AND PRACTICE OF THERAPEUTIC LIMB COMPRESSION IN LYMPHEDEMA

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Objective: Compression therapy for lymphedematous tissues is based on application of force per area of the affected limb. The knowledge of hydromechanics of the edema fluid in tissues under compression is required for an efficient protocol of application of all compression methods. The conditions to be met for proximal movement of edema fluid are: level of exerted force to generate flow, timing sufficient to evacuate excess fluid, tonicity of skin and subcutaneous tissue (hydraulic conductivity). Moreover, sites of accumulation of edema fluid in the limb should be taken into account when applying local compression. Our aim is to measure the hydromechanics parameters in and under the compressed skin and visualize edema fluid mobilization.

Material-Method: deep tissue tonometry (10.0 mm depth, kg/sq.cm), tissue fluid pressure (wick-in- needle method, mmHg), tissue fluid mobilization force test (volume), near infra-red indocyanine green (ICG, fluorescence level), and isotopic lymphographies (fluid location and flow), ultrasonography imaging were applied in 50 patients with obstructive lymphedema of limbs.

Results: a. tissue fluid pressures were lower than those applied by IPC device, b. the higher the applied compression force the larger was flow volume. c. skin and subcutaneous tissue stiffness (deep tonometry) decreased at all limb levels, d. imaging tissue (edema) fluid flow pathways on lymphoscintigrams and real time flow on NIRF ICG video could be observed and was evaluated semi-quantitatively.

Conclusions: Adjustment of compression parameters to tissue stiffness, fluid accumulation volumes, and fluid movement ability (hydraulic conductivity of tissues) at various limb levels is indispensable for effective therapy.

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LOWER LIMB OEDEMA: DIAGNOSTIC AND THERAPEUTICAL APPROACH

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The edema of the lower limbs can be from local or systemic or mixed cases. Depending on the age of patient and clinical aspects, must follow distinct and personalized diagnostic-therapeutic paths.

The diagnostic investigations (clinical and instrumental) used are: pitting-test, Stemmer-sign, skin temperature, study of renal and hepatic function, PRO-BNP dosage, EchocardiocolorDoppler with regard to diastolic function, Lymphoscintigraphy, EchocolorDoppler.

In 325 patients affected by lower limb edema, aged 2 to 83 years (112 males and 213 females) was performed:

• Unilateral forms in aged <50 years: clinical examination, echocolorDoppler and possible Lymphoscintigraphy if not post-cancer

• Bilateral forms in aged >55 years: clinical examination, echocolorDoppler and possible Lymphoscintigraphy if not post cancer

• Unilateral forms in aged >50 years: clinical examination, echocolorDoppler possible abdominal CT and tumor markers

• Bilateral forms in aged >5 years: clinical examination, echocardiocolorDoppler, PRO-BNP dosage and study of hepatic and renal functions

All unilateral and bilateral forms aged less than 55 years have been treated with CDP. In the bilateral forms, pharmacological therapy was performed. In all forms, the elastic garment with fabric weft and compression class customized in the individual case was prescribed. In all cases, a partial regression of the volume and consistency of limbs was obtained with maintenance of results through the use of an elastic garment.

The study confirms the need to customize the diagnostic-therapeutic approach to edema of the lower limbs according to the individual anamnestic and clinical aspects.

GENETICS OF PRIMARY LYMPHATIC ANOMALIES

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Primary lymphatic anomaly is a heterogeneous umbrella term and splitting the patient group into smaller entities has improved our understanding of this condition. Through insights from genetics studies (human and animal) we are starting to understand the interconnection between genotype, phenotype, and disease mechanisms, and how this understanding can lead to possible treatment. In this talk, a case where a clinical and molecular diagnosis has led to the successful treatment of a patient with MEK-inhibitor will be presented. However, diagnosing can still prove challenging and an example of the complexities around EPHB4 genotyping and phenotyping will also be covered.

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MAGNETIC RESONANCE LYMPHANGIOGRAPHY FOR THE STUDY OF LYMPHATIC SYSTEM IN LYMPHEDEMA

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Objective: Imaging of the lymphatic system is difficult because of its structural and anatomical characteristics, and the conventional diagnostic method, radionuclide-based imaging, has the disadvantage of poor resolution. Magnetic resonance (MR) imaging has been shown the capability of depicting lymphatic channels in lymphedema recently. The purpose of this study was to evaluate the imaging of MR lymphangiography (MRL) in diagnosis of limb lymphedema and its possible role in the microsurgical management of lymphedema.

Material-Method: A total of 710 patients with primary lymphedema (n ¼ 378), secondary lymphedema (n ¼ 332), were enrolled in the study. Contrast-enhanced lymphangiography was performed with 3.0 T MR unit (Philips Medical Systems, Best, The Netherlands) after intracutaneously injection of gadobenate dimeglumine. Kinetic of enhanced lymph flow within lymphatics and lymph nodes as well as the morphological abnormalities of lymphatic system were evaluated.

Results: MRL was able to display the detailed anatomical changes in the vessels and nodes. In primary lymphedema, there are three major types of lymphatic system malformation: (1) only lymph nodes affected, (2) only lymph vessels affected, and (3) both lymph vessels and lymph nodes affected. In secondary lymphedema MRL clearly demonstrated tortuous and dilated collecting lymphatics in lymphedemtous limbs. MRL also provided information concerning the functional status of lymph transport in lymphatic vessels and nodes by real-time visualization of enhanced lymph flow in lymphatic channels and within lymph nodes.

Conclusions: Contrast MRL was capable of evaluating the anatomical and functional status of lymphatic vessels and lymph nodes in lymphedematous limb. This new imaging shows good potential for use in the diagnosis and surgical management of

THE MODERN METHOD OF EDUCATION IN THE FIELD OF SURGICAL ANATOMY OF THE LYMPHATIC SYSTEM

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Objective: Learning anatomy requires identification and comprehension of numerous structures within a three-dimensional (3D) space. Historically, anatomy courses utilize didactic lectures (oral presentations) and two-dimensional (2D) pictures to provide students with a basic knowledge of the various structures. Specifically, the lymphatic system is comprised of lymph nodes, the spleen, the thymus gland, bone marrow, the lymphatic tissue of the digestive system, and lymphatic vessels .It mainly produces immune cells, collects, and transports extravasated excess interstitial fluid and macromolecules from peripheral tissues, filters the lymphatic fluid, and removes foreign material.

Material-Method: To better understand the surgical anatomy of the lymphatic system, the embryology of the lymphatic system is of paramount importance in order to augment the knowledge of anatomical variations and malformations of the lymphatics. The first lymphatic structures called the lymph sacs, are seen in the 6-to 7-week-old embryo, when the cardiovascular system is already complete and functional. The earliest structure of the developing lymphatic system is the jugular lymph sac, located near the jugular section of the cardinal veins, hence it has been proposed the the

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lymphatic system sprouts from the veins "centrifugally". From time to time, medical students who are being taught anatomy in human cadavers, (undergraduates and postgraduates) were instructed to perform anatomical dissections and surgical operations. New methods of embalming such as with Thiel's solution with components, 4-chloro-3-methylphenol as well as various salts for fixation, boric acid for disinfection, and ethylene glycol for the preservation of tissue plasticity and silicone plasticization promote the quality of teaching have contributed to better teaching the surgical anatomy of the lymphatic system .

Results: New 3D technologies have been developed that allow students to visualize and actively rotate anatomical structures in three dimensions. Whether these new technologies can fundamentally improve student performance when used in conjunction with the traditional teaching methodologies is still a subject of debate. Best educational outcome measures for surgical anatomy of the lymphatic system and plethora of studies indicate that 3D technologies may be useful for student learning,

Conclusions: Modern educational techniques include the learning based course systems, active learning and horizontal stratification Beneficial is the right educational environment Anatomical Dissections, are valuable in the teaching of anatomy and especially of surgical anatomy. Anatomage Table and 3D Anatomy will play a pivotal role in the future

In this view, the Lymphatic System will be more easily understood concerning its surgical anatomy.

LYMPHA TECHNIQUE IN SKIN MELANOMA TREATMENT

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Objective: Groin (GD) and axillary (AD) dissection for melanoma are burdened by a high incidence of lymphatic complications, both early (lymphorrhea, lymphoceles, lymphangitis, wound dehiscence) and late (lymphedema). These complications seriously compromise patients' quality of life and can modify the therapeutic project, delaying adjuvant therapy, too. Ly.M.P.H.A. Technique proved to be effective in reducing the incidence of breast cancer related lymphedema. It consists in performing, at the end of the lymph node dissection, a multiple lymphatic-venous anastomosis between arm lymphatics coming from the upper limb, afferent to the axillary lymph node and previously identified by the BPV dye, and a collateral branch of the axillary vein. The purpose of our study is to verify the effectiveness of Ly.M.P.H.A. technique also in reducing lymphatic complications following lymph node dissection for trunk melanoma.

Material-Method: The study includes 22 patients who underwent lymph node dissection, 9 AD (I, II and III level) and 7 GD. Exclusion criteria were patients with melanoma of the extremities and patients with metastatic disease (4 AD patients, 2 GD, for a total of 6 patients). In patients who are candidates to GD, lymphatic vessels of the lower limb and a collateral branch of the great saphenous vein were used for the anastomosis.

Results: We assessed the incidence of lymphatic complications (lymphorrhea, lymphoceles, lymphangitis, lymphoedema) and wound complications (wound infection and wound dehiscence). Average amounts of lymphatic leakage from drains, average time of persistence of the drains, operative times were also evaluated. The follow-up period was 2 months-4 years. The results showed a significant reduction in short and long term lymphorrhea, in average time of persistence of the drains and in incidence of secondary lymphoedema, compared to a moderate increasing of operative times.

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Conclusions: Ly.M.P.H.A. technique proved to be effective in reducing early- and late-onset of lymphatic complications in patients undergoing lymph node dissection for trunk melanoma.

This leads to a reduction in hospitalization, socio-health costs and an improvement in the quality of life of patients.

EVALUATION OF LOWER EXTREMITY LYMPHEDEMA WITH SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHY (SPECT)

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Objective: Indocyanine green lymphography (ICG-L) is applied in evaluation, mapping, and navigation of lymphedema management, but cannot visualize deep lymph flows. Single photon emission computed tomography/computed tomography (SPECT/CT) allows 3-dimensional visualization of superficial and deep lymph flows, but little is known on relationship between findings of SPECT/CT and ICG-L. This study aimed to evaluate relationship between them.

Methods: Medical records of secondary lower extremity lymphedema (LEL) patients who underwent SPECT/CT and ICG-L were reviewed. Characteristic SPECT/CT findings were detected by comparing findings between lymphedematous and non-lymphedematous limbs; a lymphedematous limb was defined as a limb with abnormal lymph circulation on ICG-L. Prevalence ratios of characteristic SPECT/CT findings were compared between lymphedematous and non-lymphedematous limbs.

Results: Thirty-four limbs of 17 LEL patients were included; 6 non-lymphedematous limbs and 28 lymphedematous limbs. Characteristic SPECT/CT findings included delayed washout of lower leg lymphatics (DWL), oligo-enhancement of inguinal lymph nodes (OLN), discontinuous early enhancement of lower leg lymphatics (DEL), and non-enhancement of deep lymphatics (NED). Between non-lymphedematous and lymphedematous limbs, significant differences were found in OLN (0% vs. 64.3%, P = 0.004) and DEL (0% vs. 67.9%, P = 0.002), whereas not in DWL (16.7% vs. 42.9%, P = 0.231) or NED (66.7% vs. 57.1%, P = 0.667).

Conclusions: Characteristic SPECT/CT findings were elucidated, and OLN and DEL were specific to LEL confirmed with ICG-L.

INDOCYANINE GREEN LYMPHOGRAPHY FOR EVALUATION AND PROGNOSIS PREDICTION OF PRIMARY LOWER EXTREMITY LYMPHEDEMA

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Objective: Primary lower extremity lymphedema (LEL) includes a wide variety of etiology. Near-infrared fluorescence indocyanine green (ICG) lymphography has been applied in evaluation of secondary lymphedema of various body parts. ICG lymphography is considered useful also for management of primary lymphedema. This study aimed to evaluate feasibility of ICG lymphography for evaluation and prognosis prediction of primary LEL.

Material-Method: Medical charts and ICG lymphography findings of 31 primary LEL patients were reviewed and analyzed. ICG lymphography findings were classified according to visibility of lymphatics and distribution of dermal backflow (DB) patterns, and clinical characteristics were compared. Outcomes of lymphaticovenular anastomosis (LVA) performed on 53 legs were evaluated according to the ICG classification.

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Results: ICG lymphography revealed that there was no abnormal finding in all non-lymphedematous legs, and that there were abnormal findings in all lymphedematous legs. Primary LEL could be classified into 4 types on ICG lymphography; proximal DB (PDB), distal DB (DDB), less enhancement (LE), and no enhancement (NE) pattern. Postoperative volume reduction after LVA surgery was significantly lower in patients with NE pattern than those with PDB pattern ($P < 0.05$).

Conclusions: Primary LEL can be classified into 4 types with different clinical characteristics and prognosis. LVA is hardly effective for patients with NE pattern.

THE EFFECTIVENESS OF MAGNETIC RESONANCE LYMPHOGRAPHY FOR ASSESSING REGIONAL PATTERN OF FLUID DISTRIBUTION OF SECONDARY LOWER EXTREMITY LYMPHEDEMA

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Objective: Indocyanine green lymphography (ICG-L) is becoming popular in lymphedema evaluation and navigation surgery, but cannot be used when a patient has bronchial asthma or iodine allergy. Non-contrast Magnetic Resonance lymphography (nMR-L) is increasingly used in lymphedema evaluation with its non-invasiveness. However, little is known on relationship between ICG-L and NMR-L findings. This study aimed to evaluate nMR-L findings in comparison to ICG-L findings.

Material-Method: Medical charts of secondary lower extremity lymphedema (LEL) patients who underwent ICG-L and nMR-L were reviewed. Regional findings of nMR-L were evaluated between lymphedematous and non-lymphedematous limbs; a lymphedematous limb was defined as a limb with ICG-L stage I-V, whereas a non-lymphedematous limb with ICG-L stage 0. Prevalence of each characteristic nMR-L finding was compared between lymphedematous and non-lymphedematous limbs.

Results: Seventy limbs of 35 LEL patients were included. ICG-L revealed ICG-L stage 0 in 10 limbs (14.3%), and ICG-L stage I-V in 60 limbs (85.7%). Characteristic nMR-L findings included reticular, honeycomb and some stripe patterns. There were significant differences between lymphedematous and non-lymphedematous limbs in reticular pattern (50% vs. 87.5%, $P < 0.001$), honeycomb pattern (0% vs. 37.9%, $P < 0.001$), and stripe pattern (22.5% vs. 74.2%, $P < 0.001$).

Conclusions: Characteristic nMR-L findings were clarified by comparing findings according to ICG-L findings. honeycomb pattern was most specific to secondary LEL.

CHARACTERISTIC COMPUTED TOMOGRAPHY FINDINGS OF SECONDARY LOWER EXTREMITY LYMPHEDEMA IN COMPARISON TO INDOCYANINE GREEN LYMPHOGRAPHY FINDINGS

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Objective: Computed tomography (CT) are one of the most widely applied imaging modality, but little is known on lower extremity lymphedema (LEL) cases. This study aimed to clarify characteristic CT findings in secondary LEL.

Material-Method: Medical records of secondary unilateral LEL patients who underwent CT were reviewed. Unilateral LEL was confirmed with ICG-Lymphogrphy(ICG-L); affected limbs showed dermal backflow on ICG-L, whereas the contralateral non-affected limbs do not. CT findings characteristic in LEL were clarified by comparing findings between lymphedematous limbs and non-lymphedematous limbs.

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Results: Thirty-four limbs of 17 patients were included. Characteristic CT findings included inguinal lymph node swelling (LNS), thickened fat layer (TFL), high density in the superficial fascia (HSF), high density in the deep fascia (HDF), fat shadow (FS), water accumulation (WA) in Deep Fascia (DF), WA in deep fat, WA in superficial fat, layered sign (LS), honeycombed pattern (HC), muscle edema (ME), Reduced muscle width (RMW) and skin thickness (ST). There were significant differences between non-affected and affected limbs in LNS (22% vs. 56%, P = 0.040), TFL (0% vs. 94%, P < 0.001), HSF (0% vs. 82%, P < 0.001) , HDF (0% vs. 53%, P < 0.001), FS (0% vs. 88%, P < 0.001), WA in DF (0% vs. 47%, P = 0.001), WA in deep fat (0% vs. 41%, P = 0.003), LS(0% vs. 41%, P = 0.001), HC (0% vs. 29%, P=0.015), ME (0% vs. 29%, P = 0.015), and skin thickness (1.00 ± 0.21 mm vs. 1.74 ± 0.91 mm, P < 0.001).

Conclusions: Characteristic CT findings of secondary LEL were clarified. TFL, HSF, and FS are useful findings with high sensitivity.

LYMPHOSCINTIGRAPHIC PATTERNS IN LOWER LIMB LYMPHEDEMA

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Objective: The aim of the study is to differentiate lymphoscintigraphic patterns, for a better understanding of the clinically assessable alterations and the compensation mechanisms between the superficial and deep circulation.

Material-Method: A retrospective study was carried out on lymphoscintigraphies of the lower limbs performed in 2019 and 2020 at University Hospital of Udine, for suspected or clinically ascertained lymphedema. An experienced nuclear medicine doctor selected one of 9 patterns for each lower limb in the study of superficial and deep network. The patterns were: 1) anatomical deficit 2) functional deficit 3) anatomical and functional deficit 4) ascent along the superficial and deep circle (compensation) 5) ascent only along the no injected circle (compensation) 6) visible collectors and DBF 7) ascent only along the no injected circle and DBF 8) Only DBF 9) the radionuclide remains at the injection site.

Results: Lymphoscintigraphic exams studied retrospectively were 67 (32 of 2019 and 35 of 2020). The anatomical alterations (pattern 1)mainly concerned the superficial circulation (21 vs 4). An important alteration of the deep circle (pattern 8 and 9) was found much more frequently in the study of the deep circle (25 vs 8). An ascent for the uninjected circle alone was much more frequent for the study of the deep system (22 vs 4). In 36 limbs the ascent was both along the superficial and deep circle.

Conclusion: The study presented is intended to constitute a step forward in the understanding of lymphoscintigraphic images and of the different circulatory pictures.

THE DEPICTION OF THE LYMPHATIC SYSTEM WITH 3D ANATOMY (ANATOMAGE TABLES) AND ITS CONTRIBUTION IN THE EDUCATION OF MEDICAL STUDENTS AND TRAINING YOUNG DOCTORS

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Objective: The lymphatic system consists of lymphatic capillaries, lymphatics and lymphocytogenic organs. It also includes the lymphoid spaces of various organs such as the pericardial cavity, the peritoneal cavity and the cavities of the central nervous system. Due to the fact that the peripheral lymphatic system is considered a closed cavity, any subcutaneously injected fluid, it enters the lymph nodes by dialysis. As a result, it is impossible to inject such a contrast medium in the embalming fluid.

Material-Method: The study of the lymphatic system on cadavers is extremely difficult because the lymphatics are indistinguishable from the surrounding tissues. Another major technical difficulty is that in the elderly, who are the most common cadaveric material, many lymph nodes are malformed and disappear. In addition, the lymphatic system presents with many anatomical variations. Our knowledge of the lymphatic system was supplemented by the use of special contrast techniques on the living (lymphangiography).

Results: Nowadays, the lymphatic system can be depicted with the Anatomage Table which is the most technologically advanced anatomical 3D imaging system. It is both a digital library of human bodies and a clinical diagnostic tool thanks to the visualization of medical methods such as CT, CBCT and MRI with more than 2 million 3D anatomical images.

Conclusions: This makes the process extremely friendly, understandable and with a high degree of repeatability to medical students and training young doctors in Lymphology. It is the most advanced procedure with special tools that allow optimal understanding of the anatomy of the lymphatic system, for attending doctors and Postgraduate medical students.

POPLITEAL LYMPH NODES VISUALISED ON LYMPHOSCINTIGRAPHIC INVESTIGATIONS OF LOWER LIMB LYMPHEDEMAS: OF DEEP AND/OR SUPERFICIAL LYMPHATIC DRAINAGES? ADDED VALUE OF THEIR SPECT-CT INVESTIGATION: FIRST RESULTS

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Objective: Popliteal lymph node(s) (PopLN) visualisation is frequently reported in the framework of lower limbedemas (planar whole body scan) lymphoscintigraphic investigations (Lysc) after the subcutaneous injection of radiocolloids in the first interdigital space of the feet (SLysc) and are usually reported as related to deep drainage. They also are normally expected in the framework of the investigation of the normal deep lymphatic system after injection of radiocolloids beyond the Achilles wheel (DLysc). However, these PopLN can also be related to superficial drainage. The objective of our study was to report the interest of SPECT-CT in these cases.

Material-Method: Retrospective review of 14 exam (5 SLysc and 9 DLysc: without dermal backflow) where "deep" lymphatic vessels (LV) (usually located median at the level of the calf-s) and PopLN were seen and analysis of the added value of spect-ct.

Results: All the PopLN seen on planar WBS of SLysc were confirmed to be related to deep LV drainage on spect-ct. However, among the PopLN seen on planar WBS of DLysc, "true" deep LV could not be seen on spect-ct in 3 cases and their visualisation (of these PopLN) could be related to superficial LV medially located at the posterior part of the calf.

Conclusions: PopLN seen on planar lymphoscintigraphic WBS can be related, not to deep LV but to superficial LV (even when they seem "deep"). SPECT-CT evaluation of their drainages is thus recommended in such cases due to their therapeutic implications. (updated series will be presented with a larger population).

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CANCER AND THE LYMPHATIC SYSTEM: AN EMERGING FIELD OF ONCOLYMPHOLOGY

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Cancer may be initiated from DNA mutations or epigenetic effects due to carcinogens, host genetic risk, chronic inflammation and others. Mutation gives rise to the unique characteristics of cancer heterogeneity with various clones competing to survive within the cancer microenvironment (CM) consisting of fibroblasts, lipocytes, immune cells, lymphatic and vascular vessels and other parenchymal cells. The mutant cancer cells grow by expansion through unique signaling pathways. The cancer cells tend to spread first through the sentinel lymph node (SLN) in over 90% of the time. The SLN serves as a primary gateway for the cancer cells to proliferate and spread further to distant sites. Occasionally, cancer cells may bypass the SLNs to spread through the blood vessels. VEGF-C has been found to induce lymphangiogenesis in the SLNs facilitating distant metastasis. The molecular mechanisms of CTLA-4 and programmed death (PD-1) pathways have enabled us to understand how cancer cells can escape the immune surveillance. Akin to Darwin's survival of the fittest from the influence of natural selection, aggressive cancer clones have achieved the survival advantage as the 'fittest' clones with the CM exerting the selective force to favor these cancer clones to develop. To date, the immune checkpoint pathways may be blocked using agents such as ipilimumab (anti-CTLA-4), pembrolizumab and nivolumab (both anti-PD-1) with significant tumor responses resulting in the FDA approval of these drugs. The interaction between the host immune system and cancer growth is highly complex. Perhaps, artificial intelligence needs to be developed to elucidate the proliferation of cancer cells in relationship to the structure and physiology of the lymphatic system in a new field, which may be coined as Oncolymphology.

EXTENDED LYMPH NODE DISSECTION FOR TESTICULAR CANCER-RESULTS AND COMPLICATIONS

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Objective: The aim of our study is the presentation of our experience to the management of patients with testicular cancer.

Material-Methods: Retrospective study conducted between 2017-2020 with 18 patients with testicular cancer who underwent extended lymph node dissection. All patients had had primarily treated with removal of the testicle and postoperative chemotherapy. During follow-up, ultrasound and CT scan of abdomen demonstrated extended lymph node invasion in the abdomen. There was no secondary metastasis at the imaging with MRI and PET scan.

Results: All patients underwent explorative laparotomy. We performed extended lymph node dissection with removal all pelvic lymph nodes. The dissection extended to the aortic root with radical clearance of retroperitoneal region. There was done fully recognition of the course of ureters and the target was a resection. For 1 patient, it was impossible the R0 resection due to the extension of disease with infiltration of multiple organs. The pathology report found 18-65 lymph nodes per patient, with invasion of 6-22 lymph nodes.During follow up there was no recurrent disease.

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Conclusions: The patients with testicular cancer present commonly recurrent disease with invasion of intraabdominal lymph nodes. These cases need careful preoperative evaluation. Intraoperatively, the lymph node dissection should extend to the aortic root with standard technique, since the surgical management is the only final curative choice. It's appropriate a surgical team with experience to these complex interventions with target a R0 resection and minimization of complications.

DISTINGUISHING AXILLARY LYMPH NODE METASTASIS FROM BREAST PARENCHYMAL LESIONS SOLELY WITH THE KEY ANATOMICAL STRUCTURE OF THE CLAVIPECTORAL FASCIA

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Objective: In cases of axillary cancerous masses physicians are called on to postulate a definite diagnosis prior to any invasive procedure. The present study aims to highlight the clavipectoral fascia as the unique anatomical boundary for adequate differential diagnosis.

Material-Methods: During 2019-2021, 4 post-menopausal women proceeded to our institution with a same clinical presentation, a palpable nodule in the axillary fossa. Our team was facing a diagnostic dilemma, was the lesion a primary breast cancer arising from the tail of Spence or was it a metastatic lymph node mass extending into the tail of the breast? Even though preoperative biopsies did not identify lymphatic tissue, we were not absolutely convinced that the lesion was not complete infiltration of lymph nodes, given the radiological findings. Destruction of the normal lymphatic structure due to complete infiltration would still give the impression of a primary breast cancer under microscopic examination. The diagnostic question could only be answered during surgery.

Results: In 3 out of 4 cases, the mass was located superficial to the clavipectoral fascia and a diagnosis of adenocarcinoma of Spence's tail was established. In one case, the mass was beneath the fascia due to breast cancer with lymph node metastasis. Hence, patient had to receive neo-adjuvant chemotherapy prior to surgical resection.

Conclusions: According to our observations, any histologically confirmed axillary breast malignancy that is found superficial to the clavipectoral fascia confirms an axillary tail of Spence tumor, while any mass beneath the fascia confirms axillary lymph nodes.

THE IMPACT OF A SCREENING AND EARLY DETECTION PROGRAM FOR LYMPHEDEMA IN MELANOMA PATIENTS

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Objectives: Early detection providing prompt intervention and risk reduction for the development of lymphedema

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associated with melanoma surgery is receiving increased interest and research attention. Strategies and methodology for early detection are continuously improved. Bioimpedance Spectroscopy (BIS) technique is used in the Lymphedema Clinic at the CPMC Cancer Center and shown to both detect early subclinical lymphedema and reduce the development of lymphedema.

Material-Methods: Melanoma patients were seen by a nurse in pre-operative visit and were educated in 1) risk reduction practices, 2) signs and symptoms of lymphedema 3) instructions of early therapeutic range of motion, diaphragmatic breathing and ongoing exercise habits. Patients were measured on SOZO for baseline measurements: L-dex (BIS) limb volume change >7 to >10% then 2 weeks post-op and followed every three month for 1 year.

Results:

Baseline Attribute	Number of Case (N)	Mean ± SD
Age	101	61.3 ± 15.1
		Percentage (%)
Body Elements		
Leg	56	53.3%
Arm	49	46.7%
Pre-Surgery Baseline		
Normal (<7.0)	87	82.9%
Slightly High (>7-10)	6	5.7%
High (≥10)	12	11.4%
Lymph Nodes Removed		
Lymph Nodes ≥ 3	55	54.5%
Lymph Nodes < 3	19	18.8%
Not Recorded	27	26.7%

Pre-Surgery L-Dex	Number of Case (N)	1st Post-op L-Dex ≥ 7 (Percentage %)	1st Post-op L-Dex ≥ 10 (Percentage %)
Normal (<7.0)	67	26 (38.8%)	20 (29.9%)
Slightly High (>7-10)	5	4 (80.0%)	1 (20.0%)
High (≥10)	10	6 (60.0%)	6 (60.0%)

Conclusion: Our preliminary data showed significant number of patients developed subclinical lymphedema by SOZO criteria. Intervention was rendered and follow-up results are being collected. A Screening and Early Detection Program should be the Standard of Care in patients with cancer treatment and ultimately may prevent a chronic lifelong condition.

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IN VITRO CO-CULTURE METHOD TO STUDY THE ROLE OF HUMAN DERMAL LYMPHATIC ENDOTHELIAL CELLS IN IN-TRANSIT MELANOMA

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Objective: Melanoma is a skin cancer with 16,000 new cases in the United Kingdom every year. Up to 10% of patients develop in transit melanoma (ITM). ITM are cutaneous and subcutaneous lymphatic deposits of cancer cells distant from the primary tumour, not reaching the draining lymph node. We hypothesise that lymphatic endothelial cells play a role in ITM tumour microenvironment. In this study, we aimed to develop in-vitro co-culture of ITM-derived melanoma cell line (WM266.4) with primary human dermal lymphatic endothelial cells (HDLEC) as ITM model.

Material-Method: WM266.4 cells were from American Type Culture Collection. HDLEC were obtained from PromoCell and characterised by immunofluorescence and flow cytometry using pan-endothelial- (cluster of differentiation 31 and 144, CD31 and CD144, and von Willebrand, vWF) and lymphatic endothelial cell-specific (lymphatic vessel endothelial hyaluronan receptor 1, LYVE-1; prospero homeobox 1, PROX1; podoplanin, PDPN) markers and confocal microscopy or fluorescence-activated cell sorting (FACS). Prior to co-culturing, WM266.4 cells and HDLEC were labelled with calcein-AM™ and CellTracker™ Red, respectively. To confirm labelling efficiency, FACS was performed. Cells were co-cultured at 1:1 ratio for 24-72 hours, imaged using confocal microscopy and separated using magnet-activated cell sorting (MACS) with anti-human CD31-coated magnetic beads. Separated cells were cultured for further 72 hours and their purity was analysed as above.

Results: Our data confirmed that original HDLEC were a pure population and showed that both HDLEC and WM266.4 were labelled efficiently (100%), survived in co-culture for over 72 hours, could be efficiently separated using MACS and retained their characteristics.

Conclusion: In conclusion, a successful in vitro co-culture of WM266.4 and HDLEC has been established, presenting further opportunities for using this model to study ITM biology.

VASCULARIZED LYMPH NODE TRANSFER WITH VERSUS WITHOUT EFFERENT LYMPH VESSEL ANASTOMOSIS

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Objective: Lymphaticovenous anastomosis (LVA) and lymph node transfer (LNT) can be a choice of lymph flow reconstructions for progressive lymphedema. The efferent lymphatic vessel (ELV) is not usually used. However, bypassing lymph flows into venous circulation before filtration via lymph nodes may cause systemic infection and cannot preserve lymph node's function. To address this problem, efferent lymphatic vessel anastomosis (ELVA) is applied in lymphedema surgeries. This study aimed to evaluate impact of ELVA on LNT.

Material-Method: One-hundred-three lower extremity lymphedema (LEL) patients underwent LNT from the lateral thoracic region. Lymph node flaps were transferred to lymphedematous lesions via perforator-to-perforator anastomosis. ELVA was performed wherever possible using a nearby small vein as a recipient. Postoperative volume, compression strength, cellulitis, and donor site complication were evaluated.

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Results: There was no severe postoperative complications, nor donor site lymphedema. ELVA was performed in 96 limbs (ELVA group), whereas not in 83 limbs (control group). Volume reduction could be achieved in 145 limbs (82%), compression reduction in 99 limbs (57%), and cellulitis prevention in 64/68 limbs (94%). ELVA group showed significantly better volume reduction than control group at postoperative 1/2/3 years, while there was no significant lymphedematous volume difference at baseline.

Conclusions: LNT combined with ELVA showed better clinical outcomes. ELVA should be performed in LNT surgery wherever possible.

EFFECT OF CPT ON MICROSURGICAL OUTCOMES IN PATIENTS WITH BREAST CANCER RELATED LYMPHEDEMA FOLLOWING LNT AND/OR LVA

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Objective: As stated in the ISL Consensus Document 2020, microsurgical procedures like lymphaticovenous anastomosis (LVA) and lymph node transfer (LNT), in the treatment of breast cancer related lymphedema (BCRL), should always go hand in hand with complex physical therapy (CPT). The aim of this study is to analyze the effect of (different post-operative protocols of) CPT in patients with BCRL who had previous LVA and/or LNT.

Material-Method: Eligibility criteria for this observational longitudinal cohort study were adult women with unilateral LVA and/or LNT in the treatment of BCRL (stage I-II) following at least 6 months of unsuccessful CPT between 2011 and 2020. The primary outcome was the relative interlimb volume difference (RID) (%) between the affected and non-affected arm for the whole arm length as well as for segments of the arm. The Perometer® was used to measure arm volumes and to calculate volumes of arm segments at baseline (T0, prior to intervention) and one year following intervention (T1).

Results: Currently, the study results are being analyzed and will be presented during the congress.

Conclusions: Preliminary results indicate that the combination of different modalities of CPT and the intensity of CPT in post-surgical patients may play an important role in the success rates of LVA and/or LNT in BCRL patients. Further research is necessary to study different peri-operative CPT protocols to improve interprofessional BCRL management in clinical practice.

LYMPHEDEMA ASSOCIATED WITH BREAST CANCER TREATMENT THAT INCLUDES ALND: A RETROSPECTIVE ANALYSIS

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Objective: Lymphedema is one of the most serious late complications of axillary lymph node dissection (ALND) in breast cancer patients. The present study was performed in order to investigate the incidence and risk factors of lymphedema following ALND in primary breast cancer patients.

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Material-Methods: The study includes 582 patients with mean age 54,8 years that received surgical treatment including ALND for breast cancer between 1985 - 2013. All operations were performed by three lead surgeons. Data from patient records, operative notes, treatment notes and follow up notes were retrospectively reviewed. The incidence of lymphedema was determined, and the association of development of lymphedema with regard to BMI, age, disease stage, level of ALND and administration of postoperative radiotherapy was investigated.

Results: 64/582 (10,9%) of the patients that underwent ALND developed lymphedema. In 71,8% of these patients, the lymphedema of the ipsilateral upper limb occurred within one year after the surgery. Age and increased BMI did not correlate with increased risk of lymphedema. Dissection of level III axillary lymph nodes, as well as postoperative axillary radiotherapy were found to increase the incidence of lymphedema (RR=3,7, p<0,001 and RR=1,86, p<0,05, respectively). Lymphedema was more common among patients with stage III breast cancer (p<0,001).

Conclusions: Radiotherapy of the axilla and Level III ALND are associated with increased risk of developing lymphedema. In our study, increased BMI was not shown to influence the development of lymphedema. Prospective studies should identify patients who might benefit from less aggressive treatment options in the axilla.

WORKING PRESSURE OF COMPRESSION GLOVES IN BREAST CANCER-RELATED LYMPHEDEMA DURING HAND RANGE OF MOTION: A PILOT STUDY

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Objective: To determine the working pressure of custom made low-stretch compression gloves on the hand range of motion (ROM) in women with breast cancer-related lymphedema (BCRL). Additionally, hand grip strength was measured.

Material-Method: Controlled transversal descriptive pilot study between February and November 2019. Twenty-seven women with unilateral BCRL using custom-made class II compression gloves during an average of 8 hours a day were included. Pressure measurement were made using a hand dorsum transcutaneous pressure sensor (MICROLAB PicoPress) and a Jamar digital hand dynamometer was used to measure strength grip. IBM SPSS Statistics 23 were performed.

Results: Significant differences were found between transcutaneous pressure applied by the glove in rest position (13.85 mmHg) versus extension position (11.35 mm Hg), versus handgrip (24.81 mmHg) (p<0,000). The average working pressure between ranging positions of the hand was 13.46±4.76mmHg. There is an average strength loss of 2.27 kg in the affected hand whilst wearing compression glove (p<0,000).

Conclusion: Custom made low-stretch gloves class II maintain a pressure range that is modified throughout different positions, working pressure detected was 13.46± 4.76 mmHg. Wearing the compression garment involves a handgrip strength loss.

TISSUE DIELECTRIC CONSTANT (TDC) AND WATER DISPLACEMENT METHOD (WDM) CAN DETECT CHANGES OF MILD BREAST CANCER RELATED ARM LYMPHEDEMA

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Objective: Most commonly, volume measurements are used to evaluate effect of lymphedema treatment, but as the accumulation of lymph fluid can be local, this method may not always be the best. Tissue Dielectric Constant (TDC), can be applied to identify local lymphedema changes, but have not been used before when evaluating treatment in mild breast cancer related arm lymphedema (BCRL). The aim of this study was to examine if TDC and water displacement method (WDM) can measure changes in mild BCRL during six months standard treatment. More specifically, we examined changes within and between three defined groups based on lymphedema thresholds of TDC and WDM at start of treatment, as well as changes of the highest TDC ratio and site.

Method: Forty-six women with mild BCRL, received treatment with compression sleeves, and instructions about self-care. Local tissue water was measured by TDC at six defined sites and lymphedema relative volume (LRV) by WDM before treatment and at first, second, third and sixth month.

Results: There was a significant decrease in the site with the highest TDC ratio, as well as LRV at all follow-up visits. At six months, TDC ratio had decreased mean -0.26 ($p<0.001$) and LRV mean -3.3% ($p<0.001$). There was a significant difference between the defined groups in change of TDC ratio, but not in LRV. Sixty percent changed the overall highest TDC ratio to another site during six months.

Conclusion: Both TDC and WDM could detect changes in mild BCRL but should be interpreted separately.

VASCULAR SURGICAL REPAIR WITHIN THE LYMPHATIC TRANSPORTING SYSTEM: PATHOPHYSIOLOGICAL, NUCLEAR MEDICAL AND CLINICAL ASPECTS

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Objective: Lymphatic grafting has been most extensively investigated regarding long term patency, experimental and clinical results, and is based on a most closely consideration of the pathophysiology of secondary lymphedema.

Material-Method: The patency of the lymphatic bypass in the case of a local interruption of the lymphatic vascular system has been controlled by indirect and MRT-lymphangiography and by lymphoscintigraphy. Volume determination was performed according to Khunke. The lymphatic transport was controlled by nuclear medical investigations.

Results: Long term patency of the grafts has been shown for more than 20 years. Significant long term volume reduction was proved longer in arm than in leg edema. Lymphatic grafting enabled the normalization of the lymphatic-transport. Complications of the autogenous lymphatic grafting were rare. A nuclear medical study showed that harvesting under strict precaution can be performed without any adverse effect on the lymphatic transporting system.

Conclusions: 40 years of experience with autogenous lymphatic grafting in more than 400 patients, bypassing a local interruption of the lymphatic vascular system, confirm the valuable profit of autogenous lymphatic grafting for the majority of the patients.

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THE ROLE OF EXCRACELLULAR MATRIX IN ENDOTHELIAL CELL ORGANIZATION AND FUNCTIONS

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Objective: All surgical procedures heavily rely on the human body capacity to repair and regenerate. Therefore, the understanding of regenerative mechanisms is important for an enhancement of the surgical efficiency and outcome. The role of extracellular matrix (ECM) cues in endothelial cell (EC) organization and function is not well understood, despite the progress in characterization of nano- to microscale fibrillar ECM networks in blood and lymphatic vessels. Instead, the predominant modulator of EC organization and function is traditionally thought to be hemodynamic shear stress (blood or lymphatic shear flow). There is a common understanding in vascular medicine that uniform shear stress induces parallel-alignment of ECs and enhance their anti-inflammatory properties, whereas disturbed flow induces a disorganized configuration of ECs and switches their behavior to pro-inflammatory, which can lead to atherosclerosis and thrombosis. Lymphatic vasculature experiences oscillatory fluid flow which, in particular, activates several transcription factors necessary for the maintenance of lymphatic valves. Moreover, the shear flow plays a fundamental role in lymphatics, by inducing development and regeneration of lymphatic vessels. Nowadays, the key surgical treatments of lymphedema, such as LVA and VLNT, target to reconstruct or restore a physiological lymph flow, which may subsequently reduce pathological tissue changes associated with lymphedema. Our goal is a further enhancement of the surgical lymphedema treatments.

Material-Method: The alignment, migration, proliferation, and anti-inflammatory behavior of ECs have been analysed when they were cultured on nanofibrillar collagen membranes with aligned or randomly oriented pattern.

Results: ECs cultured on aligned nanofibrillar membranes remained well-aligned and migrated predominantly along the direction of aligned nanofibrils, despite exposure to shear stress orthogonal to the direction of the aligned nanofibrils [1,2]. Furthermore, in contrast to ECs cultured on randomly oriented membranes, ECs on aligned nanofibrillar films exposed to disturbed flow had significantly reduced inflammation and proliferation, while maintaining intact intercellular junctions.

Conclusions: These findings help in guiding the development of novel devices including BioBridge Collagen Matrix to enhance the existing surgical treatment of lymphedema.

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SURGICAL LYMPHOLOGY: WHAT MORE THAN 30 YEARS OF CLINICAL EXPERIENCE TEACH YOU?

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Objective: Lymphatic surgery is acquiring an increasing role in the treatment of lymphatic diseases. The aim of the study is to identify what are the lessons that we can draw from a clinical experience of over 30 years.

Material-Method: The author reports the clinical experience in the treatment of primary and secondary lymphedema

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of the upper and lower limbs, as well as of the external genitalia. The surgical technique adopted in the various cases and the technology used over the years are reported. Taking charge of the patient included the collection of the clinical history, the specialist visit, the evaluation of the required instrumental tests, in particular the echo-color-Doppler, lymphoscintigraphy and ultrasound. Centimeter measurements and the percentage of fluids and interstitial fibrosis were also acquired. These measurements were also performed in the post-operative follow-up.

Results: The results were evaluated in terms of volumetric reduction of lymphedema, decrease of tissue consistency, numerical reduction of lymphangitis attacks, greater stability of the improvement obtained and better patient's quality of life. In addition, postoperative lymphoscintigraphy was performed which indicated the improvement of the lymphatic transport index and the reduction of the dermal back flow as well as demonstrating the patency of the lymphatic-venous microsurgical anastomoses.

Conclusions: This extensive clinical experience has allowed us to draw some conclusions which are, in our opinion, very important considering how many are approaching lymphatic surgery, looking at it only from a technical point of view and not from a cultural lymphological point of view, thus managing to obtain only partial results.

VASCULAR ANATOMICAL VARIATIONS OF COLON AND LYMPH NODE DISSECTION FOR CME

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Objective: The aim of this study is the presentation and analysis of vascular anatomic variations of colon and the relation with lymph node harvesting for CME.

Material-Methods: Retrospective study conducted from 2018-2021 including 180 patients with colon cancer. 35% had right colon tumors and 65% left colon tumors. All patients underwent CME resection (complete mesocolic excision). Intraoperatively, we studied all possible anatomic variation of colon vessels. Then we measured the distance between the high ligation of vessels and the tumor location. Then we studied the pathology report with emphasis to the number of lymph nodes.

Results: We identified anatomic variations to 5% of patients. The most common vascular variation was two stems of middle colic artery arising from superior mesenteric artery, while the right colic artery presented only 20%. For the left colon, the most common vascular variation was the sigmoid vessel arising from inferior mesenteric artery (30%). These variations resulted to extended surgical maneuvers for CME resections. The pathology report referred wider mesocolon to the patients with variations. The removal of all mesenteric lymph nodes is more difficult in these patients. The number of lymph nodes ranged from 13-65.

Conclusions: Vascular anatomic variations have major role in the quality of specimen and the number of retrieved lymph nodes. The detailed knowledge of surgical anatomy of these mesenteric vessels and the high ligation gives the better oncologic result with the fewer complications.

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DIAGNOSIS AND MANAGEMENT OF SENILE LYMPHEDEMATHE: THE EFFICACY OF MULTIPLE LYMPHATIOVENOUS ANASTOMOSIS IN SENILE LYMPHEDEMA PATIENTS

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Objective: Lymphedema is a chronic, progressive swelling of tissue caused by inadequate lymphatic drainage. Historically, lymphedema is classified as either abnormal development (i.e. primary lymphedema) or damage to lymph nodes or lymphatic vessels (i.e. secondary lymphedema). However, some lower extremity lymphedema cases of geriatric patients did not clearly fit into any of these two groups. We regrouped these patients as "Senile lymphedema" and evaluated the characteristics and surgical approaches of senile lymphedema patients. In this presentation, we describe an institutional experience of 32 consecutive geriatric lymphedema patients receiving multiple-sites lymphaticovenous anastomosis.

Material-Method: From 2010 to 2017, 32 senile lymphedema patients (23 females and 9 males) with a median age of 79.2 years (range 71 to 88 years) underwent multiple sites lymphatiovenous anastomosis. Lymphedema characteristics, ICG lymphography findings, surgical approaches and outcomes were retrospectively evaluated.

Results: Almost all senile lymphedema patients (30/32) showed bilateral lower extremity lymphedema and senile lymphedema was distinctly different from primary lymphedema in various aspects. More than 80% of patients were improved by multiple-sites lymphaticovenous anastomosis.

Conclusion: Senile lymphedema is a bilateral lower leg lymphedema occurred in elderly patient, usually over 70 years of age, with no obvious cardiological, endocrinological or medical problems inducing extremity edema. Multiple-sites lymphaticovenous anastomosis can be an effective approach for senile lymphedema.

FUNCTIONAL LYMPHATIC-CHANNEL TRANSFER FOR UPPER LIMB LYMPHEDEMA RESIST TO LYMPHATIC VENOUS ANASTOMOSIS

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Objective: Multisite lymphaticovenular anastomoses (mLVA) for lymphedema can reduce volume of limb edema. However, some of the cases were resistant to mLVA. Hence, we performed vascularized lymphatic-channel transfer (VLT) including LVA in the flap for the case of lymphedema resist to mLVA. In this report, the results of VLT for upper limbs lymphedema were presented.

Material-Method: During 2013 to 2019, we underwent VLT for 13 cases of lymphedema resistant to mLVA. The patients were consisted from average age of 61.4 (range. 46-76), male 1 and female 12. Edema was progressed or unchanged despite physio-compression therapy and previous mLVA. VLT was performed period of 6 months to 5 years after first mLVA. The donor site of VLT was 3 cases with first web space flap of the foot and 9 cases with superficial circumflex iliac artery perforator flap, and both flap were taken to one case. During VLT, additional LVA was underwent.

Results: Average follow-up duration was 11.3 (range. 3-38) months. The results after surgery at the present time were compression unnecessary 1, improvement 11, invariant 1, and exacerbation 1 case.

Conclusions: MLVA for lymphedema is underwent generally. However, there are individual differences in the effect of LVA, and it is presumed that degeneration of smooth muscle cells within lymph channel affect the postoperative course.

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Hence, VLT was effective because the normal lymphatic-channel was sufficiently functional to drainage the lymph fluid. However, the supermicro-surgical technique is warranted for LVA, we will present the technique with VIDEO for detail in this report.

LIPOSUCTION OF LARGE CHRONIC LEG LYMPHEDEMAS - DOES IT REALLY WORK IN THE LONG RUN?

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Objective: Patients with chronic non-pitting lymphedema do not respond to conservative treatment or microsurgical procedures because of early deposition of excess adipose tissue. To remove the excess adipose seems thus to be a logical treatment strategy. This prospective study describes the long-term outcome of liposuction of leg lymphedema.

Material-Methods: 126 patients with a mean±SEM age of 49±1,4 years, and with a duration of leg swelling of 13±0,9 years underwent liposuction due to non-pitting, chronic lymphedema. There were 64 primary (PL) and 62 secondary lymphedemas (SL) following cancer therapy. Age at cancer treatment, and interval between cancer treatment and lymphedema start were 42±1,8 years and 2,8±0.7 years respectively. Age at onset of PL was 28±1,9 years.

Results: Aspirate volume was 3452±135ml with an adipose tissue concentration of 94±0,9% in the tourniquet fraction. Preoperative excess volume was 3489±155 ml. Postoperative mean reduction was 82±2,4% at 3 months and 101±2,2% at 1 year, and more than 100% during 20 years' follow-up, i.e. the lymphedematous leg was somewhat smaller than the healthy one.

Conclusions: 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.

ISOLATED NANOFIBRILLAR COLLAGEN SCAFFOLD IMPLANTATION ASSOCIATED WITH LYMPHATIC REGENERATION FOLLOWING RADICAL INGUINOFEMORAL LYMPH NODE DISSECTION

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Objective: Nanofibrillar collagen scaffolds (BioBridge™ [BB]; Fibralign Corporation, Union City, California, USA) have been shown to enhance lymphatic regeneration in conjunction with lymphaticovenous anastomosis and vascularized lymph node transfer. This case study is the first illustration of guided lymphatic regeneration with isolated BB placement.

Material-Method: A 74-year-old Caucasian male with chronic bilateral lower extremity lymphedema (stage I-II) and right medial foot melanoma underwent wide local reexcision with a skin graft and right groin selective sentinel lymph node (SLN) dissection. Postoperatively, he developed right lower extremity stage III lymphedema with cellulitis of the right foot. Because of 5/5 positive right inguinofemoral SLNs, he underwent completion right pelvic and radical inguinofemoral lymph node dissection with removal of 23 additional nodes, and concurrent placement of BB in the right groin. Specifically,

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BB was placed at the medial femoral triangle, oriented towards the suprapubic fatty tissue and medial to the spermatic cord, and superficially at the dermal subcutaneous level from the distal femoral triangle to the contralateral groin.

Results: At 15 months postoperatively, the patient's right lower extremity demonstrated stage I lymphedema that grossly resembled the contralateral lower extremity. Thigh girth decreased 12cm. The patient had no further episodes of cellulitis. L-Dex score improved from 44.0 pre-BB placement to 13.5 at 15 months postoperatively. MRI Lymphangiogram showed evidence of contrast update across the right groin and pubis, corresponding to the site of BB placement.

Conclusions: Isolated BB placement at the time of lymph node dissection can enhance lymphatic regeneration and promote resolution of lymphedema.

LYMPHATIC PREVENTION IN SURGERY FOR BENIGN LESIONS

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Objective: Lymphatic complications after surgery (venous or arterial surgery, surgery for benign lesions) have a variable incidence. They may be represented by lymphocele, lymphorrea, lymphedema and lymphangitis. In some areas, where the risk to develop lymphatic complications is higher, such as axillary or inguinal region, a particular attention should be reserved.

Material-Method: Patients candidate for surgery at risk for lymphatic complications were studied with lymphoscintigraphy to assess pre-existing lymphatic impairment. Blue Dye was injected distally in all patients. Blue lymph nodes and lymphatics were identified and preserved or used to perform Multiple Lymphatic-Venous Anastomoses (MLVA) with a competent collateral venous branch. A suction drain was maintained for 3-4 days to avoid accumulation of lymph in the surgical field. Patients were followed up clinically and instrumentally (3 month - 6 years).

Results: The use of this protocol of prevention allowed to preserve the peri-lesion or peri-vessels lymphatic pathways in 80% of the cases. In 20% of the cases, it was necessary to perform lymphatic-venous anastomosis according to the Ly.M.P.H.A. technique because it was not possible to preserve the lymphatic pathways or because they passed through the lesion. In all cases there was no peripheral edema, lymphangitis or lymphangitis. Lymphoscintigraphy demonstrated no post-operative lymphatic impairment.

Conclusions: An accurate diagnostic investigation and proper surgical technique associated with microsurgical procedures demonstrated to be of paramount importance in avoiding lymphatic complications and in treating lymphatic insufficiency. The blue dye allowed to identify intraoperatively lymphatics and nodes colored in blue, in order to preserve them and prevent lymphatic complications. According to our experience lymphoscintigraphy proved to supply important information about the functional assessment of lymphatic circulation and it can guide to an MLVA in case of lymphatic impairment.

POSTTHROMBOTIC SYNDROME: PATHOPHYSIOLOGY AND MICROCIRCULATORY ASPECTS

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ORAL PRESENTATIONS

Joint Session:

- VAS-European Independent Foundation in Angiology/Vascular Medicine
- ISL-International Society Lymphology
- ESL-European Society Lymphology

Venous function depends on open and structurally normal veins with a regular venous valve and calf pump function. DVT disintegrates normal venous structures and valve function leading to ambulatory venous hypertension, capillary hypertension, endothelium dysfunction, leukocyte trapping, platelet activation, oedema, and microcirculatory dysfunction. The severity of these factors depends on the degree of recanalization, collateralization, and the degree of venous valve dysfunction as well as on the capacity and function of the lymphatics. Microcirculatory dysfunction in PTS is characterized by capillary morphologic changes and a progressive loss of capillary density, which might translate in tissue hypoxia comparable to critical limb ischemia. The pathophysiological mechanisms offer targets for treatment, which must be multimodal to be successful.

POSTTHROMBOTIC SYNDROME: OVERVIEW AND UNMET CLINICAL NEEDS

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Joint Session:

- VAS-European Independent Foundation in Angiology/Vascular Medicine
- ISL-International Society Lymphology
- ESL-European Society Lymphology

Vascular diseases are the most common cause of death and disability. The post-thrombotic syndrome (PTS) is the most common long-term complication of deep vein thrombosis (DVT) occurring in up to 40-50% of patients. Impaired thrombus resolution with persistent venous outflow obstruction is involved in the pathogenesis of PTS . PTS has been rarely considered as an outcome of trials of anticoagulant treatment of DVT. As a result, there are limited evidence-based approaches for diagnosis, prevention and treatment of PTS. PTS is defined as the presence of signs and symptoms which can develop after an episode of DVT, however there is no gold standard for PTS diagnosis. The Villalta scale has been endorsed by scientific societies for PTS diagnosis, , however it has several drawbacks which have to be considered. DVT prevention is the first step for also preventing PTS. After DVT occurrence, an adequate quality of anticoagulant treatment and prevention of recurrence, especially of ipsilateral DVT, are recommended. Other options are graduated compression stockings and the approach of "early thrombus removal". The latter involves either catheter- directed or pharmacomechanical thrombolysis, which however are associated with a risk of bleeding and at the moment cannot be recommended routinely, except for selected cases. Treatment of PTS involve conservative treatment with compression stockings and exercise training, while interventional approaches such as venous angioplasty and stenting have limited evidence and cannot be routinely recommended at this time.

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POSTTHROMBOTIC SYNDROME: HOW TO PREVENT?

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Joint Session:

- VAS-European Independent Foundation in Angiology/Vascular Medicine
- ISL-International Society Lymphology
- ESL-European Society Lymphology

Deep Vein Thrombosis (DVT) prevention with pharmacologic or mechanical thromboprophylaxis used in high-risk patients and settings is the most important step for preventing post-thrombotic syndrome (PTS). After DVT occurrence, adequate quality of anticoagulant treatment and prevention of recurrence are relevant steps. The anticoagulant treatment plays a crucial role in both primary and secondary PTS prevention. The other options for PTS prevention are graduated compression stockings (GCS) and early thrombus removal. GCS could play a role in preventing PTS. A Cochrane systematic review, published in 2017, showed that the use of GCS led to a clinically significant, although non statistically significant, reduction in the incidence of PTS with no reduction in the incidence of severe PTS no clear difference in DVT recurrence or PE. It was shown that thigh-length stockings did not provide better protection against development of PTS than knee-length stockings.

However, there are conflicting data on the long-term effectiveness of GCS to prevent PTS. It was reported that wearing GCS for two years seemed to be superior to wearing them for one year in terms of PTS incidence. In contrast, the IDEAL DVT study showed that it was safe to shorten the duration of elastic compression therapy after deep vein thrombosis for prevention of PTS limited to one year in selected subjects, was as effective as 2.5 years of persistent use after acute DVT.

Early thrombus removal includes such procedures such as: catheter-directed thrombolysis, pharmacomechanical thrombectomy, and pharmacomechanical catheter-directed thrombolysis.

However, the guidelines concluded that the selection of patients for thrombolytic treatment should be done on a case-by-case basis, with a predominant focus on patients with extensive (e.g. iliofemoral) thrombosis, recent onset of symptoms, low risk of bleeding and long life expectancy, who are treated at hospital centers experienced in performing these techniques.

POSTTHROMBOTIC SYNDROME: LYMPHATIC SYSTEM AND POSTTHROMBOTIC SYNDROME

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Joint Session:

- VAS-European Independent Foundation in Angiology/Vascular Medicine
- ISL-International Society Lymphology
- ESL-European Society Lymphology

Venous and lymphatic system are mutually dependent dual outflow system of the circulation. All fluid transported from the heart with blood is coming back through venous and lymphatic system. However, all the fluid coming out from the blood capillaries is transported back exclusively through the lymphatic system.

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Lymphatic system overload e.g. in posthrombotic syndrome (PTS) leads to damage of lymphatic capillaries and vessels, including damage of anchoring filaments and lymphatic valves, increased lymphatic capillary permeability, lymph reflux to superficial lymphatic plexus and finally to lymph stasis and impairment of local immune defense. Lymphatic transport is impaired in posthrombotic syndrome. Interestingly impaired lymphatic function can improve after venoplasty with stenting of posthrombotic iliac vein stenosis.

The relationship between venous and lymphatic systems is deeper and more complex than only hemodynamic. Failure of one of them or both results in tissue edema, inflammation and skin ucers.

POSTTHROMBOTIC SYNDROME: CURRENT TREATMENT

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Joint Session:

- VAS - European Independent Foundation in Angiology/Vascular Medicine
- ISL - International Society Lymphology
- ESL - European Society Lymphology

The symptoms and signs describing postthrombotic syndrome (PTS) can vary from subjective discomfort to venous swelling, skin changes, venous claudication to venous ulcers, which appear in about 2-10% of patients. Due to the variability of the problems treatment varies. The first step is to provide proper anticoagulant treatment with less recurrent deep venous thrombosis. Some subjective problems could be addressed just by proper explanation - the placebo effect. The second procedure is physical training, which can improve the calf muscle pumping effect and consequently the symptoms of PTS. The compression usually by stockings is accepted as the first line of PTS treatment. It reduces the symptoms, swelling and is effective in patients with venous ulcers. When contraindicated intermittent pneumatic compression for two months could be prescribed. Among conservative treatment drugs containing micronized purified flavonoid fraction, which improve mainly subjective complaints, could be also used. In the case of conservative treatment-resistant PTS with severe disability, some invasive procedures could be considered. The endovenous recanalization probably with dedicated venous stents appears to be appropriate as the therapy of choice. Some additional hybrid or pure surgical procedures like bypass of the occlusion, transposition or transplantation of the veins, reconstitution of the incompetent venous valves were suggested, too, although they are recommended with a low level of evidence.

It can be concluded, that there is no specific treatment for PTS, but some problems could be alleviated, and less invasive treatment should be considered first.

POSTTHROMBOTIC SYNDROME: REVASCULARIZATION PROCEDURES-POSSIBILITIES AND LIMITATIONS

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ORAL PRESENTATIONS

Joint Session:

- VAS - European Independent Foundation in Angiology/Vascular Medicine
- ISL - International Society Lymphology
- ESL - European Society Lymphology

Approximately 60% of patients with acute iliofemoral deep vein thrombosis recover without further symptoms. However, 40% will have some degree of post-thrombotic syndrome (PTS) and 4% will develop severe PTS. PTS is the most common complication; it reduces quality of life and increases DVT-related costs. The clinical symptoms and severity of PTS may vary; the most common symptoms include edema, pain, hyperpigmentation, lipodermatosclerosis, and ulceration. PTS is based on the principle of outflow obstruction, may be caused by venous hypertension, and may lead to valvular damage and venous reflux or insufficiency. A significant lumen reduction within the iliac vein system is defined by an aspect ratio ≥ 2. Recent technical developments and new dedicated venous stent techniques now give the opportunity to recanalize even complex venous outflow obstructions. First in man safety and efficacy data are very promising for the new dedicated venous stents, but long-term data are still missing.

POSTTHROMBOTIC SYNDROME: "NO MORE VENOUS ULCERS!" VAS INTERNATIONAL CAMPAIGN: A COLLABORATIVE EFFORT

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Joint Session:

- VAS - European Independent Foundation in Angiology/Vascular Medicine
- ISL - International Society Lymphology
- ESL - European Society Lymphology

Venous Leg Ulcers (VLUs) represent the most common type of leg ulceration and a significant clinical problem, affecting approximately 1% of the population and 3% of people over 80 years of age, in westernized countries. Moreover, the global prevalence of VLUs is predicted to escalate dramatically, as people are living longer, often with multiple comorbidities.

Patients with VLUs show an impaired quality of life index with a large social, personal, financial and psychological cost. In parallel, the economic drain on the health-care systems is going to be unbearable.

As the situation is totally preventable, VLUs reflect the failure of the current health system to educate new doctors and aware the population all over the world.A global plan which can join all forces and will be able to reach people, GPs, National and International Bodies is strongly recommended.

VAS is a European Scientific non-profit Foundation whose mission is to contribute to the development of Angiology/ Vascular Medicine, in multi-center co-operation amongst clinicians and researchers throughout Europe and Worldwide (VAS International Consortium). **The final aim of VAS is the fight against Vascular Disease for its prevention and control** for the benefit of patients and the society.

The "No More Venous Ulcers" campaign reflects the above idea to join forces all over the world. Every vascular organization (Angiology/Vascular Medicine, Phlebology, Lymphology), patient organizations and individuals in case that a Society doesn't exist, are invited to participate.

The joining procedure is web-based by clicking at https://www.vas-int.net/spread-awareness/no-more-venous-ulcers/ and sign a short agreement.

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The organizations must be represented by one authorized person and all contributors must declare they accept the non-profit policy of VAS. Industry employees cannot participate in no way.

As the VLUs problem is very complicated the participants must represent all type of Geographic, Social-economic and Infrastructure differences, all over the world.

During the following months, the first web-based meeting will collect data about the current condition in different areas and define ways to work (meetings, dissemination, new contacts etc).

This campaign can run with common actions with the other two VAS International Campaigns concerning the "No More Vascular Amputations" from Peripheral Arterial and Buerger's Diseases.

PHYSICAL TREATMENT IN CANCER LYMPHEDEMA OF THE PATIENT WITH ONGOING DISEASE: A RESOURCE OR A TABOO?

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Objective: For too long it has been improperly stated without demonstration that the decongestive physical treatment (in particular manual lymphatic drainage) performed in the treatment of patients with secondary lymphedema with oncological disease, represented a reason for risk of disease progression especially in relation to the metastatic phase. In reality, the development of an oncological metastasis is the result of a delicate and complex dynamic biological balance between the aggressiveness of the tumor and the defensive capabilities of the host's immune system. This has meant (and still does) that many cancer centers have banned (and banned) the physical decongestion therapies that many patients, especially after radiotherapy, need to improve their quality of life. The lymph does not stop and it is certainly not accelerating its progression from a healthy area (such as a large arm) to the lymphoglandular stations proximal to the area itself, which facilitates the spread of the tumor.

Material-Method: Over two years, we studied 74 patients divided into two homogeneous groups, by oncological pathology and clinical stage, suffering from secondary lymphedema of the upper limbs (39 patients with breast K) and lower limbs (35 patients with male and female genital neoplastic pathology or abdominal, with the exclusion of skin tumor pathologies arising in the lymphedematous limb, for example melanoma). 41 patients were treated with a course of combined physical therapy every six months and 33 wore only the elastic garment granted by the oncologist specialist. Clinical monitoring continued for the next 24 months.

Results: After two years in the first group 6 patients (14.6%) died, in the second 5 (15.1%). In the first group the average volume reduction of the affected limb was 59%, in the second group the volume was substantially unchanged. In the first group 6 subjects (14.6%) had presented an episode of acute lymphangitis, in the second group 8 subjects (25.8%) had presented one or more episodes (in one case 4) of acute lymphagitis.

Conclusions: This preliminary study highlights how the decongestive physical treatment in the patient with cancer in progress does not increase the progression of the disease compared to untreated patients; conversely, it improves the quality of life of patients (anatomical and functional improvement, lower incidence of lymphangitic complications) with simultaneous improvement in mood, an important aspect also for the purpose of contrasting the tumor pathology itself.

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EXPLORING LOWER-LIMB PAIN, HEAVINESS AND TIGHNESS IN RELATION TO LYMPHOEDEMA UP TO 2 YEARS FOLLOWING GYNAECOLOGICAL CANCER

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Objective: To assess the prevalence of lower-limb symptoms, including pain, heaviness, and tightness, pre- through to 2-years post-surgery for newly diagnosed gynaecological cancer, and to compare the prevalence of symptoms between those with and without lower-limb lymphoedema.

Material-Method: Self-reported lymphoedema, lower-limb pain, heaviness and tightness (5-point Likert scale, none to extreme) were prospectively collected pre-surgery (baseline), and at and 6-, 12- and 24-months post-surgery in 408 women with gynaecological cancer. Generalised estimating equation modelling was used to identify levels of lower-limb symptoms over time, and to assess the relationship between pain, heaviness, tightness and self-reported lymphoedema.

Results: Women were on average 59 (SD: 11) years at diagnosis, and approximately three in five were diagnosed with endometrial cancer (58%) and stage I disease (60%). Prevalence of symptoms ranged between 26-40%, 23-42%, 28-45%, and 29-48%, with evidence of prevalence increasing over time for women with lower-limb lymphoedema and decreasing for women without lower-limb lymphoedema. Odds of reporting mild-extreme symptoms were 3.8 - 4.4 times (range 95%CI: 2.09 - 6.20) higher for women with lower-limb lymphoedema compared with women without lymphoedema.

Conclusions: Lower-limb symptoms are prevalent from pre-surgery up to 2-years post-surgery in all women with gynaecological cancers but have a higher prevalence in women with lower-limb lymphoedema, which is consistent with the upper-limb literature. At the time of the conference, this analysis will be replicated using objectively-measured lymphoedema with bioimpedance spectroscopy, and we will also report on symptom severity.

FLUIDOTHERAPY FOR BREAST CANCER RELATED LYMPHEDEMA: A PILOT STUDY

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Objective: We aimed to evaluate whether the edema-relieving and pain-relieving effects of fluidotherapy in BCRL patients in the treatment of lymphedema can make an additional contribution to complex decongestive therapy (CDT).

Material-Method: A total of 40 stage 2 and 3 BCRL patients were included in the study. Patients were randomized into 2 groups. Group 1 was given for lymphedema 15 sessions of manual lymphatic drainage, compression bandage and remedial exercises. Group 2 received the same treatment as Group 1 additionaly fluidotherapy was carried out for 15 sessions and 20 minutes once a day for 3 weeks. Upper extremity volume differences and pain with visual analogue scale (VAS) were evaluated before and after treatment.

Results: Seventeen patients in Group 1 and thirteen patients in Group 2 completed the study. The mean age of Group 1 was 59.23±11.86, and Group 2 was 61.92±12.41. The lymphedema stages, the duration of disease, the lymphedema volumes and pain levels before treatment were similar in both groups ($p>0.05$). The extremity volumes of both groups decreased significantly after treatment ($p<0.001$ for both group) and pain significantly improved ($p=0.001$ for both group).

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The mean change in volume measurements and VAS score before and after treatment in Group 2 were significantly higher than in Group 1 patients (p=0.028, p=0.020 respectively).

Conclusions: Fluidotherapy was shown to provide a reduction in the amount of lymphedema in patients with lymphedema secondary to breast cancer. Also, a marked improvement was observed in pain scores. Therefore, thermotherapy modalities should not be considered contraindicated in the treatment of lymphedema.

INTRAARTICULAR SHOULDER CORTICOSTEROID INJECTION AND SUPRASCAPULAR NERVE BLOCKADE FOR THE TREATMENT OF POSTMASTECTOMY SHOULDER ADHESIVE CAPSULITIS AND LYMPHEDEMA

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Objective: The aims of the study are to investigate the effectiveness of shoulder intra-articular injection and suprascapular nerve blockade treatment of shoulder adhesive capsulitis in breast cancer related lymphedema (BCRL) and to evaluate whether there will be an increase in lymphedema volume and infection attacks after injection.

Material-Method: A total of 50 BCRL patients with shoulder pain and limited range of motion were included in the study. Patients were randomized into 2 groups. Group 1 was given for lymphedema 15 sessions complex decongestive therapy (CDT) and for adhesive capsulitis shoulder exercises. Group 2 received the same treatment as group 1 after shoulder intra-articular corticosteroid injection and US-guided suprascapular nerve blockade. Upper extremity volume differences, shoulder range of motions (ROMs), and pain (VAS) were evaluated before and after treatment.

Results: Twenty two patients in both groups completed the study. Pain level and the lymphedema volumes before treatment were similar in both groups (p>0.05). After treatment, the ROMs of Group 2 improved significantly compared to Group 1 (flexion p=0.020, abduction (p=0.007), internal rotation p=0.010, external rotation p=0.003). The extremity volumes decreased significantly after treatment (p<0.001 for both group) and shoulder pain significantly improved (group 1 p=0.010, group 2 p<0.001). Worsening of lymphedema or infection were not observed. Joint ROMs of Group 2 increased significantly (p<0.001).

Conclusions: Shoulder joint corticosteroid therapy and suprascapular nerve blockade applied in the treatment of adhesive capsulitis in BCRL can be beneficial and do not cause worsening in lymphedema and infection attacks.

COMPLIANCE TO COMPLETE DECONJESTIVE THERAPY IN PATIENTS WITH POSTMASTECTOMY LYMPHODEMA

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Objective: To determine the level of compliance of patients with complex decongestive therapy (CDT) Phase 2 treatment components in patients with postmastectomy lymphedema (PML) and also to determine the factors affecting the compliance.

Material-Method: Cross-sectional study. Ninety female patients (24-65 years), with unilateral upper extremity PML, chemotherapy and radiotherapy completed, previously undergoing CDT, were included. Lymphedema staging was done according to the criteria of the International Society of Lymphology. Patients information about lymphedema, the method and source of information, whether they found the information sufficient or not were recorded. The patients' compliance

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levels for each method were determined by recording the methods they used at home and how often they applied these methods. Patients who applied 4 days a week or more frequently were considered as "compliant", patients who applied 3 days a week or less frequently and patients who did not apply at all were considered "incompatible". The LYMQOL scale was used to assess quality of life, the Beck Depression and Beck Anxiety scales were used to assess depression and anxiety, and the Multidimensional Scale of Perceived Social Support was used to assess the degree of social support.

Results: 96.7% of the patients were informed about lymphedema before, 65.6% of these patients were informed about lymphedema at the initial period, 23.3% after surgery, 4.4% before surgery, and 3.3% after radiotheraphy. It was determined that the first information was given by the physical medicine and rehabilitation physician in 64.4% of the patients. While 64.4% of the patients found the initial information sufficient, 30% stated that they found it insufficient.Treatment compliance rate was 74.4% for skin care, 46.6% for compression garments, 42.2% for self-massage, 42.2% for exercise, 18.8% for multilayer bandaging.

Conclusions: According to the data of this study, we observed that patients were mostly informed after lymphedema developed. For this reason, it is important to increase the awareness of healthcare professionals working in the field of oncology about early information and directing them to lymphedema rehabilitation units. The second important data is that the compliance of patients with postmastectomy lymphedema to KDT Phase 2 is insufficient for components other than skin care.

EFFECTS OF PHYSICAL ACTIVITY ON THE LYMPHATIC SYSTEM OF PATIENTS WITH SECONDARY LYMPHOEDEMA FOLLOWING BREAST CANCER SURGERY

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Objective: The purpose of this study is to observe the effects of physical activity on the lymphatic system in patients with a breast cancer related lymphedema (BCRL).

Material-Method: 3 phased lymphoscintigraphy exams of both upper limbs of 122 patients with unilateral BCRL were analyzed using evaluation criteria for lymphatic flow, development of collaterals and their extension towards the root of the limb.

Results: In 0.8% of cases, the axillary (Ax) lymphatic nodes (LNs) are seen in phase 1 (after 30 minutes in resting conditions) vs. 27 % of cases in phase 2 (after 15 minutes of exercise) and 65 % of cases in phase 3 (after one hour of normal activities). In 58 % of cases, lymphatic collaterals (dermal backflow or particular LNs) are seen in phase 2 vs. 75 % in phase 3. The collaterals are extended to the axilla in 17 % of cases in phase 2 vs. 46 % in phase 3.

Conclusion: Under certain conditions, maintaining a light level of physical activity could improve the lymphatic drainage in the lymphedematous limb of patients with a BCLR. The lymphatic flow and the lymph charge in the areas of dermal backflow seems to be increased by physical activity.

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THE IMPACT OF EXERCISE ON LYMPHOEDEMA FOLLOWING BREAST CANCER SURGERY: DOES THE EXTENT OF LYMPH NODE DISSECTION MATTER? RESULTS FROM A RANDOMISED, CONTROLLED TRIAL

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Objective: To evaluate lymphedema onset after an 8-month, mixed-mode exercise intervention versus usual care among breast cancer survivor's post-surgery, with respect to the extent of lymph node dissection (<5 versus 5+).

Material-Method: Exercise for Health was a randomised, controlled trial (n = 194) evaluating the effect of exercise (mixed-mode, 180+ minutes of moderate-intensity weekly exercise, delivered via 16 sessions with an exercise professional over an 8-month period) commencing six weeks post-breast cancer surgery. Lymphoedema was assessed via self-report of a clinical diagnosis (SR) and objective assessment using bioimpedance spectroscopy (BIS) at baseline (6-weeks post-surgery), mid-intervention (6-months post-surgery) and post-intervention (12-months post-surgery).

Results: Personal and diagnostic characteristics between the exercise and usual care groups were balanced at baseline. Among women with <5 lymph nodes removed, the proportion who were classified as having lymphoedema post-diagnosis were similar between groups according to SR (p = 0.511) and BIS assessment (p = 0.246). The proportion of women who developed lymphoedema following the removal of 5+ lymph nodes were also similar between groups (SR, p = 0.334; BIS, p = 0.193). However, there was a clinically relevant difference (>10% difference) between the exercise (n = 13, 18%) and usual care groups (n = 9, 30%) in the proportion of women with SR lymphoedema 12-months post-surgery.

Conclusions: These findings suggest mixed-mode exercise of moderate-intensity does not cause lymphoedema and instead may prevent lymphoedema among those who receive axillary lymph node dissection as part of their surgery for breast cancer.

GLUTEAL LYMPHEDEMA ASSOCIATED WITH LOWER EXTREMITY LYMPHEDEMA. - A STUDY WITH INDOCYANINE GREEN LYMPHOGRAPHY AND MAGNETIC RESONANCE IMAGING

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Objective: Gluteal lymphedema is a topic rarely discussed in scientific papers. Our recent findings revealed that one in five patients with lower extremity lymphedema has lymphatic drainage patterns with dermal backflow extended to the gluteal. This study aimed at characterizing gluteal lymphedema with indocyanine green (ICG) lymphography and evaluating tissue changes with magnetic resonance imaging (MRI).

Material-Method: Twenty-eight patients with unilateral lower limb lymphedema who had both ICG lymphography and MRI prior to any surgical procedure were included in this study. The ALERT ICG protocol was applied and extension of dermal backflow to the gluteal region was used as diagnostic criteria for gluteal lymphedema.

Results: Ten patients demonstrated gluteal lymphedema on ICG lymphography and had higher incidence of skin

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hypertrophy in the gluteal region, but no difference in leg excess volume compared to the no gluteal lymphedema group. The increase in gluteal subcutaneous tissue on the affected side was larger in patients with gluteal lymphedemas, with a median increase of 20% vs 11%, but the difference was not statistically significant (p=0.29). Gluteal subcutaneous tissue increase was positively correlated to age and ipsilateral leg excess volume, as well as it being larger in right sided lymphedemas.

Conclusions: Gluteal lymphedema was not a rare condition for patients with late-stage lower extremity lymphedema and the increase in subcutaneous tissue was prominent in some patients. We suggest using the term "gluteal lymphoedema" for this entity as a first step to highlight the need for future research.

INDOCYANINE GREEN LYMPHANGIOGRAPHY: A POWERFULL TOOL FOR AN INTRAOPERATIVE DIFFERENTIAL DIAGNOSIS

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Objective: Treating the lymphatic leaks and the lymphoceles in the groin area is still a difficult challenge today for the surgeons. A rare case is presenting in which an intraoperative lymphangiography with the use of indocyanine green was made, and a differential diagnosis between lymphocele and reactive seroma achieved.

Material-Method: A 72-years old female patient that underwent aortobifemoral bypass due to lower extremity obstruction in 2008. Three years later, in both groin sides clinically appeared lymphoceles. A fistula formed and persistent lymphatic leak appeared. For a decade the patient underwent many imaging and paraclinical examinations that confirmed the clinical diagnosis of the lymphoceles. She even hospitalized up to three and a half months for complications that occurred.

Results: For the treatment of the left fistula, an intraoperative lymphangiography with indocyanine green was performed. During the surgical procedure founded that the "leak" was due to a reactive seroma in contrast to the results of imaging tests and clinical diagnosis. The seroma was almost in contact with the stent of femoral. An extended surgical debridement performed, scar and fibrous tissue from previous surgeries removed, drainage applied, and the wound sutured in multiple layers. The drainage was removed after five days and the next day the patient was discharged. Nine months later, both fistula and seroma are not detected.

Conclusion: The indocyanine green lymphangiography is a powerful tool for the treatment of the lymphatic leaks and the lymphoceles in the groin area. However, as we deduce from the above rare case, this technique can be used to make the differential diagnosis between lymphoceles, lymphatic leaks and seroma.

REVIEW AND CASE-BASED RECOMMENDATIONS FOR THE IMAGING AND IMAGE-GUIDED TREATMENT OF CENTRAL LYMPHATIC DYSPLASIA IN NOONAN SYNDROME

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Objective: Determine the historical use and utility of various lymphatic imaging modalities in patients with Noonan Syndrome (NS) and develop an algorithmic approach to imaging and image-guided patient care across the spectrum of NS developmental defects.

Material-Method: A PubMed database search was performed, covering all time periods. Inclusion criteria for this study were: 1) diagnosis and clinical description of patients with NS, and 2) imaging studies of lymphatic structure, function, and/or sequelae in patients with NS. Conventional oil contrast lymphangiography, CT-lymphangiography, MR-lymphangiography, and radionuclide lymphangioscintigraphy were among the imaging modalities examined.

Results: 21 publications, which included 52 patients, were eligible for inclusion. Clinical descriptions and imaging results from 2 of our own patients with NS were also included. All 21 studies observed anatomic abnormalities in the central lymphatic vasculature of patients with NS. The two studies with the largest patient cohorts found an association between the visualized obstruction of the thoracic duct and correspondingly poor clinical outcomes.

Conclusions: The development and increased use of lymphatic imaging over time has led to significant progress in our understanding of lymphatic phenotypes in NS and the lymphatic etiology of many NS manifestations and sequelae. This review supports the hypothesis that central lymphatic obstruction, due to large lymph vessel/valvular dysplasia, results in variably severe lymphatic reflux underlying the spectrum of congenital features, symptoms, and complications associated with NS. Consequently, a NS diagnosis should prompt early lymphatic imaging and the development of an individualized image-guided treatment plan.

SCINTIGRAPHIC INVESTIGATIONS OF THE DEEP AND SUPERFICIAL LYMPHATIC SYSTEMS IN THE EVALUATION OF LOWER LIMB OEDEMA

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Objective: The purpose of this study was to evaluate a new lymphoscintigraphic exam of the deep lymphatic system in patients presenting a normal or paradoxical superficial lymphatic system on classical lymphoscintigraphy for their lower limb lymphedema.

Material-Method: 15 patients with unilateral and 17 with bilateral LLE underwent 3-phased deep lysc of the lower limb via the injection of 99 mtc-labelled human serum albumin (HSA) nanocolloids in the Kager's triangle.

Results: The absence of popliteal lymphatic node visualization after phase 2 of DLS lysc to diagnose a deep lymphatic insufficiency has a specificity and a sensitivity of 89% in patients with unilateral LLE and without associated venous symptoms. An insufficiency of the DLS was observed in 67% of cases with unilateral LLE and 59% of patients with bilateral LLE of venous and/or lymphatic origin.

Conclusions: The lymphoscintigraphic visualization of the popliteal lymphatic nodes after the injection of 99 mtc-labelled HSA nanocolloids in the Kager's triangle seems to be an effective way to diagnose DLS insufficiency in patients with LLE but normal findings in the SLS.

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LYMPHOSCINTIGRAPHIC EVALUATION OF THE EFFECTS OF MANUAL LYMPHATIC DRAINAGE AT THE ROOT OF THE LOWER LIMB FOR PATIENTS WITH LOWER LIMB LYMPHEDEMA

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Objective: The purpose of this study is to lymphoscintigraphically assess the effect of skin mobilization, non-specific massage and MLD on the root of the lower limb for patients with lower limb lymphedema.

Material-Method: Lower limb root lymphoscintigraphical exams of 80 patients with primary (n=44) and secondary (n=36) lower limb lymphedema were analyzed. Lymphoscintigraphical exam were realized using intradermal injections of 99mTc labeled nanosized colloids of Human Serum Albumin at the root of the limb. Imaging was taken directly after the injection (Subphase 1), after pinching and stretching of the injection site (Subphase 2), after a non-specific massage applied on the injection site (Subphase 3) and after manual lymphatic drainage of the injection site (Suphase 4). The number of opened lymphatic pathways was analyzed and compared after and between each Subphase (SP).

Results: No improvement of the lymphatic drainage following the totality of the 4 phases were observed in only 5% of the cases (n=4). Subphase (SP) 1 showed opened lymphatic pathways in 27.5% of the cases. Only 2.5% of these cases didn't show improvement following the next SP. SP 2 showed newly opened lymphatic pathways in 60.0% of the cases. Only 6.8% of these cases didn't show improvement following the next SP. SP 3 showed newly opened lymphatic pathways in 71.3% of the cases. Only 11.4% of these cases didn't show improvement following the next SP. SP 4 showed newly opened lymphatic pathways in 75.1% of the cases. MLD was the only technic to allow the visualization of the lymphatic drainage at the level of the root of the edematous limb in 6 cases (7.5%).

Conclusions: Physical therapy leads to a greater number of lymphatic collaterals openings in a region where no other technique of complex decongestive therapy technique can be applied.

LYMPHOSCINTIGRAPHIC EVALUATION OF THE EFFECTS OF MANUAL LYMPHATIC DRAINAGE AT THE ROOT OF THE UPPER LIMB FOR PATIENTS WITH UPPER LIMB LYMPHEDEMA

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Objective: The purpose of this study is to lymphoscintigraphically assess the effect of skin mobilization, non-specific massage and MLD on the root of the lower limb for patients with lower limb lymphedema.

Material-Method: Upper limb root lymphoscintigraphical exams of 122 patients with secondary upper limb lymphedema were analyzed. Lymphoscintigraphical exam were realized using intradermal injections of 99mTc labeled nanosized colloids of Human Serum Albumin at the root of the limb. Imaging was taken directly after the injection (Subphase 1), after pinching and stretching of the injection site (Subphase 2), after a non-specific massage applied on the injection site (Subphase 3) and after manual lymphatic drainage of the injection site (Suphase 4). The number of opened lymphatic pathways was analyzed and compared after and between each Subphase (SP).

Results: No improvement of the lymphatic drainage following the totality of the 4 phases were observed in only 11% of the cases (n=14). Subphase (SP) 1 showed opened lymphatic pathways in 30.3% of the cases. Only 5% of these cases didn't show improvement following the next SP. SP 2 showed newly opened lymphatic pathways in 31.1% of the cases. Only 6.5% of these cases didn't show improvement following the next SP. SP 3 showed newly opened lymphatic pathways in 43.4% of the cases. Only 13.9% of these cases didn't show improvement following the next SP. SP 4 showed newly opened lymphatic pathways in 63.9% of the cases. MLD was the only technic to allow the visualization of the lymphatic drainage at the level of the root of the edematous limb in 20 cases (16.4%).

Conclusions: Physical therapy leads to a greater number of lymphatic collaterals openings in a region where no other technique of complex decongestive therapy technique can be applied.

SPECT/CT ASSESSMENT OF UNEXPECTED LYMPHATIC DRAINAGES IN PATIENTS WITH UPPER LIMB LYMPHEDEMA OR LOWER LIMB LYMPHEDEMA

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Objective: The aim of this retrospective study was to evaluate the contributions and interests of SPECT/CT imaging, a new imaging technique that allows 3D visualization, when applied to 1ary LLLE.

Material-Method: 47 patients with primary lower limb lymphedema (PLLL), 53 patients with secondary lower limb lymphedema (SLLL) and 93 patients with upper limb lymphedema (SULL) underwent a standard bilateral planar 3 phases lymphoscintigraphic imaging and a SPECT/CT imaging.

Results: For the patients with lower limb lymphedema, 19.1% of the patients with PLLL and 26.4% of the patients with SLLL showed unexpected lymphatic pathways draining the edematous limb. These unexpected lymphatic pathways were described as inter-gluteal, antero-abdominal or supra-iliac. For the patients with SULL, 64.4% of the patients showed unexpected lymphatic pathways draining the edematous limb. These lymphatic pathways were described as posterior, deep or Mascagni's lymphatic pathways. Following a fourth phase some patients showed paravertebral drainage.

Conclusions: Most of the unexpected lymphatic pathways could only be observed with the SPECT/CT imaging. Any unexpected lymphatic pathway draining the edematous limb could and should influence the therapeutic management by the physical therapist making the SPECT/CT an important therapeutic tool for the physical therapist.

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LYMPHOSCINTIGRAPHIC ASSESSMENT AS A THERAPEUTIC GUIDANCE FOR LYMPHEDEMA TREATMENT

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Objective: The purpose of this study is to quantify in a first time the effects of a standard MLD (SMLD) in patients with ULL using lymphoscintigraphic approaches and in a second time the effectiveness of a lymphoscintigraphically guided MLD (LGMLD).

Material-Method: 34 patients who had undergone a lymphoscintigraphy of the upper limb at Jules Bordet Institute were selected to participate to the study and randomized into two groups. At the end of their lymphoscintigraphic examination, the first group underwent two phases of SMLD during 15 minutes per phase with imaging after each phase. The second group underwent a first phase of SMLD (during 15 minutes) followed by a second phase of LGMLD with imaging after each phase. The quantifications were made on the imaging of each phase of the lymphoscintigraphic exam and on each area of interest appearing (axillary and in transit lymph nodes, areas of lymph stasis in "dermal backflows").

Results: The results show that the colloidal activities in the axillary lymphatic nodes of the edematous limb are statistically increased (P value = 0.001) and the activities in the areas of DBF statistically decreased (P value < 0.0001) by the MLD when compared to a period of resting. The lymphoscintigraphically guided DLM is statistically increasing the filling of the axillary lymphatic nodes when comparing to the standard DLM (P value = 0.0242).

Conclusions: MLD increases the lymphatic flow and decreases the importance of the areas of DBF. Moreover, a lymphoscintigraphic assessment can give some useful information about the patients and can help the physical therapist to increase the effects of the DLM.

ELUCIDATING THE HISTOLOGICAL HETEROGENEITY OF LYMPHOVASCULAR DISEASES USING DIAGNOSTIC LIGHTSHEET IMAGING

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Objective: Although various genes causing lymphovascular diseases in humans have been identified, it is still unknown how genetic abnormalities cause lymphatic disease at the cellular level. This is associated with the absence of suitable microscopic imaging techniques for visualization of the vasculature as standard 2-dimensional histology is not sufficient to understand complex lymphatic vascular networks. Therefore, we have developed a novel approach towards 3D-histology which allows the identification of the underlying histological alterations and heterogeneity of lymphovascular diseases.

Material-Method: To elucidate histological heterogeneity of lymphovascular diseases on the cellular and spatial level and to overcome the limitations of standard histology, we apply innovative immunofluorescence staining protocols to entire tissue biopsies and perform optical sectioning of the entire sample using lightsheet microscopy. This approach,

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called VIPAR, represents a novel diagnostic tool for lymphovascular diseases and is based on digital 3-dimensional reconstruction of optical sections allowing the visualization of entire vascular networks. Followed by automated data extraction and analysis algorithms, the underlying histology is quantified in 3-dimensional space.

Results: In patients with lymphovascular diseases, we were able to identify the underlying histological alterations and describe the lymphatic phenotype in more detail using our diagnostic tool for 3D-histology. By analyzing a large cohort of patient, we were able to elucidate the histological heterogeneity of various types of lymphovascular diseases.

Conclusions: The VIPAR approach for 3D-histology allows 3-dimensional visualization of the entire lymphatic vasculature in patients and therefore facilitates deep-phenotyping. Additionally, it provides relevant information for improved patient stratification for pharmacological and surgical interventions and increases our current knowledge on the histological heterogeneity of lymphovascular diseases.

IRRADIATION OF REGIONAL LYMPH NODES IN BREAST CANCER: CLINICAL GUIDELINES

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Objective: Emerging data from numerous recent randomized clinical studies in breast cancer patients with node positive nodes or with negative nodes but with high-risk features have reported improvement in survival from regional lymph nodes irradiation.

Material-Method: A systematic literature review of randomized controlled trials, meta-analyses and prospective or population-based studies was performed to identify studies published since January 2000, providing evidence-based data for the management of regional lymph nodes irradiation on breast cancer patients.

Results: Meta-analyses of the Early Breast Cancer Trialists' Collaborative Group showed that irrespective to the extent of nodal involvement radiotherapy to the regional lymph nodes is associated with significantly reduced locoregional recurrence, overall recurrence, and breast cancer mortality. Data from randomized studies with a follow up over 10 years enlighten the extend of nodal irradiation. Furthermore, the MA.20 and the EORTC 22922-10925 trials showed that the addition of the supraclavicular and internal mammary lymph node area improved local and distant control and disease specific mortality. The AMAROS trial revealed that axillary radiotherapy after positive sentinel lymph node biopsy provides excellent axillary control in T1-2 breast cancer and axillary lymph node dissection (ALND) may omitted. In addition, the Z0011 trial showed that in patients with limited sentinel node metastasis and breast- conserving surgery followed by postoperative radiotherapy, ALND could be spared without compromising locoregional control or survival.

Conclusions: Regional node irradiation is an indispensable part of the adjuvant therapy in patients with lymph node positive early breast cancer and is a complex and evolving field of interest due to its significant clinical impact.

IRRADIATION IN PELVIC LYMPH NODES: WHERE AND WHEN?

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Objective: Pelvic nodal irradiation (PNI) recommendations in gastrointestinal (GI), genitourinary (GU) and gynecological cancers evolve together with the rest of oncologic treatments. Current guidelines are presented.

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Material-Method: The results of a PubMed research from January 2000 up to August 2021 using the keyword "pelvic nodal radiotherapy" were reviewed.

Results: PNI is a part of definite and adjuvant radiotherapy treatments for most localized pelvic cancers. Rectal and anal cancer radiation therapy include PNI. Together with brachytherapy, PNI is an integral part of radiotherapy of gynecological cancers, especially in cervical and in high-risk endometrial cancer. In medically inoperable muscle-invasive bladder cancer treated with concurrent chemoradiotherapy, PNI has not established its role yet over bladder-only radiotherapy. Prophylactic PNI research has mainly focused on prostate cancer. Even with modern techniques, it increases late GU and GI toxicity compared to prostate-only treatment, but toxicity is acceptable with both classic and moderate hypofractionated treatments. Daily image-guided radiotherapy (IGRT) is highly recommended. Prophylactic PNI has a clear role in high-risk patients and in the unfavorable-intermediate risk patients with a risk of nodal recurrence greater than 15% as calculated by the Roach formula. In the oligometastatic setting, stereotactic ablative irradiation of positive pelvic lymph nodes is increasingly being used.

Conclusions: Radiation oncology has developed modern techniques, such as IMRT, VMAT and SBRT, which are more precise, increasing efficacy and minimizing toxicity of PNI. Therefore, indications of PNI evolve together with these technical advances.

RADIATION INDUCED TOXICITY AFTER PELVIC IRRADIATION: THE PELVIC POINT OF VIEW

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Objective: Radiotherapy is a long-established treatment modality in Oncology. We aim to review the radiation induced toxicity in regard to lower limb lymphoedema.

Material-Method: Mechanisms of radiation induced lymphoedema will be reviewed. A literature review was performed through pubmed to assess the relation between pelvic radiation and the incidence of lower extremity lymphoedema as well as other risk factors (primary disease, type of surgery etc).

Results: From the lymphology point of view, pelvic radiotherapy may lead to lower extremity lymphoedema. The mechanisms through which radiation induces lymphoedema are mainly through damage to the lymphatic vessels due to development of dense fibrous tissue that blocks lymphatic flow, inhibition of lymphatic proliferation preventing compensatory mechanisms of new lymph vessel formation and finally through development of fibrosis of the radiosensitive lymph nodes. From the literature review 6 retrospective studies of various gynaecological cancers and 1 meta-analysis of vulvar cancer were identified and showed that post-operative radiotherapy increases the risk of lymphoedema by 40%. In terms of total dose and duration of treatment no association was found, however external beam radiation therapy as opposed to vaginal brachytherapy was found to increase the risk of lymphoedema.

Conclusions: Pelvic radiotherapy is commonly used in genitourinary malignancies such as endometrial, cervical, vulvar, ovarian, prostate and bladder cancer as it improves local control, disease free survival and overall survival. Despite its proven benefits, pelvic radiation carries risks related to toxicity. From the lymphology point of view, pelvic radiotherapy leads to increased risk of lower extremity lymphoedema.

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IMMUNOHITOCHEMICAL OBSERVATION OF THE LYMPHATIC VESSELS IN THE LESIONS OF COLORECTAL CARCINOMA IN ADENOMA

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Objective: Most advanced colorectal cancers are thought to result from the development of carcinoma in adenoma lesions through adenoma- carcinoma sequence. We studied the lymphatic vessels in the lesions of carcinoma in adenoma by immunohistochemical method.

Material-Method: Formalin-fixed paraffin-embedded sections were prepared from the lesions of 23 serial archival cases of carcinoma in adenoma registered in the Department of Pathology, Toyama City Medical Association Health Control Center. We performed H.E. staining, elastica van Gieson staining and immunohistochemical reactions using anti-podoplanin monoclonal antibody of the sections.

Results: Some foci of adenocarcinoma in carcinoma in adenoma lesions were surrounded by fibrosis and the others were not. Proliferation of lymphatic vessels was observed in the lesions associated with fibrosis. No lymphatic vessels were found around the lesion of adenocarcinoma without fibrosis. In most of the foci of adenocarcinoma, the expression of podoplanin, which does not form lymphatic vessels was observed in the interstitium, regardless of presence or absence of fibrosis. No cancer cell invasion in the lymphatic vessels was observed in all cases.

LONG-TERM FOLLOW-UP AFTER EXTRAPERITONEAL MULTI-SITE LVAS FOR CRITICAL CHYLOTHORAX AND ASCITES

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Objective: Chylothorax and ascites has been reported to be congenital, acquired, primary, secondary, and the like, and the causes may be thoracic duct passage obstruction/obstruction, chylorrhea, and the like. In particular, neonatal chylous ascites is often severe and often fatal. Treatment includes puncture waste fluid and a fat-restricted diet, but in some cases, intraperitoneal LVA by laparotomy may be performed for awarded patients. However, no subsequent long-term follow-up has been reported.

Material-Method: mLVAs were performed for 3 critical chylothorax or ascites cases.

Results: After surgery, all cases were salvaged and no recurrence was occurred.

Conclusions: Severe chyle thoracic ascites and lower limb edema can be lethal. Early mLVAs were considered to be one of the curative treatments. The combination of LVA and vascularized lymphatic/lymph node transplantation should be considered for severe cases.

SIMULTANEOUS SOFT TISSUE AND LYMPHATIC RECONSTRUCTION BASED ON LYMPH AXIALITY CONCEPT

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Objective: Lymphedema may occur after reconstruction for extremity soft tissue defect including main lymph pathways. To prevent postoperative lymphedema, it is ideal to simultaneously reconstruct both soft tissue and lymphatic system. This

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study aimed to compare lymph flow restoration (LFR) and lymphedema development (LED) after soft tissue reconstruction with and without consideration of lymph axiality.

Material-Method: One-hundred twenty two cases of extremity soft tissue free flap reconstruction were evaluated. Soft tissue defect was reconstructed with lymph-interpositional-flap transfer (LIFT) in 75 cases (LIFT group); lymph vessels' stumps were approximated between the flap and a recipient site under indocyanine green (ICG) lymphography. In 47 cases, defect was reconstructed with a conventional free flap without consideration of lymph axiality in 47 cases (control group). Postoperative LFR and LED were compared between the groups.

Results: There was no statistical difference in background data between the groups. LFR rate was significantly higher in LIFT group than that in control group (57% vs. 15%, $P < 0.001$). LED rate was significantly lower in LIFT group than that in control group (20% vs. 49%, $P < 0.001$).

Conclusions: LIFT allows simultaneous soft tissue and lymphatic reconstruction, and is useful for primary prevention of postoperative extremity lymphedema. ICG lymphography navigation and lymph axiality are keys to achieve an optimal extremity soft tissue reconstruction.

NAVIGATION LYMPHATIC SURGERY FOR INTRACTABLE LYMPHORRHEA AND LYMPHOCYST

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Objective: Intractable lymphorrhea or lymphocyst may occur after surgical intervention to a lymph-rich region such as the groin. Since recurrence rate is high after conventional conservative or macroscopic surgical treatments, more secure reconstructive treatment is warranted for intractable cases. This study aimed to evaluate feasibility and effectiveness of navigation lymphatic surgery for the treatment of intractable lymphorrhea / lymphocyst.

Material-Method: In 44 lymphorrhea and/or lymphocyst cases where conservative treatments failed, lymphatic supermicrosurgeries were performed. Under ICG lymphography navigation, ruptured lymph vessels were identified, and reconstructed with supermicrosurgical procedures; anastomosed to a nearby intact lymph vessel or to a nearby vein if available, or microsurgically ligated. Postoperative recurrence and lymphedema development were evaluated.

Results: Ruptured lymph vessels were successfully identified in all cases under ICG lymphography navigation. Lymph vessel was used as a recipient in 3 cases, and vein in 40 cases; in 1 case, no recipient vessel was available and the ruptured lymph vessel was just ligated. No cases showed recurrence, but lymphedema developed in 1 case where the ruptured lymph vessel was ligated. The case after lymphatic ligation showed secondary lymphedema.

Conclusions: ICG lymphography is useful to identify ruptured lymph vessels, which is critical for the treatment of intractable lymphorrhea / lymphocyst. Ruptured lymph vessel should be reconstructed as possible, because simple ligation may cause postoperative lymphedema.

MASSIVE LOCALIZED LYMPHEDEMA LEADING TO ANATOMICAL DISTORTION- A REPORT OF TWO RARE CASES AND REVIEW OF THE LITERATURE

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Objective: Massive localized lymphedema (MLL), also reported as pseudosarcoma constitutes a rare benign clinical disorder, presenting in obese patients, characterized by chronic accumulation of lymph and adipose tissue due to lymphatic flow obstruction. Its etiology and treatment are not completely elucidated yet.

Material-Methods: A 43-year-old, morbidly obese Caucasian female, and a 54-year-old obese Caucasian male proceeded to our institution with extended lymphedema of the thigh. Surgical excision of the soft tissue mass was performed in both cases, in order the patients to earn back mobility of their limb. The operation was uneventful. The histopathologic analysis asserted the diagnosis of MLL in both cases.

Results: MLL is a scarce, non-malignant clinical entity that may mimic an abundance of soft tissue tumors. Patients with MLL are typically obese females with BMI>40kg/m^2 that present with non-specific symptoms. Herein, the diagnosis of MLL is challenging and up to the present study, surgery seems being the most efficient treatment.

Conclusions: Surgeons' deep knowledge regarding this peculiar clinical disorder is the cornerstone for the establishment of a correct diagnosis and subsequently, the adequate treatment, in addition to the elimination of the potentiality of malignant transformation of MLL to angiosarcoma or liposarcoma and of probable recurrence of MLL as well.

PREVENTION OF POST-OPERATIVE LYMPHEDEMA AFTER ALND WITH LYMPHA: TECHNICAL CONSIDERATIONS TO OPTIMIZE OUTCOMES

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Objective: Lymphedema remains common following axillary lymph node dissection (ALND) for breast cancer lymph node metastasis, and radiation therapy (RT) further increases lymphedema risk. Axillary reverse mapping (ARM) identifies the lymphatics draining the arm, and Lymphatic Microsurgical Preventative Healing Approach (LYMPHA) includes lymphaticovenous anastomosis (LVA) at the time of ALND for lymphedema prevention.

Material-Methods: Breast cancer patients with biopsy-proven axillary lymph node metastasis and clinical stage T1-3, N1-3 disease, undergoing ALND from 2019-2021 were prospectively followed. Limb measurements, L-Dex, and lymphatic mapping using fluorescence imaging were performed pre- and post-operatively. During ALND, ARM was performed to identify the significant lymphatics draining the arm. The technique is demonstrated for identification of ARM lymphatics for preservation or for LYMPHA with LVA. Complications and onset of lymphedema were monitored.

Results: Nineteen patients with average age 52 and average BMI 26.8 kg/m^2 underwent ALND with simultaneous LYMPHA procedure. The number of LVAs performed ranged from 1-4 per axilla. Significant ARM lymphatics were preserved in 3 patients. LYMPHA operating time ranged from 32-95 minutes. There were no surgical complications. 16/19 (84%) of patients received post-operative RT. With average follow up of 7 months, no patients developed lymphedema. Post-operative ICG lymphatic mapping confirmed intact lymphatic conduits with uptake of ICG across the axilla and no dermal backflow.

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Conclusions: ALND with LYMPHA resulted in successful LVA of significant ARM lymphatics in all patients. In this cohort of patients with high risk for lymphedema, no lymphedema occurred at early follow up, indicating this technique is an effective method to decrease lymphedema rates.

OBESITY ASSOCIATED LYMPHEDEMA

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The increasing prevalence of obesity worldwide - we are already talking about an obesity epidemic - will result in a dramatic increase in obese patients with lymphedema and lipedema; a topic that is completely underestimated, a topic that is rarely represented at conferences, but also in scientific publications.

At the same time, the severe obese patient with lymphedema or lipedema is also a very unpopular patient, unpopular in medical practices, clinics and with lymph therapists.

Unpopular certainly because of the well-known resentment towards severe obese people, but also unpopular because of the helplessness that we - medical professionals - feel towards these patients.

This lecture describes the clinical aspects of this obesity associated lymphedema as well as the pathophysiological development of this disease. The treatment concept for this group of patients, which has proven itself for many years in the Földiklinik, the European Center for Lymphology, is described in detail.

INFECTION OF LYMPHEDEMA

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Objective: Viral infection is not contributory in lymphedema. Bacterial and fungus infection are important because the lymphedema becomes worse after some of the infections.

Material-Method: Tinea and bacterial infections (erysipelas, acute lymphangitis, acute cellulitis, acute lymphedema-related acute bacterial dermatitis, etc.) are discussed from clinical pint of view. Number of examined cases are mentioned in each examination.

Results: 1) Tinea is complicated in 40% of secondary and 47% of primary lymphedema. 59% of lower extremity's secondary lymphedema suffer from this infection which is related with lymphedema-related acute bacterial dermatitis. It is seen more in the lower extremity. 2) Acute cellulitis is seen in all parts of the body and usually complicated with tinea. 3) Erysipelas. Is not a simple bacterial infection but some immunological reaction to bacteria. This is also seen in any part of the body, although the face and genitalia are favorite sites. 4) Acute lymphangitis is usually bacterial in origin but some of them are hypersensitivity reaction. 5) Lymphedema-related acute bacterial lymphangitis is seen in only lymphedematous skin. In all of the above infections except tinea systemic antibiotics are effective. However in the last complication it is only sometimes effective. What is important is lymphedema becomes worse after the infections.

Conclusions: There are fungal and bacterial complications of lymphedema. Some cause worsening of lymphedema.

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PREVENTION OF SECONDARY LYMPHEDEMA ON UPPER AND LOWER LIMBS

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Material-Method: The authors report their experience based upon the diagnosis and the treatment of 3950 cases of patients with lymphedema in 30 years. 680 primary lymphedemas and 3270 secondary. In this peculiar topic 2625 concerned upper limb and 645 lower limb.

Results: Mastectomy with clearing out axilla and radiotherapy for breast cancer are of course the most important circumstance; but we underline the importance of the very precise knowledge of the anatomy of the derivative ways of vicariance, for example deltopectoral mascagni's way, scapular posterior, tricipital. So complete and total axillar lymphadenectomy does not occur secondary lymphedema and the concept of sentinel lymph node does not prevent the apparition of lymphedema. The wound, the injury of derivative ways, only, explain lymphedema in quite 98% of cases. On the opposite in lower limbs a little biopsy of adenopathy in inguinofemoral nodes occur in many cases the apparition of secondary lymphedema.

Conclusion: So a general conception of new prevention is proposed to be given not to the patient but to the surgeons and radiotherapists to avoid destruction of those precise pathways. That represents the concept of «active prevention» and does not concern the attitude of the patients but of the therapists.

GENITAL LYMPHEDEMA - MANUAL LYMPAHATIC DRAINAGE

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Genital lymphedema is the progressive and chronic edematous condition of genital organs due to disrupted lymphatic circulation. It can be caused by primary or secondary lymphedema and generally seen in males. Although it is a rare condition, it becomes challenging due to physical, emotional and social problems leading to impaired quality of life. Complex-decongestive-treatment (CDT) is initiated to reduce edema and prevent complications like lymphorrhea, hematuria and cellulitis. Manual-lymphatic-drainage (MLD) and compression therapies are the mainstay of the management.

The MLD covers the central areas, axillary region, inguino-axillary anastomosis and the genital area. The MLD consists of four basic-techniques (stationary-circle, rotary, pump and scoop) and is performed in a proximal to distal direction with light skin strokes. Pubic area is decongested toward to the lower truncal-quadrants and anastomosis area by rotary and stationary circles. Then the stationary circles on both sides of the scrotum are performed to manipulate the lymph fluid toward the pubic area and from here toward the axillary lymph nodes using inguino-axillary anastomosis. The lower parts of the scrotum are decongested toward to the gluteal watershed. After the scrotum, penis is decongested.

In conclusion, the management of genital lymphedema is challenging as there is no standard treatment or algorithm. The applications of MLD on the genital area are also difficult due to frustration, intimacy of patients and the reluctance, lack of knowledge/skills of the therapists. Therefore education on MLD of genitalia should be encouraged in order to develop knowledge and skills and to overcome barriers among both patients and health-professionals.

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COMBINED SURGICAL TECHNIQUES TO TREAT MOST ADVANCED LYMPHEDEMAS

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Objective: Rational approach for the surgical treatment of the most advanced lymphedemas.

Material-Method: Protocol, sequential procedures, tricks and tips according to genoa experience.

Results: Clinical registry and long term clinical outcomes.

Conclusions: Also, the most advanced Lymphedemas can be treated with very satisfactory results in long term.

SURGICAL PROCEDURES IN GENITAL LYMPHOEDEMA

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Lymphatic insufficiency of the male and female external genitals is caused by either insufficient development of the regional lymphatic system (primary cause) or damage due to tumour, inflammation, iatrogenic or any other injury of the regional lymphatic vessels and lymph nodes (secondary causes). In its chronic form leads to a clinical picture of lymphoedema, lipohypertrophy, and/or soft tissue fibrosis and interferes with the quality of patient's life (motion, personal hygiene, verrusocis lymphostatica, lymphorrhea, pain and attacks of erysipelas).

A microsurgical procedure creating lympho-venous or lympho-lymphatic anastomoses would be a causal treatment. Such an approach is rather sporadic because patients usually comke in an advanced stage of the disease with fibrotic remodelling of the prepuce, skin of the penis and scrotum, or labia majora with surrounding skin and often affecting also soft tissues of the pubic area. In such cases, a resection is an optimal approach that improves all aspects of the quality of life of the patient. If a lymphatic reflux from lower limbs and/or the abdominal wall is found, an anti-reflux procedure with a lymph-venous anastomosis is appropriate.

The lecture presents the results of surgical treatment in patients with this disorder, with emphasis given to indications for surgery, particular steps of the surgical procedure, post-operative care and complications.

SEQUENCING AND TARGETTING OF TREATMENT- WHAT EVIDENCE SHOULD WE USE AND WHAT TREATMENT IS BEST?

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Objective: To help participants understand the importance of collecting a range objective (and sometimes subjective) information and of using that to target and sequence the lymphoedema treatment program.

It's well known that lymphoedema treatment is often a "shotgun" type of approach - when many things are done at once to help the patient. This can include, Lymphatic drainage, skin care, bandaging, garments or wraps, diet advice, laser/LED, lymph taping and a plethora of other treatments. But often we are not sure which is best and in what order. Further, the

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range of treatments, their frequency, their costs and their effect on the presenting condition can be daunting for the patient and demanding of the therapist.

Most of the types of multi-faceted treatments and indeed many of the individual components of them have good levels of evidence to support them but there are still many uncertainties and controversies.

So, what can we do to overcome these? It's acknowledging the patient as an individual with an individual set of presentations/co-morbidities. To do this we must collect information about the patient's, medical, surgical, family and medication histories as well as undertaking a range of objective tests such as Tissue Dielectric Constants, Bio-impedance, fibrinometry, Indurometry, to tell us about fluids and tissue composition changes and Indo Cyanine Green / Lymphoscintigrams to tell us about functional issues, LYMQOL to tell us about subjective issues and then to use this to specifically target the issues and to sequence our treatments. For instance, there is little point trying to move lymph through a fibrosed area without first dealing with it (perhaps with Laser). We can make a difference, but we need to know what's best and when!

COMPLEX DECONGESTIVE THERAPY IN PATIENTS WITH UPPER LIMB LYMPHEDEMA FOLLOWING BREAST CANCER TREATMENT: RESULTS AFTER INITIAL PHASE

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Objective: We reviewed the results of the decongestive phase of Complex Decongestive Therapy (CDT) in patients with upper limb lymphedema following breast cancer treatment (BCRL).

Patients-Methods: We retrospectively studied 94 patients with BCRL treated at our facility and analyzed volume reduction at the end of the first phase of CDT and during follow up. Age, time of edema, adjuvant therapies, axillary dissection, and edema extension were evaluated. Pre- and post-treatment limb volumes were calculated using the truncated cone method.

Results: The median time of decongestive phase was three weeks. Pre-treatment volume was 2.594 ± 1.494 ml while normal limbs measured 1790 ± 385 ml. At the end of the decongestive phase excess volume was reduced to 314 ml ($p<0.001$) and percentage difference was reduced from 43.3% to 17.5% ($p<0.001$). The only factor related to final result was age, elderly patients (≥ 65 years) showed a greater reduction of the excess volume than younger ones (-35.5% and 16.1%; $p=0.038$). Patients were followed for a mean time of 15 months and mean volume of the treated arm at the last appointment measured 2.129±565 ml and mean difference between limbs was 337±339 ml, similar to the end of the first phase ($p=0.287$).

Conclusion: CDT is an efficient method to conservatively treat BCRL patients, provided that adequate technique and material are employed by skilled and trained therapists.

EFFECTIVENESS OF LINFOROLL® MANUAL LYMPH MASSAGE IN PATIENTS WITH SECONDARY LYMPHEDEMA: ANALYSIS OF DATA COLLECTED FROM 2014 TO 2018

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Objective: Linforoll® is a device dedicated to physical treatment of Lymphedema. Over the years Linforoll® has been demonstrated to allow standardization of the physical parameters, operator dependent, in manual lymph drainage. Aim of the study was to gain insight into effective parametres applied during the treatment of patients with secondary post-surgical lymphedema using Linforoll®.

Material-Method: Data were obtained from a group of 74 patients collected from 2014 to 2018. Following clinical evaluation, lower limb (Thigh-Leg-Foot) and upper limb (Arm - Forearm - Hand) affected by lymphedema were treated with Linforoll®.

Results: Volumetric and tonometric values pre and post treatment, number of treatment sessions and the relative improve in tissue elasticity were recorded. Analysis of data indicated that the applied force during manual massage with Linforoll® was over 100 mmHg but did not overcome 150 mmHg. Applied force was strictly dependent on local tissue stiffness.

Conclusions: This work confirmed the advantages of Linforoll® massaging in lymphedema in terms of evidence based medicine goal standards. Data are recorded and are useful for comparing results both after each treament and between different sessions.

COMMUNITY BASED CDT FOR LYMPHEDEMA ADMINISTERED TO TRAINED VOLUNTEERS - IS IT EFFECTIVE?

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Objective: To compare outcomes of lymphedema care delivered by 1. A specialized clinic (SBSC) run by a surgeon and therapist which had patients from across the country versus 2. A remote community care clinic in a Filarial endemic area (SANGTIN). Here patients came from nearby areas

Material-Method: Emphasis at both places is to counsel and initiate Complex Decongestive Therapy (CDT) and follow up through long term penicillin and self-care at home. Data recording was done through a special software (MedicAid™) which included subjective measurements and limb volume measurements. SANGTIN volunteers were trained by the SBSC team on limb care, CDT (Bandaging alone) as well as use of MedicAid™. Follow up was monthly, with a possibility to consult SBSC through telemedicine. Clinic follow up was less regular as patients came from far of places.

Results: See tables I and II. Overall improvement was significant in both. Comparison based on similar duration of follow up was possible for the 1–2-year interval (highlighted). This included 19 SBSC patients the clinic and 28 at SANGTIN. No significant difference between the outcomes was noted.

Conclusions: Community based clinics through trained volunteers are an important and effective method for managing lymphedema in filaria endemic areas

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Table I Overall comparison

Months	Min of Vol Change	Average Follow Up (days)	Number of Pts
Clinic	**-4786.59**	**948.54**	**78**
0-12	-2013.86	269.79	24
12-24	-2757.21	455.79	19
24-36	-391.77	929.00	10
36-48	-720.37	1211.33	6
48-60	-4786.59	2225.95	19
Sitapur	**-1469.93**	**189.90**	**98**
0-1	-1469.93	18.77	43
1-12	-1098.43	123.11	27
12-24	-633.19	517.11	28
Grand Total	**-4786.59**	**526.11**	**176**

Table II Comparison of results for follow up 12-24 months.

	Delhi clinic	Sitapur
Follow up duration	456 days (s.d. 85, range 366-668 days)	518 days (s.d. 58, range 432-581 days)
Average	1283 ml	1018 ml
S.D.	2607 ml	610 ml
Min change	-2757 ml*	-620 ml*
Max change	6907 ml	1939 ml
N	19	26

Comparing initial volume with final, paired t test t = 8.51, d.f. = 25, p < .00001.
*- Sign means limbs became worse.
Kolmogorov-Smirnov test, K-S test statistic (D) is 0.09257.
p-value is .96408.

EFFECT OF COMPLEX DECONGESTIVE THERAPY ON LIMB VOLUME, BODY COMPOSITION, GAIT AND BALANCE IN PRIMARY LYMPHEDEMA: A CASE REPORT

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Objective: The aim of this study was to evaluate the effect of complex decongestive therapy (CDT) on limb volume, body composition, gait and balance in a child with primary lymphedema.

Material-Method: This case report describes a 13-year-old girl with bilateral lower extremity lymphedema. Edema was evaluated by circumference measurement and the volume was calculated with a truncated cone model. Body composition was evaulated with Tanita BC-418, gait and balance were assessed with Zebris FDM. Nineteen sessions of CDT were applied to the patient and the assessments were repeated at the end of treatment.

Results: Right and left lower extremity volume decreased by 3.88% and 1.93%, respectively. The difference in volume

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between the right and left lower extremities was 4.44% in pre-treatment and 2.53% in post-treatment. Body fluid ratio pre-treatment and post-treatment was 51.18% and 49.31%, respectively. At post-treatment compared to pre-treatment, gait velocity and cadence were the same value, step width decreased by 4 cm and the center of pressure area increased by %124.

Conclusions: The case report demonstrated that CDT is effective in decreasing the limb volume and body fluid ratio in bilateral lower extremity primary lymphedema. Further researches are needed to evaluate the effects of CDT on gait and balance.

WHY DO YOU NEED TO PERFORM VOLUME MEASUREMENTS AND FOLLOW-UP WHEN TREATING LYMPHEDEMA?

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Objective: Outcomes of lymphedema treatment seldom present results as excess volume or excess volume reduction. Instead, circumference measurements - taken at random sites along the extremity and summarized - are used making it very difficult to estimate the true outcome as well as to compare various studies. Also, continuous follow-up of treatment outcome is important.

Material-Method: Volume measurement by using plethysmography or repeated 4-cm-circumference measurements along the extremity is an easy method to assess treatment outcome and to increase the scientific impact. Circumference measurements can be transferred into volumes by using Excel workbook and data are directly linked to figures showing outcome (download here: www.plasticsurg.nu). Data: number of patients, excess volumes, percent reduction, ratio of edematous/normal extremity as well as incidence reduction of erysipelas, are linked to graphs that can easily be pasted into PowerPoint-presentations when presenting results. Other parameters that can be calculated are for example: age at cancer surgery, staging of tumor, removal of lymph nodes, chemotherapy, irradiation, previous treatment, erysipelas incidence, onset, and duration.

Results: The logistics of follow-up will be presented.

Conclusion: Added circumference measurements is not adequate either for clinical use or scientific studies. Volumes from plethysmography or based on Excel-calculation of 4-cm-circumference measurements are useful and show excellent validity and reliability. Volume measurement of both extremities must be performed at the same time to get a reliable measure of the excess volume. Measurements are important also for the patient, who graphically can see that outcome of treatment, which will increase the patient's compliance.

COMPRESSION STOCKINGS IN PREVENTION OF LOWER EXTREMITY LYMPHEDEMA IN WOMEN UNDERGOING TREATMENT FOR GYNECOLOGICAL MALIGNANCIES (UPDATE)

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Objective: To assess effectiveness of class 2 compression stockings in prophylaxis of lower extremity lymphedema in

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women undergoing treatment for gynecological malignancies

Method-Material: 58 women undergoing surgery for gynecological malignancies (cervical, uterine, ovarian, vulvar cancer) with planned inguinal lymphadenectomy, were randomly assigned to prophylactic class 2 round-knitted compression stockings (CS) or to usual care group (UC). Prior to the surgery anthropometric measurements (BMI, WHR), leg volume assessments were performed and women's complaints were assed with Likert type scale. In addition, women assigned to CS group answered ICC compression questionnaire part 1. Follow- up visits were scheduled 3, 6 and 12 months after surgery. Leg volume measurements were done on every visit and adjusted to weight using weight - adjusted change formula (WAC). During the last visit anthropometric measurements, EORTC-QLQ-C30 questionnaire and women's complaints were assessed. Additionally, women in CS group answered ICC compression questionnaire part 2.

Results: Weight adjusted volume change (WAC) after 12 months was significantly higher in the control group (no compression) than in the study group. No significant leg volume change (WAC) was noticed in the study group (compression stockings). Pitting edema was noticed in 8 women from the control group and no women in the study group. No difference in the QOL was found between the control and the study group.

Conclusions: Prophylactic compression stocking are effective in prevention of leg lymphedema in women undergoing surgery for gynecological cancer. Wearing prophylactic compression stockings did not affect QOL.

EFFECT OF THE VOLUME OF LYMPHEDEMA ON THE REDUCTION OF EDEMA DURING INTENSIVE TREATMENT

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Objective: Lymphedema is a clinical condition caused by a failure of the lymphatic system that leads to the retention of macromolecules and fluids. The aim of the present study was to illustrate variations in the reduction of edema related to volume.

Material-Method: A clinical trial was conducted with 60 patients having undergone intensive treatment for unilateral lymphedema using the Godoy method® (mechanical lymphatic therapy eight hours per day, cervical lymphatic therapy 15 min per day, use of grosgrain stockings/bandages eight hours per day (adjustment with reduce during the day). Evaluated three groups with different volume: Group I (<1kg), Group II (1 to 2kg) and Group III (2 to 4 kg). The reduction in edema in patients with different initial volumes was evaluated using volumetric analysis (water displacement). The reduce was evaluated by Mann-Whitney U test considering an alpha error of 5%.

Results: The Mann-Whitney U test revealed no significant difference in the reduction in the percentage of volume between the patients in Group I (< 1 kg) and those patients in Group II (1 to 2 kg) ($p = 0.08$). However, a significant difference was found between Group I (< 1 kg) and Group III (2 to 4 kg) ($p = 0.04$).

Conclusions: The volume of the limb in lymphedema interferes with the treatment time and can bring data to program the average duration of treatment used.

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ARE FEWER CIRCUMFERENCE MEASUREMENTS RELIABLE TO DETERMINE VOLUME MEASUREMENTS IN LOWER LIMB LYMPHEDEMA COMPARED TO EVERY 4th CM?

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Objective: In lymphedema management, lower limb volume is commonly assessed by circumference measurement every 4th cm which is however time-consuming. The aim of this study is to evaluate the agreement between volume measurements derived from circumference measurements every 4th cm (V4) with every 8th cm (V8) and every 12th cm (V12) in patients with lower limb lymphedema (LLL) and to determine the test-retest reliability of these methods.

Material-Method: Thirty women with unilateral or bilateral LLL were measured twice, two weeks apart using circumference measurements every 4th cm. Inclusion criteria: (i) primary or secondary LLL; (ii) persistent lymphedema for the past 6 months; (iii) daily treatment with compression stockings. Exclusion criteria: (i) ongoing LE treatment; (ii) comorbidity affecting lower limb volume. Volume was calculated using the truncated cone formulae. Statistics: Intraclass correlation coefficient (ICC), Bland-Altman plots with limits of agreement, standard error of measurement (SEM%) and the smallest real difference (SRD%).

Results (preliminary): Overall, there are high agreement between the V4 and the V8 and V12 methods (ICCs 0.99). Also, the test-retest reliability is high for all three methods (ICC 0.99 for V4, V8 and V12, respectively) and the measurement error low both for a group of subjects (SEM%: 1.2%-1.5%) and a single subject (SRD%: 3.4%-4.1%).

Conclusions: The V8 and V12 methods agree sufficiently with the V4 gold standard method. All three methods are reliable with small measurement errors indicating that real clinical changes can be detected over time. Fewer circumference measurements can therefore be recommended in the management of LLL.

THE EFFECT OF OBESITY ON COMPLEX DECONGESTIVE THERAPY (CDT) OUTCOMES IN PATIENTS WITH GYNECOLOGIC CANCER-RELATED LOWER EXTREMITY LYMPHEDEMA: A RETROSPECTIVE STUDY

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Objective: Lower-extremity-lymphedema is a concerning complication after treatment for gynecological-cancers. The aim of this-study was to evaluate the-effect of obesity on complex-decongestive-therapy (CDT) outcomes in patients with GCRL, in regard to volume-reduction, functional-status and QoL.

Material-Method: The patients with unilateral-GCRL who were provided CDT in the last 12-months were retrospectively included. Patients were classified as having normal/overweight (group1) and obese/morbid obese (group2). All patients received combined-phase1 CDT including skin-care, manual-lymphatic-drainage, multilayer-bandaging and supervised-exercises five times/week for three-weeks, as a total of 15-sessions. The limb excess-volumes according serial-circumference-measurements of the-limb; improvement of functional-disability and QoL-scores which-were routinely

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evaluated by Lower-Extremity-Functional-Scale (LEFS) and Lymphedema-QoL-Questionnaire-Leg (LYMQOL-Leg) questionnaires were recorded from files and compared between the groups.

Results: A total of 30 patients (group1:16, group2:14 patients) with a mean age 56.23±29.5 years, were analyzed. Demographic and clinical characteristics were were similar between groups. There were significant improvements in volumes (group1: 10500 vs 8352, group2: 11615 vs 8750), functional-scores (group1 0.624 vs 0.681, group2: 0.483 vs 0.544), and all subscores of LYMQo (overall-QoL group 1: 6.1 vs 6.8, group 2: 5 vs 5.6), in both groups after the-CDT ($p<0.05$). The improvements in volumes, functional-status and QoL scores were comparable between the groups while the mean BMI was related with LYM-QoL-functional sub-scores.

Conclusions: In conclusion, obesity may have a negative impact on CDT outcome in regard-to functional improvement and QoL, but not to volume-reduction. We suggest health-professionals to be aware of this subject and inclusion of education on weight-control, in order to increase the functionality and QoL, in the-management of GCRL.

PILOT STUDY CONCERNING THE CLINICAL EFFICIENCY OF MANUAL LYMPHATIC DRAINAGE

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Objective: After studies have concluded that manual lymphatic drainage is not effective in lymphedema of the lower limbs and upper limbs such as e.g. in breast cancer related lymphedema (BCRL). Other studies have concluded that the efficacy is limited to physiological, psychological, social, ... effects, but that the clinical effect has not been demonstrated.

Material-Method: We launched a study to observe if there was a clinical effect of the Manual Lymphatic Drainage (MLD) on BCRL patients and Lower limb lymphedema patients who were treated before being admitted in our hospital by Complex Decongestive Therapy (CDT) excluding MLD and we re-integrated the MLD in their treatment. Inclusion criteria: i) Patients considered to be chronically stable, treated with all CDTs except MLD for at least 6 months, ii) without any change in volume or circumference for at least 6 months, iii)whose last two garment orders have shown no further decrease in volume or circumference.

Conclusions: A clear clinical difference in volume and circumference was observed at the end of each MLD session and this change in circumference resulted in ordering new garments that were smaller (in volume), this difference was noted between 1 to 7cm. The therapeutic goals of MLD differ from and cannot be achieved by other CDT modalities (compression, exercise, … and skin care). These results, make MLD an indispensable ingredient for a successful treatment plan in patients with lymphedema.

THE NEW LYMPHOLOGY: CLINICAL AND HISTOLOGICAL REVERSAL OF FIBROSIS IN ALL CLINICAL STAGES OF LYMPHEDEMA

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Objective: Presented the normalization or near normalization of lymphedema at all clinical stages. This term is one of the challenges that lymphologists have been seeking for decades and that is the goal of all clinical treatment.

Method-Material: To present one of the greatest advances in medicine in recent decades, which is the histological reversal of fibrosis in the treatment of lymphedema. The Godoy & Godoy Method® has been achieving these goals in stages and in recent world congresses it has shown that it is possible to normalize or almost clinically normalize lymphedema in all clinical stages, including elephantiasis. Various treatment techniques such as the development of new concepts and methods for manual and mechanical lymphatic therapy and new compression materials. Currently, biopsy studies before and after the treatment of fibrosis in lymphedema show that it is possible to histologically reverse the fibrotic process. The method stimulates the lysis and synthesis of extracellular matrix proteins, reversing the fibrotic process.

Conclusions: The reversal of fibrosis brings one of the greatest advances in medicine in these decades, therefore lymphology has contributed to the evolution of medicine.

THE EFFECT OF COMPLEX DECONGESTIVE THERAPY IN GENITAL LYMPHEDEMA ASSOCIATED WITH HIDRADENITIS SUPPURATIVA

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Objective: Genital lymphedema (GL) is the progressive and chronic edematous condition of genital organs due to disrupted lymphatic circulation. Hidradenitis suppurativa(HS) is a chronic, recurrent, inflammatory skin disorder that may lead to scarring, contracture, and blockage of lymphatic channels and accumulation of lymph in the interstitial space. GL is an uncommon, debilitating and probably underrecognized complication of long-standing and severe HS. Herein we report one male patient with GL associated with HS.

Material-Method: A 56-year-old male, worker, exsmoker, with a body-mass-index of 32 kg/m2, consulted from dermatology clinic to lymphedema unit for the edema of genital area. He affected by HS since 2 years, presented with typical multiple inflammatory nodules, abscesses, and scars in the axillary, inguinal, inner thigh and gluteal regions (Hurley stage3). The swelling in the genital area has begun 2 months ago and gradually increased. The patient received 4-sessions of complex-decongestive-therapy (CDT) (2days/week) which comprised manual-lymphatic-drainage and Coban-2-layer-bandages.

Results: After 4-sessions-of-CDT, the patient demonstrated reduction in scrotal measurements(initial evaluation 15cm x 13 cm (length x girth) vs discharge 10 cm x 9cm). A better scrotal contour was achieved and the degree of buried penis was decreased, and the urination was easier and no more painful.

Conclusions: Genital lymphedema is frequently overlooked and underreported by patients and health care providers, which can greatly delay the management of patients' symptoms. It is essential to perform standardized assessment to identify the severity of the involvement and intervene early conservative management approaches to reduce symptoms and prevent progression in patients suffering from this chronic condition.

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PASSIVE EXERCISES IN THE TREATMENT OF LOWER LIMB LYMPHEDEMA

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Objective: Lymphedema is a clinical condition associated with a deficiency in the formation and/or drainage of lymph. The aim of the present study was to evaluate the difference in the reduction of lymphedema between one and two hours of continuous use of the RAGodoy® device.

Material-Method: Patients with a clinical diagnosis of clinical stage II or III lower limb lymphedema were randomized to two groups of 30 patients. Group I was submitted to one hour of passive exercise using the RAGodoy® electromechanical device, which performed approximately 28 plantar flexion and extension movements per minute. Group II was submitted to the same method for two consecutive hours. The patients were submitted to volumetric analysis before and after treatment. Differences in each patient and use Stats Direct 3 program was used for the statistical analysis.

Results: No significant difference in volumetry was found between groups prior to treatment. A significant reduction occurred in both groups after treatment compared to the baseline evaluation ($p = 0.0001$ in each group). The mean difference was 76.1 ml after one hour of exercise and 104.33 ml after two hours, corresponding to an additional 28.23 grams ($p = 0.04$, paired t-test).

Conclusions: Passive plantar flexion and extension exercises performed using the RAGodoy® electromechanical device enables a continuous reduction in the volume of the edema for a period of two hours. Thus, this is a form of mechanical lymphatic drainage that can be used for several hours in the treatment of lymphedema.

THE USE OF SUPERVISED SELF-REDUCTION TREATMENT TO INITIATE REDUCTION, CONTROL AND EMPOWERMENT OF THE PATIENT WITH LYMPHOEDEMA

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Objective: Treatment options over the last decade have allowed for the supervised management of patients for a reduction phase of treatment. The pandemic has been the instigator of change from traditional Decongestive Lymphatic Therapy (DLT), to self-reduction using wraps (and pumps), and movement and drainage. Our objective was to evaluatie if changing treatment programmes will produce similar or better results from that gained from traditional DLT whilst empowering the patient and saving resources.

Method-Material: Following a holistic assessment including limb volume, tissue and psychosocial, patients were provided with a suggested treatment programme consisting of a Velcro wrap, exercise and drainage and supporting information. In addition, some were offered pneumatic compression as home use. 10 patients were reviewed weekly via telephone or video call and reassessed, supported or treatment adjusted. Respecting Covid-19 restrictions, Face to face review to undertake objective measurements were taken.

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Results: All patients had an improvement in limb volume, tissue texture and psychosocial, demonstrating a simpler and comprehensive treatment programme can achieve reduction with a cost saving benefit when the patient is empowered to self-manage their treatment.

Conclusion: Treatment programmes for DLT have been slow to evolve, with treatment protocols, including daily multi-layer bandaging, manual lymphatic drainage, skin care and exercise, being defined as best practice. The introduction of wrapping systems, and new electrotherapies means that patients can reduce their limb volume with the correct support, education and supervision, improving the cost burden and inpoving concordnance.

FIFTY YEARS OF LYMPHATIC SURGERY IN GENOA

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Objective: A Life for Lymphatic Surgery in Genoa (1971-2021).

Material-Method: Development of technical methods and clinical registry.

Results: Long term clinical outcomes.

Conclusions: Complete lymphedema functional therapy according to genoa protocol.

SURGICAL MANAGEMENT OF GIANT LYMPHEDEMA MALFORMATIONS: CLINICAL STUDY OF 20 CASES AND THE EVOLUTION OF SURGICAL PROCEDURES

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Objective: Treatment of giant lymphatic malformations is a challenging endeavor for physicians. Conventional treatments, such as nonoperative compression therapy or sclerotherapy, are rarely curative and many patients have been suffered from infection, lymphorrhea or cosmetic disfigurement. Incomplete partial resection of lymphatic malformations also usually resulted in reexpansion and recurrence. In this presentation, we describe an institutional surgical experience of 20 consecutive giant lymphatic malformations patients and evaluate efficacy and limitation of various surgical treatments. The evolution of lymphatic malformations surgical procedures is also discussed.

Material-Method: From 1991 to 2020, 20 giant lymphatic malformations patients (10 males and 10 females) with a median age of 19.3 years (range 5months to 49 years old) were underwent operative treatments. Lower extremity in 11 cases, head and neck in 6 cases, upper extremities in 2 cases, back and lumbar region in 1 case and intraperitoneal region 1 case. Surgical approaches included partial resection(6 cases), partial resection combined with lymphatic bypass surgery (3 cases), radial resection with skin graft reconstruction (2 cases), radical resections with flap reconstruction (6 cases). All of these cases were reinvestigated in terms of cosmetic and functional aspects.

Results: At a median follow up of 3.5years (3 weeks to 29 years), more than 60% of patients were improved. In 30% of patients, symptoms had been worsened.

Conclusion: Giant massive lymphatic malformations are usually refractory to conventional treatment. Radical resection combined with free flap reconstruction can be an effective approach cosmetically and functionally.

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LYMPHA TECHNIQUE: LONG TERM FOLLOW-UP IN THE SURGICAL PREVENTION OF SECONDARY LYMPHEDEMA

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Objective: Many attempts have been made to try to prevent lymphedema secondary to axillary, inguinal and pelvic lymph node dissection. The LYMPHA technique represents the most effective surgical procedure for the primary prevention of lymphedema. The purpose of the study is to report the results about 12 years after the birth of the method.

Material-Method: The author reports the LYMPHA method applied for the prevention of lymphedema secondary to axillary dissection for breast cancer and melanoma and to femoro-inguinal dissection for cancer of the vulva, melanoma and Merkel cell tumor. For oncological reasons, the LYMPHA technique in melanoma can only be used in cases of melanoma localized to the trunk and not to the extremities. The surgical method and the use of Patent Blue and ICG are described. The criteria for assessing the risk of the onset of secondary lymphedema and for identifying patients at greater risk are reported.

Results: Clinical results were evaluated by centimeter measurements and lymphoscintigraphy. The learning curve of the method is about 20 cases. The reduction in the incidence of lymphedema obtained with the LYMPHA technique was very significant, to the point of being able to indicate it in all cases of complete lymph node dissection.

Conclusions: In conclusion, we can affirm that the LYMPHA technique represents the most effective method in the primary prevention of secondary lymphedema of both the upper and lower limbs, surpassing the results obtained from the use of the sentinel lymph node procedure and the ARM technique.

A MICROSURGERY-BASED ALGORITHM IN THE TREATMENT OF PRIMARY LYMPHEDEMA

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Objective: Primary lymphatic anomalies present a plethora of phonotypic heterogeneity. Lymphedema is the most common finding, as a result of peripheral lymphatic system failure and/or internal lymphatic dysfunction. In our algorithm we aim to use the St George's classification, in order to provide a comprehensive management.

Method-Material: An accurate clinical-laboratory diagnosis and genetic profile are used to characterize the patients according to St George's classification. Lymphatic microsurgery, lipectomy modalities and conservative techniques have been applied. Congenital, late onset, and overgrowth +/- vascular lesion cases with present lymphatic vessels have been treated with Vascularized Lymph Node Transfer (VLNT) and/or Lymphaticovenous Anastomoses (LVA), while in syndromic and systemic cases a more conservative approach has been chosen.

Results: Between 2011 and 2021, a total of 87 primary lymphedema patients were managed, using our institution's algorithm. All patients had one or more courses of manual lymphatic drainage, 23 patients received microsurgical intervention (23 VLNT flaps [three bilateral, one double], 4X3 LVAs), and six underwent an ultrasound assisted lipectomy. The mean volume reduction of the limbs was estimated at 47%, the infection rate reduced from 2 to 0,7 per year, pain was reduced from 6 to 1 and feeling of heaviness from 7 to 2 in a VAS scale. The mean follow up time was 47 months (12 - 110 months).

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Conclusions: A carefully chosen surgical or conservative method results in favorable outcomes and control of debilitating symptoms. A surgically based treatment algorithm provides more treatment options in the armamentarium of managing primary lymphatic diseases.

DOES LIPOSUCTION REALLY LEAD TO COMPLETE REDUCTION OF ARM LYMPHEDEMA? WHAT HAPPENS AFTER 25 YEARS?

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Objective: Patients with chronic non-pitting lymphedema do not respond to conservative treatment because early deposition of excess adipose tissue. Microsurgical reconstructions cannot provide complete reduction. To remove the excess adipose seems thus to be a logical treatment strategy. This prospective study describes the long-term outcome of liposuction of arm lymphedema.

Material-Method: 189 women with non-pitting edema with a mean±SEM age of 62±0.8 years underwent liposuction. Mean age at breast cancer operation, mean interval between breast cancer operation and lymphedema start, and duration of lymphedema were 51±0.8 years, 2.8±0.4 years, and 8.6±0.5 years respectively. Aspirate and arm volumes were recorded.

Results: Aspirate mean volume was 1671±45ml with an adipose tissue concentration of 96±0.7% in the tourniquet fraction. Preoperative mean excess volume was 1411±52ml. Postoperative mean reduction was 104±2.0% at 3 months and 116±2.1% at 1 year, and more than 100% during 24 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 1.4±0.02, rapidly declining to 1.0±0.01 at 3 months, and less than 1 after 6 months.

Conclusions: Liposuction is an effective method for treatment of chronic, non-pitting arm lymphedema in patients. Because of adipose tissue hypertrophy, it is the only known method that completely reduces excess volume at all stages of arm lymphedema. Removing the hypertrophied adipose tissue is a prerequisite to achieve complete reduction. The newly reduced volume is maintained through constant use of compression garments.

THERAPEUTIC HAND MASSAGES IN ANTIQUITY: REPORTS OF THE GREEK PHARMACOLOGIST DIOSCORIDES

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Objective: In many cases of the Ancient Greek Literature, extensive reference is made to the therapeutic application of abrasions-massages, especially in cases of injuries. Typical examples are references in works by Aristophanes, Xenophon, Plato, Plutarch, Theophrastus, Pausanias, Aretaeus, with Dioscorides as the most important representative.

Material-Method: Review and analysis of the existing literature.

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Results: Pedanios DioskoridEs (40-90 AD) was born in Anazarvo, Cilicia (Magna Grecia). He got his name Pedanios when he was adopted by a Roman of the Pedani family to acquire Roman citizenship rights. He studied in Tarsus and from the first years he was engaged in the study of the medicinal properties of various plants, a subject with which he dealt systematically, especially with his participation as a physician in the campaigns of the Romans. Dioskorides described the medicinal action of more than 1000 substances, classifying these substances not alphabetically - as we find later in copies or translations of his work - but in categories according to their characteristics and activity. One of his best known works is "Peri tis iatrikis" or "De materia medica". Some of his reports are the following: Iris the Illyrian: Dioskouridis refers extensively to the description of the plant but also to its processing, from which substances with exudative, muscle relaxing and heating action are obtained («…μείγνυνται δε και πεσσοίς και μαλάγματι και ακόποις…»). Balm: As it is typically mentioned, it is an emulsion with intense warming and soothing action, suitable for cases of chills. Cedar: Dioskorides refers extensively to the characteristics of this tree, which produces a thick and clear oil suitable for the treatment of scabies in dogs and cattle («…θεραπεύει δε ιδίως το έλαιον και τας επί των τετραπόδων ψώρας και κυνών και βοών καταχρώμενον…»). Laurel: Suitable for the preparation of heating and emigration ointments. Hercules panacea: Described as an aromatic and caustic plant, the emulsion of which is applied in cases of sciatica. Myrtle oil: It is characterized by astringent and hardening properties and is applied to joint injuries with analgesic and epidemic action. Oil-Applied in cases of stretch marks and warts on the skin with warming and emollient properties. Moreover, the widespread use of oil in antiquity, since Homeric times, in medical practice is known. Other herbs from which Dioskorides describes the preparation of preparations for their epidemic and soothing use in massages are Celtic nard (which grows in the Alps and Istria), oil honey from Syria, moss, myrrh myrtle, must , the incense burner etc.

Conclusion: Pedanios Dioskoridis (40-90 AD) describes the use of different plants with therapeutic hand massages in cases of lymphedemas.

LYMPHEDEMA PATIENTS' QoL AFTER LYMPHATIC-VENOUS BYPASS SURGERY

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Objective: The appearance of lymphedema decreases the quality of life of patients. The aim of this study is to assess the quality of life of patients after lymphedema treatment by lymphatic microsurgery.

Material-Method: The sample was made up of 28 adult patients, suffering from idiopathic or secondary lymphedema in the lower (25 patients) or upper (3 patients) limbs and treated with "Lmphatic-venous anastomosis (LVA)" in the Surgical Lymphology Service of the IRCCS AOU Policlinico San Martino di Genova. We used the LYMQoL questionnaire, translated in Italian and adapted, evaluating, before and after the intervention, 3 domains: functionality, appearance/body image, symptoms. The statistical analysis was carried out only on the sample of patients suffering from lymphedema of the lower limbs.

Results: After microsurgery we found an overall improvement in the patients' quality of life, demonstrated by a reduction in the scores of the questionnaires, with statistical significance ($p < 0.05$) on the Wilcoxon signed rank test in all paired comparisons, with the only exclusion comparisons relating to two variables.

Conclusions: The results obtained showed an overall and statistically significant improvement in the quality of life of patients suffering from lymphedema after undergoing to LVA microsurgical treatment. In order to confirm these results, the planning of further studies may be considered, with the enrollment of a higher number of patients monitored in long-term follow-up.

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OEDEMA OF LOWER LIMBS IN GREAT OBESE PATIENT: PROBLEMS TO SOLVE WAITING BARIATRIC SURGERY

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Objective: Obese patients presents, very often, several co-morbidities of rehabilitative interest. Some of these could obstacle the bariatric interventation or worse after it. The aim is to solve as bettter and soon as possible. In recent years, it has become increasingly frequent to deal with the physical rehabilitation treatment of lymphedema or lymphedema with severe venous insufficiency on patients suffering, among other things, from severe obesity.

Material-Method: The experience in this regard involved taking care of 11 patients with lymphedema with concomitant venous insufficiency, 8 of whom with diffuse ulcerative lesions of various nature and morphology. These patients were all candidated to bariatric surgery, but with the necessity of a reduction of volume and often of solving of skin lesions before the surgical intervention. All the patients observed exceeded the weight of 200 kilograms with an age between 36 and 72 years. Among the observed patients, 6 had lipedemic component in association with lymphedema or phlebolymphedema. In all patients, the psychosocial aspect played a major role in all phases of physical rehabilitation treatment. 5 of them lived in poor hygienic condition and 3 presented a serial storage syndrome that promoted difficulties in resolution of sepsis of lesions. Another important aspect to consider is that in the 7 patients who lived alone, the difficulties of managing the treatment through elastic compression were added. The inability to bend down to remove the bandage and proceed to personal hygiene before repackaging it has led to important organizational and logistical problems. The bariatric surgery unit also requests the complete resolution of each skin lesion before intervening on the patient. In 2 patients, an important psychosomatic component was observed with psoriatic manifestations even in the injured areas or at risk of injury, leading the patient to repeatedly scratch the part in an uncontrolled manner, especially at night, worsening the clinical frame. In a patient with past following a deep venous thrombosys syndrome, the difficulty in resolving the lesions was fueled by a never diagnosed nickel allergy. In a second patient with the same difficulties, the delay was related to the intake of a chemotherapy drug which, interrupted at the end of the cycle, showed to be the cause of superficial exudation and failure to resolve the lesion.

Conclusions: Once again the choice of materials and the 360° analysis of the psychosocial component is crucial in obtaining the results. Adherence, in fact, plays a particular role in problem solving and this is possible to reinforce thanks to the constant monitoring and active participation of patient toward the surgical approach.

DIAGNOSTICS, TREATMENT AND PREVENTION OF POSTOPERATIVE LYMPHORRHEA

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Objective: To develop methods for the diagnostics, treatment and prevention of lymphorrhea after surgical interventions.

Material-Method: 83 patients (45 men and 38 women) with lymphorrhea from damaged lymph vessels in the neck - 13 patients, in the mediastinum - 12, in the abdominal cavity - 17 were studied. The main group consisted of 42 people, the comparison group consisted of 41 people. Lymphorrhea is difficult to detect due to the slow flow of lymph and lack of its specific color. Lymphotropic intraoperative fluorescent lymphography was previously used to visualize the lymph vessels in the wound, and MRI-lymphography was used to directly determine the source of the lymphorrhea. The tactics

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of the lymphorrhea treatment depended on the volume of lymph loss. Lymphorrhea in the amount of up to 1 liter was considered physiological and was replenished with keto diets - low-carb foods rich in fat and moderate protein content. In case of lymphorrhea in the amount from 1 to 3 liters, infusion therapy was the main method, which included: fresh frozen plasma, protein preparations, fat emulsions in combination with endolymphatic lymphostatic therapy. Lymphorrhagia of more than 3 liters of lymph required urgent ligation of the damaged lymphatic vessels and infusion therapy. The indication for urgent ligation was the level of total protein in the blood below 35 g/l, decrease in lymphocytes of less than 15%.

Results: The number of complications decreased from 69.1% to 40.5% when MRI lymphography was used before the second intervention and fluorescence lymphography was performed intraoperatively. The mortality among patients with postoperative lymphorrhea in the main group was 8 (19.5%), and in the comparison group the mortality was 18 (42.9%). In case of a decrease in blood lymphocytes to 11.9% and total protein to 47.8 g/l, MRI-lymphography was added to the algorithm of treatment of such patients for urgent indications. In case of recurrent lymphorrhea, ligation of the lymphoragic vessel was repeated.

Conclusions: Only timely diagnostics and comprehensive treatment of lymphorrhea, as well as urgent ligation of the damaged lymphoragic vessel, can provide for a favorable outcome.

MULTIMODALITY APPROACH TO LYMPHEDEMA SURGERY ACHIEVES AND MAINTAINS NORMAL LIMB VOLUMES: A TREATMENT ALGORITHM TO OPTIMIZE OUTCOMES

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Objective: Surgical treatment of lymphedema is challenging and outcomes are suboptimal. Physiologic procedures including lymphaticovenous anastomosis (LVA) and vascularized lymph node transfer (VLNT) improve lymphatic flow but cannot reverse fibrofatty tissue deposition, whereas liposuction removes fibrofatty tissue but cannot prevent disease progression. The adjunctive use of nanofibrillar collagen scaffolds (BioBridge) can promote lymphangiogenesis. We report a treatment algorithm utilizing a multimodality approach to achieve sustained normal limb volumes in patients with stage II-III lymphedema.

Material-Methods: A retrospective review of stage II-III lymphedema patients treated with liposuction, physiologic procedures, and BioBridge from 2016 through 2019 was conducted. Our treatment algorithm is described. Outcome measures included excess volume reduction and lymphatic function assessed by indocyanine green (ICG) and MR lymphangiography. Compression garment usage was self-reported.

Results: Eighteen patients with stage II-III lymphedema underwent LVA and/or VLNT ± liposuction ± BioBridge. Triple combination therapy achieved 111.5% ± 34.55% edema reduction vs 97.9% ± 36.4% following VLNT ± LVA with liposuction vs 70% ± 19% after VLNT ± LVA alone at an average follow up of 13 months postoperatively. ICG and MR lymphangiography showed significantly more new lymphatic collectors and decreased dermal backflow in the triple combination therapy group. Duration of compression decreased from 12.5 hours/day to 7.5 hours/day (p=0.003). Six of eight (75%) patients with history of cellulitis had no further recurrence. The majority (78%) of patients maintained normal volume for up to 2.4 years.

Conclusions: This treatment algorithm of combination therapy can optimize outcomes and achieve sustained normalization of limb volume in stage II-III lymphedema.

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EFFICACY OF TAPING TO IMPROVE THE LYMPHATIC FLOW IN PATIENTS WITH PERIPHERAL LYMPHEDEMA USING INDOCYANINE GREEN (ICG) LYMPHOGRAPHY

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Objective: Evaluate the efficacy of Taping to improve the lymphatic drainage using ICG lymphography in patients with lymphedema.

Material-Method: We studied 15 patients (n=15) with chronic lymphedema: 5 (n=5) presented upper limb secondary lymphedema, 4 (n=4) had lower limb secondary lymphedema and 6 (n=6) had lower limb primary lymphedema. 0.2 mL of ICG was administered subcutaneously in each interdigital spaces of the foot or hand according to each case, and a region of dermal back flow pattern was identified. The Taping was placed on this area and it was evaluated again with infrared camera after 3 minutes. The patient did not engage in significant physical activity during the evaluation period.

Results: Lymph mobilization has been observed, evaluated by ICG lymphography, of 7 centimeters on average in the proximal direction with the taping placed.

Conclusion: Therefore, it was observed that lymphatic taping was effective to improve lymph drainage, which helps as a complement of physical treatment.

LYMPHATIC DRAINAGE AND KINESIOTAPE

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Objective: Under normal conditions the transport capacity of the lymphatic system is more than 10 liters, which can be increased to 20-25. When necessary, compensatory mechanisms (collateral lymphatic pathways + lympholymphatic and lymphovenous anastomoses) are triggered. The increase in the diameter of the vessels causes a valvular insufficiency which worsens the transport capacity. The lymphatic system has two functions: an immunological function of transporting antigens from the tissues to the antigens from the tissues to the lymphoid organs to produce immune reactions, and another: extravascular homeostatic, by reabsorbing and returning to the blood circulation the protein bodies and plasma proteins that are continuously leaving the blood capillaries into the interstitium. The treatment of lymphedema is based almost exclusively on rehabilitation measures, monitoring sites to assess progress. Lymphatic drainage pumps, pharmacology of lymphedema, limiting work overload, preventing the outflow of fluids from the blood capillary, help evacuate retained water by reducing oncotic pressure linked to accumulated proteins. PREVENTION: creams, antiseptic agents, fungicides, topical and oral benzopyrones, etc. TREATMENT: diuretics, immunological therapy, benzopyrones. IMMUNOLOGICAL THERAPY: injection of lymphocytes, immuno BCG vaccine by scarification.

Material-Method: Kinesiotape bandage.

Results: Improve muscle function & the injured ligament. Joint alignment, increase spacing improve lymphatic drainage, fibrosis, scars and hematomas & organic or segmental function.

Conclusions: Increasing temperature: warm colors. Decrease temperature: cool colors. Provides muscle support. Eliminates pain. Decreases inflammation, edema.

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BODY IMAGE, SELF-ESTEEM, ANXIETY AND DEPRESSIVE SYMPTOMS IN WOMEN WITH LIPEDEMA AND LOWER LIMB LYMPHEDEMA: A COMPARATIVE STUDY

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Objective: The aim of this study was to assess body image, self-esteem, self-reported anxiety and depression and the relationship to sociodemographic and clinical characteristics in women with lipedema and lower limb lymphedema; compared within groups and with a healthy control group.

Material-Method: A hospital-based, cross-sectional design was conducted. Sociodemographic data were recorded in 159 adult women; 53 of those had diagnosed with lipedema (group1), 53 were patients with lower limb lymphedema (group2) and 53 were healthy individuals (group3). Clinical characteristics including duration of diseases, stages and types of diseases, clinical history, symptoms and signs were also recorded in group 1 and 2. Body image, self-esteem and anxiety and depressive symptoms were assessed using the Body Image Scale, the Rosenberg Self-Esteem Scale, Hospital Anxiety and Depression Scale respectively. All of the data were collected before treatment in clinical groups. Descriptive and interferential statistical analysis were performed to compare the groups and to verify associations ($p<0,05$).

Results: Both clinical groups had poorer body image and self-esteem scores and higher anxiety and depressive symptoms scores compared with healthy controls. Lipedema patients had poorer body image scores compared with lymphedema patients. There were significant correlations between duration of disease and the body image scale scores and depressive symptom scores in lipedema patients.

Conclusions: Lipedema and lymphedema patients exhibit poorer body image and self-esteem and higher anxiety and depression symptoms compared with healthy counterparts. Health professionals should be aware of the aforementioned psychological issues and take into account when planning treatment approaches.

THE COMPARATIVE FREQUENCY OF BREAST CANCER-RELATED LYMPHEDEMA DETERMINED BY BIOIMPEDANCE SPECTROSCOPY AND CIRCUMFERENTIAL MEASUREMENTS: RELATIONSHIP WITH FUNCTIONAL STATUS AND QUALITY OF LIFE

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Objective: The aim of this study were to comparatively determine the frequency of subclinic lymphedema by using prospective monitoring with bioimpedance spectroscopy (BIS) and circumferential measurements in a group of patients who underwent breast cancer surgery. We also aimed to evaluate the relationship between volume-changes and functional-status and QoL in patients with breast cancer-related lymphedema (BCRL).

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Material-Method: A-hundred patients who had unilateral breast-cancer surgery were randomly allocated to Group1 and Group2, which were assessed with circumferential and BIS (L-Dex) measurements respectively for volumes at baseline, 3rd-month and 6-month.The demographic and clinical properties were recorded. Functional status and QoL was evaluated by Q-DASH and LYM-QOL-Arm questionnaires. The threshold for lymphedema was determined as >10 L-Dex ratio from baseline, and >5% excess-volume difference compared to unaffected arm.

Results: Eigty-two female-patients with a mean-age of 49.7+10.2 years completed the 6-month follow-up. The demographic and clinical properties were similar between the groups. Most the patients were housewives, over-weight and had modified radical mastectomy with chemotherapy and radiation therapy. The frequency of lymphedema at the end of 6-month, was determined by 28% and 21% with BIS and with circumferential-measures respectively. Also, QoL and functional scores were correlated with volumes-determined by circumferential measurements and L-Dex scores.

Conclusion: During the first 6-months after surgery; the frequency of subclinical lymphedema assessed by L-Dex was higher than the frequency assessed by circumferential measurements. Periodic monitoring of women by BIS is suggested in order to allow early detection and timely intervention for BCRL, as well as to improve functionality and QoL.

RADICAL REDUCTION AND RECONSTRUCTION FOR MALE GENITAL ELEPHANTIASIS

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Objective: Management of extremity elephantiasis is challenging, and that of male genital elephantiasis (MGE) is even more challenging due to its complicated shape and of high risk of lymphorrhea and cellulitis. Complete resection of fibrous tissue and lymphatic reconstruction is considered ideal for the treatment of MGE. The aim of this study was to evaluate feasibility of radical reduction and reconstruction (3R) for isolated MGE.

Material-Method: Seven patients underwent 3R for isolated MGE treatment. The 3R operation consisted of fibrous tissue resection in the genitalia and reconstruction of soft tissue and lymphatic structure using superficial circumflex iliac artery perforator (SCIP) lymphatic flap transfer (LFT). No compression was applied postoperatively. Patient and flap characteristics, intraoperative findings, and postoperative results were evaluated.

Results: Resected tissue volume ranged from 609 to 2304 gram (average, 1511.0 gram). SCIP-LFT was performed in all cases; pedicled full-thickness SCIP-LFT for scrotal reconstruction in all cases, and SCIP pure-skin-perforator flap transfer for penile reconstruction in 3 cases. There was no postoperative genital complication or evidence of genital lymphedema recurrence in mean follow-up of 22.7 months. Genital lymphedema score significantly improved postoperatively (6.7 ± 1.8 vs. 0.3 ± 0.5, $P < 0.001$).

Conclusions: 3R operation allowed one-stage curative treatment for isolated MGE. LFT plays an important role to prevent postoperative wound problem and lymphedema recurrence after radical resection of fibrotic tissue.

DIFFERENT TYPES OF SURGERY FOR DIFFERENT GRADES OF SECONDARY LYMPHEDEMA

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Objective: Different types of surgery have been described for the surgical treatment of lymphedema featuring resectional, deviative, or reconstructive issues. Different stages of lymphedema show different pathological changes within the lymphedematous tissue.

Method-Material: Therefore, the surgical answer should be given specifically for different pathologies, especially for these within the lymphatic collectors.

Results: Early stages of lymphedema often show actively propulsing lymphatic collectors. This is necessary to push lymph fluid centrally. Thus, early stages of lymphedema are particularly eligible for less invasive procedures where only a local intervention is used like in lymphovenous anastomoses.

In advanced stages the lymphatic collectors get more and more fibrotic and loose the propulsing ability. Under these circumstances the reconstruction of an active pumping and suctioning force replacing the impaired lymph collectors is necessary. Lymphatic collector grafts have shown to fullfill this demand. Resectional methods seem to be necessary for advanced secondary tissue changes. They are indicated either as sole intervention in far advanced stages or as an adjunct after having improved the lymphatic outflow.

Conclusions: Significantly improved lymphatic transport, measured by lymphatic scintiscans as well as radiological long term patencies of more than 10 years within our experience of more than 400 cases of lymphatic collector-transplantations demonstrate the value of such active lymphatic collector grafts especially in late stages of lymphedema.

LYMPH SPARING LIPOSUCTION IN TREATING LIPEDEMA: WHY AND HOW

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Objective: Liposuction in treating Lipedema is aimed to remove abnormal fat while preserving other structures such as lymphatic channels. Our evaluation of Lipedema patients includes ultrasound assessment of the subcutaneous fat in the legs. Examination is done 10cm above the medial malleoli with Terason t3000 US System, 2-12MHZ. We consistently found high echogenicity and increased tenderness of the deep fat versus the superficial fat, that led us to hypothesize: The subcutaneous fat in Lipedema is not homogenous, therefore it should not be aspirated in it's entirety and thereby improve surgical results.

Method-Material: i) In 25 consecutive patients (50 legs) we compared (A) the echogenicity of the superficial fat vs. the deeper fat (numerical value 1 to 10, ultrasound white/black scale) and (B) the thickness of superficial/deep fat. ii) Pain level (0 to 10) by pinching of superficial fat (~2cm) vs. full thickness (superficial + deep) fat, at the medial calf. Iii) Outcome of Water-jet Assisted Liposuction (WAL): 82 patients, 218 procedures. WAL technique: (1) liposuction limited to the deep fat layer - avoiding the superficial (~10mm) fat; (2) local anesthesia; (3) 3.5mm cannula; (4) cannula moves in all directions; (5) no heat or power assisted liposuction, only Water-jet Assisted Liposuction (WAL).

Results: i) Echogenicity: Superficial fat 2.93+1.26, deep fat 6.05+1.36 ($P<0.05$), Thickness: Superficial fat 7.2+3.1mm, deep fat 14.3+6.1mm. ii) Pain level: Superficial fat 1-2/10, deep pain >7/10. iii) Outcome: Excellent relief of pain, tenderness and skin sensitivity was experienced by all. None experienced increased swelling or lymphedema.

Conclusions: Correlating the ultrasound findings, pain levels and the surgical outcome supported our surgical technique as described above. We believe that avoiding the superficial fat and applying a gentle technique like WAL provides an excellent symptomatic relief while preserving lymphatic channels.

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SURGICAL OUTCOMES ANALYSIS OF NOONAN SYNDROME PATIENTS EVALUATED WITH LYMPHATIC IMAGING

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Objective: Assess how advances in lymphatic imaging, microsurgery, and interventional endovascular radiology impact evaluation of the lymphatic phenotype, clinical status, and post-procedural outcomes in select patients with Noonan Syndrome (NS).

Material-Method: A PubMed literature review was performed. Inclusion criteria for this study were: 1) diagnosis and clinical description of patients with NS, 2) lymphatic imaging of structure, function, or post-operative sequelae, and 3) documentation of lymphatic surgical intervention and/or iatrogenic lymphovascular complications from operative injury.

Results: Using these criteria, 8 publications were eligible for inclusion in our review. Patients (n=17) were grouped into three surgical categories depending on the type of procedure performed combined with outcomes. 1) Lymphatic vessel incision/ligation (n=6): Post-operative onset of new lymphatic reflux issues (n=5), chylothorax (n=4), and death (n=3). Authors attributed these reported consequences to iatrogenic disruptions in lymphatic flow and their sequelae. 2) Lymphatic intravascular embolization/sclerosis (n=7): Postoperative resolution of symptoms (n=1), stable condition or minor improvement (n=4), death (n=2). Embolization procedures of peripheral lymphatic vessels which did not obstruct central lymphatic flow were not associated with significant complications. 3) Lympho-venous anastomosis (n=3): Resolution of acute symptoms was apparent in all three patients, while long-term improvement could only be confirmed for two patients.

Conclusions: Pre- and post-operative findings of lymphatic imaging in this review support the hypothesis that central lymphatic flow disturbances in NS underlie the spectrum of congenital features, symptoms, and surgical complications associated with the disease. Surgical intervention should therefore prioritize the preservation and/or restoration of central lymphatic flow in these patients.

LONG-TERM FOLLOW-UP OF SILICONE TUBE IMPLANTATION FOR BYPASSING THE SITE OF LYMPH FLOW OBSTRUCTION-2020

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Objective: We proposed in 2010 to drain edema fluid accumulations in advanced stages of lymphedema with obliterated collecting trunks by creating artificial pathways to non-obstructed regions by implantation of "silicone lymphatics". The 10 years follow-up in around 100 patients provide information on the therapy and side effects. Our aim is to present the 10 years follow-up results of lymphedema therapy by subcutaneous implantation of silicone tubings in lower and upper limbs and the fate of tubing and complications.

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Material-Method: In over 300 patients in our centers with obstructive limb lymphedema silicone tubes were implanted subcutaneously. Compression and prophylactic penicillin were applied in the same fashion before and after implantation.

Results: a) immediate decrease of limb circumference within days after implantation, b) in lower limbs in 5 years follow-up a decrease in mid-calf circumference by a mean -9% (P<.05), in mid-thigh a mean -2.0% (P<.05). In upper limb decrease in mid-forearm was -8.5% (P<.01) and in mid-arm a mean -10% (P<.05). These data did not differ from those after 10 years. The new observations included a) "dryness" of tissues, b) all tubes patent, c) encapsulation of the tubing, d) no major inflammatory reactions to tubing, e) in 5% of cases inflammation appeared. It required intra-tubing antibiotics or removal. Re-implantation of tubing into other tissue channel was done in 16 patients.

Conclusions: Treatment of advanced lymphedema by silicone tubing implantation has become an effective routine procedure. Long-term observations point to inflammation after leg abrasion and encapsulation of tubing requiring re-implantation.

DIAGNOSIS, CLASSIFICATION AND RISK FACTORS IN LYMPHATIC DISEASES: THE ROLE OF THE NEW TECHNOLOGY

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Objective: New technologies in the diagnosis of the lymphatic diseases for modern classification & related risk factors.

Material-Method: Presentation of the new technologies employed in the Genoa Campisi's Team.

Results: Experience.

Conclusions: New horizons of the modern diagnostic technologies.

A MODIFIED MOUSE-TAIL LYMPHEDEMA MODEL

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Objective: Development of an easy and reproducible experimental method of secondary lymphedema.

Methods: We produced surgical interruption of lymph flow of the tail in 20 C57 Black mice. We analyzed histopathological modifications and molecular markers expression for inflammation, lymphangiogenesis and adipogenesis. Ten mice

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were submitted to a previously described mouse-tail method and compared to a modified technique after three and six weeks after surgical procedure. Tissue samples were collected from the proximal part of the tail (control) and from the distal part (lymphedema) for both models.

Results: Animals in both operative groups developed marked edema in the distal part of the tail, characterized by lymph vessels dilation, edema, inflammatory cell infiltration, and adipose tissue deposition. Lymphedema was detected after 3 weeks in both models, reaching its maximum after 6 weeks. Adipocytes detected by histology (Oil red O staining) and molecular markers for adipogenesis, lymphangiogenesis and inflammation (lipin 1 and 2, SLP76, and F4-80) were demonstrated to be increased equally in both models.

Conclusion: Both models provide a reliable method to study lymphedema pathophysiology. However, our modified technique is easier and faster to perform while still providing reliable and consistent results.

POLYVINYL ACETATE RESIN TUBE (PART) FOR TRAINING OF LYMPHATIC SUPERMICROSURGERY

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Objective: Lymphatic supermicrosurgery, or lymphaticovenular anastomosis (LVA), has become a therapeutic option for compression-refractory lymphedema. However, LVA requires sophisticated microsurgical skills called supermicrosurgery. Various living and non-living training models have been reported for supermicrosurgery, but none of them are perfect in terms of infectious risk and cost. We aimed to develop a new training material for LVA.

Method: Luminal structures or tubes were created using various materials including polyvinyl alcohol (PVAL), polyvinyl acetate resin (PAR) and hydrocolloid (HC). The created tubes characteristics were recorded, and their feasibilities were evaluated by microsurgeons regarding anastomotic similarities to the lymph vessel and suitability for LVA training.

Results: Average time and cost to create a 15-mm-long tube were 20.0 min (range, 10 to 30 min) and 0.14 USD (range, 0.06 to 0.31 USD). Diameter of created tubes ranged from 0.35 to 0.80 mm (average, 0.58 mm). All the tubes could be anastomosed using 11-0 nylon with 15-micron needle. Anastomotic patency could be assessed in PVAL tube and PAR tube (PART), whereas not in HC tube. Feeling of anastomosis in PART was most similar to that in LVA.

Conclusions: PART can be a training model alternative to previously reported training models, which allows supermicrosurgery practice with reduced infection risk and cost.

PILOT TELEMATICS POST-SURGICAL PROGRAM IN BREAST CANCER SURVIVORS IN TIMES OF COVID-19

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Objective: The aim of the study is the implementation of a telematic early postsurgical program in our breast cancer survivors for treat the early complains and asses patient satisfaction with this education tool during covid period

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Material-Method: Prospective descriptive pilot study. Inclusion criteria: Adult women who had intervention for breast cancer. Having a remote connection device. Without language barrier or sensory limitation who signed the informed consent and completed the telematics program between 25/05/2020 to 20/04/21. Protocol Pre and post assessment of range of joint mobility, volum of the arm, scars and handgrip. The telematic program consisted of 1 session per hour per 3 week in self-management, mobility, muscle strengthening, lymphedema and scars with delivery of home audiovisual support material. The data were exploited with spps version 23.

Results: 49 patients, mean age 50.3 +/- 9.3 SD, 91.8 righ- handed, 50% tumorectomized and 63.3% lymphadenectomized. Pre-programme values are hangrip 18,13+/ 4,89SD Kg 71,4% initial volume minus 5% with respect to the contralateral, 67,3% had scar retraction 44,9% limitation of arm mobility. In the subsequent control visit they had a handgrip 19,96+/ 4,026kg, 69,4% volume minus 5%, 12,2% scar retraction and 30,6% limitation of mobility. Infiltration techniques were required in 38.8% of cases. 71.4% had no complications at the subsequent visit. All patients showed a high satisfaction with the telematic program (75% very satisfactory and 25% satisfactory).

Conclusion: The early telematic rehabilitation program has proved to be safe and satisfactory in our sample of breast cancer patients.

INTERIM-ANALYSIS OF NILE - A RANDOMIZED CONTROL CROSS-OVER CLINICAL STUDY COMPARING DAYSPRING - A NOVEL WEARABLE COMPRESSION TECHNOLOGY TO PNEUMATIC COMPRESSION DEVICE IN THE TREATMENT OF LYMPHEDEMA

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Objective: To evaluate the Koya Dayspring calibrated gradient segmental compression in contrast to an advanced pneumatic compression device (APCD).

Material-Method: Up to 50 patients with breast cancer-related lymphedema (BCRL) were enrolled at 6 sites. Subjects were randomized to receive home treatment with either the Dayspring System or the Flexitouch Plus pneumatic pump. Limb volume, LYMQOL, and adherence to daily therapy were measured.

Results: Subjects were nearly all female. At the interim analysis, there was no statistically significant difference in limb volume changes between the two devices; and improvement in LYMQOL for the Dayspring device. Adherence to Dayspring therapy was found to be higher than to Flexitouch Plus.

Conclusions: Technology advancements have accelerated and with the Dayspring innovation users can now be mobile and active. In this randomized cross-over design study, patients were able to experience treatment with both a legacy pneumatic compression pump and the Dayspring wearable compression device. The LYMQOL measures lymphedema QoL and should similarly capture any changes over time regardless of which device is used. With the chronic daily demand of lymphedema treatment over the patients entire life, mobile and wearable smart treatment options that more easily fit into the daily patterns of a patient's life are more likely to be used and to provide benefits.

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ISOLATED NANOFIBRILLAR COLLAGEN SCAFFOLD IMPLANTATION ASSOCIATED WITH LYMPHATIC REGENERATION FOLLOWING RADICAL INGUINOFEMORAL LYMPH NODE DISSECTION

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Objective: Nanofibrillar collagen scaffolds (BioBridge™ [BB]; Fibralign Corporation, Union City, California, USA) have been shown to enhance lymphatic regeneration in conjunction with lymphaticovenous anastomosis and vascularized lymph node transfer. This case study is the first illustration of guided lymphatic regeneration with isolated BB placement.

Material-Method: A 74-year-old Caucasian male with chronic bilateral lower extremity lymphedema (stage I-II) and right medial foot melanoma underwent wide local reexcision with a skin graft and right groin selective sentinel lymph node (SLN) dissection. Postoperatively, he developed right lower extremity stage III lymphedema with cellulitis of the right foot. Because of 5/5 positive right inguinofemoral SLNs, he underwent completion right pelvic and radical inguinofemoral lymph node dissection with removal of 23 additional nodes, and concurrent placement of BB in the right groin. Specifically, BB was placed at the medial femoral triangle, oriented towards the suprapubic fatty tissue and medial to the spermatic cord, and superficially at the dermal subcutaneous level from the distal femoral triangle to the contralateral groin.

Results: At 15 months postoperatively, the patient's right lower extremity demonstrated stage I lymphedema that grossly resembled the contralateral lower extremity. Thigh girth decreased 12cm. The patient had no further episodes of cellulitis. L-Dex score improved from 44.0 pre-BB placement to 13.5 at 15 months postoperatively. MRI Lymphangiogram showed evidence of contrast update across the right groin and pubis, corresponding to the site of BB placement.

Conclusions: Isolated BB placement at the time of lymph node dissection can enhance lymphatic regeneration and promote resolution of lymphedema.

NEAR-INFARED LYMPHATIC TRANSPORT IMAGING TO EVALUATE RESPONSE TO AN AMBULATORY SMART WEARABLE DEVICE

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Objective: Lymphoedema is a chronic condition with unmet need where patients continue to struggle with treatment options. In this study, Dayspring™, a next-generation ambulatory connected wearable device is evaluated using ICG lymphatic imaging. The objective was to evaluate the safety and efficacy of Dayspring™, an ambulatory connected wearable device that applies calibrated sequential gradient compression. This clinical study was designed to evaluate the device's ability of lymphatic transport, in healthy and subjects with lymphoedema.

Material-Method: The study was designed as a controlled prospective open-label non-randomised study. 7 subjects were enrolled and evaluated pre and post use of device. 0.02mg of Indocyanine green (ICG) was administered intradermally. Lymphatic pathways and transport of lymph was recorded using a Near-Infrared (NIR) camera.

Results: The Dayspring™ device was administered to all subjects and lymphatic transport observed pre and post use of device. The device was self-administered and allowed all subjects to be mobile during active treatment. Additionally, the device was Bluetooth-enabled allowing connectivity and remote patient monitoring. Results from imaging demonstrated potential for aiding lymphatic function for all subjects, defined as proximal movement of dye after therapy.

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Conclusions: Advances in compression technology have potential to improve the treatment of lymphoedema. The Dayspring™ device provides benefits in complete ambulatory use and connectivity for adherence. Results from this preliminary study demonstrated potential improvement of lymphatic function in all subjects and ease of use. The device was found to be safe with no adverse events.

MULTIPLE ONE-SITE LYMPHATIC - VENOUS ANASTOMOSIS (MLVA): STATE OF THE ART AND FUTURE PERSPECTIVES

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Objective: Advantages in long term clinical outcomes of the Genoa MLVA.

Material-Method: Tricks and tips of the single site multiple lymphatic-venous anastomosis according to Genoa protocol.

Results: Clinical registry.

Conclusions: MLVA as rational system of treatment for lymphedemas.

LYMPHATIC VESSEL TRANSPLANTATION: FROM HISTORY TO CURRENT INDICATION

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Objective: The vascular-surgically established procedure of bypassing a regional vascular blockade was adapted to the tiny lymphatic vessels. These have the specific advantage to pump lymph actively.

Material-Method: Extensive experimental studies were performed in rats and in dogs. Worldwide for the first time lymphatic autogenous grafts were used to treat a lymphedema in July 1980 thereafter. More than 400 patients were treated and investigated by clinical and nuclear medical follow up studies. The patency of the grafts was proved by radiological, nuclear medical and MRT based studies. Quality of life studies were additionally performed.

Results: Significant long term volume reduction was proved especially in arm-lymphedema. Long term patency of grafts was seen for more than 20 years. Significant improvement was recorded for the quality of life especially because many patients did not need further additional treatment like MLD or compression hosieries.

Conclusions: The success of lymphatic grafting was shown in multiple studies. Interestingly it was not restricted to early edemas as it is proposed for lymphatic-venous anastomoses. This is probably due to the active pumping ability of the autogenous grafts. This type of surgery needs however a complex procedure. Peripheral lymphatic-venous anastomoses on the other hand need often only a minor surgery under local anesthesia and is suggested especially for

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early edemas. Lymphatic grafting is currently indicated especially for advanced lymphedema and as a second option after a minor surgical procedure.

PARADIGM SHIFT IN LIPEDEMA AND NOW? WHAT SHOULD CHANGE

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European Center of Lymphology

Lipedema is associated with numerous myths.

Myths that found their way into scientific publications decades ago, and which have been accepted and repeated since then without criticism; myths which have become widely accepted facts among health professionals and as a consequence also among lipedema patients.

Many of these myths have been debunked in recent years. For instance, we now know that lipedema is not an "edema disease". We also know that pure lipedema is not a disease of the lymphatic vessels. This paradigm shift also has consequences for the treatment of our patients. If no edema can be detected in lipedema, decongestion also makes no sense. Instead, we should focus on the actual suffering of our patients.

Patients diagnosed with lipedema mainly suffer from pain in the adipose tissue. However, the perception of pain depends heavily on the psychological situation of the women. Many patients suffer from psychological stress and mental disorders, which already existed before the onset of lipedema and which in turn increase the sensation of pain. The vast majority of patients also suffer from weight gain, which is certainly not caused by lipedema but by obesity. And finally, women diagnosed with lipedema suffer from a lack of self-acceptance - not least due to the current ideal of beauty, which favors thin legs.

This paradigm shift led to an 'International Consensus on Lipedema', which was drawn up by renowned experts from seven European countries and published in 2020. This consensus is now supported and disseminated by opinion leaders from 14 European countries and well-known experts from the USA, Canada and Australia.

DIAGNOSIS OF LIPEDEMA

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Lipedema is a frequent disease in women, but frequently misdiagnosed as lymphedema or obesity. One of the major problems is the lack of a test to confirm the diagnosis of lipedema.

Diagnosis of lipedema is mainly based on history and clinical examination.

Patients present a symmetrical and abnormal increase of adipose tissue from the hips, involving the buttocks, thighs and calves, always affecting bilaterally both lower limbs and sparing feet, provoking a visual effect of "Cuffing Sign". There is an evident disproportion in the distribution of the fat. Patients complain of edema in lower limbs -that may worsen with orthostasis and heat-, pain and minimal trauma-induced bruising. These are the most significant differences between lymphedema and lipedema.

The diagnostic criteria for lipedema were described by Wold (1951) and have been modified by Herbst. The most characteristic manifestations of lipedema are bruising, disproportion between the upper and lower body-halves,

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symmetrical involvement and unaffected feet.

As obesity is the most frequent comorbidity in patients with lipedema, the differential diagnosis is not always easy to do.

Joint hypermobility syndrome, that is a connective tissue disorder, has been associated with lipedema.

Imaging tests that provide structural and functional information of the lymphatic system such as indirect lymphography, lymphofluoroscopy, magnetic-resonance lymphangiography and high-resolution duplex ultrasounds have failed to show until now, any pathognomonic findings of lipedema that could assist in setting a definitive diagnosis.

Research in Genetic may bring some light in the near future.

LYMPHOSCITIGRAPHIC FEATURES OF LYMPHATIC INSUFFICIENCY OF THE LOWER LIMBS ARE PRESENT IN THE MAJORITY OF WOMEN WITH LIPEDEMA

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Objective: Lipedema is characterized by symmetrical pathological deposition of subcutaneous adipose tissue, pressure-induced or spontanous pain of adipose tissue and the tendency to easy bruising. It affects women almost exclusively and is present mainly within their lower limbs. The aim of the study was to evaluate the lymphoscyntigraphic alterations in lipedema.

Material-Method: 54 women in the mean age of 42 (in the range of 22-72) with the clinical criteria of lipedema and without clinical signs of lymphedema underwent ymphoscyntigraphy. Lymphoscintigraphic images were assessed qualitatively for alterations of lymphatic insufficiency, i.e.: delayed, asymmetrical, or lack of visualization of the inguinal lymph nodes and dermal backflow (as the major alterations), and additional lymphatic vessels (collateral circulation), dilatation of lymphatic vessels and visualization of popliteal lymph nodes (as the minor alterations).

Results: Minor lymphoscyntigraphic alterations were found in the majority of patients and in 51% of them they were asymmetrical. The most frequent lymphoscinthygraphic alteration was the presence of additional lymphatic vessels within the calf (in 54%). The presence of additional lymphatic vessels within the thighs was found in 6%. Dilation of lymphatic vessels was present in 46% patients within the calf and in 11% within the thigh. Normal inguinal lymph nodes were visible in all the patients and the popliteal lymph nodes were visualized in 44%. Dermal backflow was present in 18%.

Conclusions: Our preliminary study implies a link between lipedema and insufficiency of the lymphatic system. Further studies are necessary to clarify this relation.

THE INTERNATIONAL CONSENSUS ON LIPEDEMA

Tobias Bertsch

Foeldi Clinic Germany, European Center of Lymphology

Lipedema is much more than big and painful legs. Instead of focusing on a never-proven edema in lipedema, rather than treating patients with decongestion, we need to focus on the real suffering of our patients.

As described in the International Consensus Document, Patients diagnosed with lipedema mainly suffer from pain in the adipose tissue. However, the perception of pain depends heavily on the psychological situation of the women. Many

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patients suffer from psychological stress and mental disorders, which already existed before the onset of lipedema and which in turn increase the sensation of pain. The vast majority of patients also suffer from weight gain, which is certainly not caused by lipedema but by obesity. And finally, women diagnosed with lipedema suffer from a lack of self-acceptance - not least due to the current ideal of beauty, which favors thin legs.

The therapy concept recommended in the International Consensus Document affects all aspects described and is presented in the lecture together with the scientific principles. This consensus is now supported and disseminated by opinion leaders from 14 European countries and well-known experts from the USA, Canada and Australia.

Physiotherapists are the key stakeholders in lipedema!

Compression and exercise therapy are central points of this therapeutic approach. In addition, physiotherapists should educate lipedema patients: explain the connection between weight gain and worsening lipedema and the connection between psychological state and pain perception.

Morbidly obese patients often also suffer from obesity-associated lymphedema (in addition to lipedema). Manual lymphatic drainage is essential for this group of patients.

In addition, physical therapists should also network with obesity experts and psychologists. Only if all aspects of our patients' suffering are taken into account we can offer them a long-term successful therapy.

LIPEDEMA DIAGNOSIS AND CONSERVATIVE TREATMENT

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Lipedema is a chronic adipose tissue disorder that almost affects women. The etiopathogenesis is based on hormonal and genetic factors but has not been elucidated yet. As lipedema is often misdiagnosed as lymphedema and obesity, the differential diagnosis and prevention of further progression is important. However lipedema can be associated with obesity or lipolymphedema can occur in advanced cases. There are diagnostic criteria for lipedema which depends on detailed physical examination and anamnesis. The condition involves typically the hips, thigh, buttocks, legs and upper arm. There is a disproportion between upper and lower parts of the body and the tissues in affected areas are generally loose and painful. Spontaneous bruising is a common sign. Pure lipedema is always symmetrical and Stemmer's sign is negative. Ultrasonography and lymphoscintigraphy may be needed for differential diagnosis in selected patients.

A multidisciplinary team which includes PMR physicians, nurses, physical therapists, dietician, psychologist, plastic surgeon and bariatric surgeon, is needed for treatment. The conservative approaches comprise individualized special diet, weight control, exercises and compression garments. Psychological support is also very important for emotional and mood disorders. Complex decongestive therapy and pneumatic compression pumps may be needed for patients with lipolymphedema and phelobolipedema. Alternative approaches like deep oscillation-therapy, acoustic wave therapy, cryotherapy and ozone therapy are used among patients without inconclusive results.

In conclusion; awareness, diagnosis of lipedema as well as education of both patients and health professionals are critical to prevent the advanced disease, supply early treatment and to increase the quality of life of these suffering patients.

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FAT DEPOSITION AS A RESULT OF INFLAMMATORY RESPONSE IN EXPERIMENTAL LYMPHEDEMA

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Objective: Our aim was to establish the chronology of fat deposition in experimental lymph stasis and the relationship between inflammation and adipogenesis.

Material-Method: We used a modified model of experimental lymphedema in twenty male C57BL6 black mice to assess the time line of lymphedema formation and correspondent tissue modifications, three and six weeks after surgical interruption of lymphatic pathways. We studied adipogenesis and inflammatory markers in histological samples of the tails using quantitative polymerase chain reaction in nitrogen oxide synthase 2 (NO2) - deficient and dexamethasone treated mice.

Results: Increased fat deposition was observed after three weeks with further increase at six weeks. Genes involved in the inflammatory process (TNF-α, IL-6, MCP-1) were up-regulated before adipocyte maturation, evaluated by increase in lipin expression. Adipogenesis was inhibited in NO2 - deficient and in corticosteroid treated animals.

Conclusion: In the modified mouse tail lymphedema model, inflammation precedes adipogenesis. Our data suggest that MCP-1 and nitric oxide may be potential targets for lymphedema management.

WHY DOES LYMPHEDEMA LEAD TO ADIPOSE TISSUE DEPOSITION AND HOW CAN YOU TREAT IT?

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Objective: Adipose tissue deposition was questioned by several lymphologists when we already in 1987 noted this phenomenon. Multiple evidence for adipose tissue deposition will be presented from the literature.

Results:

1. Serosal increased "fat wrapping" in Crohn's disease caused by inflammation (Borley et al. 2000).
3. Exophthalmos in Graves' is caused by inflammatory adipose tissue increase (Lantz et al. 2005).
4. A mutation (Prox1) leads lymph leakage and adult-onset obesity in mice (Harvey et al. 2005).
5. CT showed 81% more adipose tissue in the edematous arm (Brorson et al. 2006).
6. Adipogenesis in response to lymphatic fluid stasis is associated with a marked mononuclear cell inflammatory response (Zampell et al. al 2012).
7. Lymphatic fluid stasis up-regulates the expression of fat differentiation markers both spatially and temporally (Aschen et al. 2012).
8. The pathophysiology of lymphedema drives adipose-derived stem cells toward adipogenic differentiation (Levi at al. 2013).
9. Liposuction aspirate removed showed 94% of adipose tissue in 76 women (Brorson et al. 2004, Hoffner et al. 2018).

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9. Excess adipose tissue is also present in muscle tissue (Hoffner et al. 2018, Trinh et al. 2019).

10. DXA in showed a significant increase of adipose and muscle tissue in the edematous arm, which were normalized after liposuction. (Brorson et al. 2009, Hoffner et al. 2018, Karlsson et al. 2021).

Conclusion: There is overwhelming evidence for adipose tissue deposition in lymphedema. In contrast to microsurgery, liposuction leads to complete reduction of the excess volume.

CLIMATE CHANGE AND CLIMATIC VARIATION IMPACT ON CHRONIC OEDEMAS: A SYSTEMATIC REVIEW

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Objective: Chronic oedema is a significant problem worldwide with substantial burden on both the health service and quality of life. Primary management techniques utilise compression garments, bandaging and manual lymphatic drainage. Rising temperature because of climate change is well documented. Higher temperatures and increased humidity result in additional discomfort, physiological changes and reduced compliance with core treatment recommendations. It is anticipated that this will present significant challenges for the ongoing management of chronic oedema/lymphoedema. The objective of our study was to systematically review the literature for evidence about the impact of climatic variations on chronic oedema.

Material-Method: All studies that examined the general population who have chronic limb oedema were included in the review. Exclusion criteria were articles that were not a primary study and studies published before 2000.

Results: 2489 studies were identified using our search criteria and then screened. Five articles met the inclusion criteria. Articles fell into three broad categories of compression garments difficulties, physiological changes, and seasonal filarial attacks.

Conclusions: Studies showed a clear connection with warmer temperatures and symptoms of lymphoedema. Patient experience and objective measures did not clearly align. There is a distinct lack of evidence and further research in this area is strongly recommended.

DIAGNOSTICS OF LYMPHATIC VESSELS DAMAGE IN FRACTURES OF LOWER LEG BONES ASSOCIATED WITH A POST-THROMBOTIC SYNDROME

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Objective: To improve the results of diagnostics and treatment of lymphatic vessels damage in fractures of lower leg bones associated with post-thrombotic syndrome.

Material-Method: For this objective, a clinical observation was performed with participation of 186 patients aged 20–76 years with fractures of lower leg bones and a post-thrombotic syndrome in the history. The medium age of the patients was 40.7 ± 3.8 year. For high-quality diagnostics and correction of the lymphatic status, a comparative analysis of fluorescent lymphography and MRI lymphography with contrast enhancement was performed. Fluorescent

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lymphography with 1.0 % fluorescein sodium (disodium salt) and a light source with 480 nm wavelength was performed in all 186 patients. The contrast was injected into the interdigital spaces of the affected lower limb. The distribution of the contrast agent along the superficial lymphatic vessels was assessed, the result was recorded immediately and after 30-45 minutes. MR-lymphography with contrast enhancement was performed in 24 (12.9 %) patients to examine the condition of deep lymphatic structures (lymph nodes, lymphatic collectors, lymphatic vessels) and their patency. On a 1.5 T tomograph in T-1 weighted image (VI) and in 3D on T-2 VI in STIR mode (short tau inversion recovery), lymphatic vessels were visualized in dynamic studies after 5, 15, 25, 35, 45 and 55 minutes.

Results: The fluorescent lymphography in 123 (66.1 %) out of 186 patients showed changes in the lymphatic status in the superficial lymphatic vessels of the lower leg, which manifested themselves as lymphedema, lymphatic cysts, lymphatic vessel thrombosis, thrombolymphitis, and lymphorrhea.

Contrast-enhanced MRI lymphography performed in 24 patients showed that 5 (2.7%) of them did not reveal changes in the deep lymphatic vessels of the lower leg, 9 (4.8%) had lymphatic ruptures, 4 (2.2%) - thrombosis of the lymphatic vessels, in 6 (3.2%) - extravasates.

Conclusion: With fractures of the leg bones in patients suffering from post-thrombotic disease, the lymphatic system in the area of injury is damaged, which is manifested by ruptures, inflammation and thrombosis of the lymphatic vessels, external lymphorrhea, lymphedema of the injured lower extremities, which are reliably MR-lymphography with contrast.

TREATMENT OF CANCER-ASSOCIATED THROMBOSIS: EVIDENCE AND PRACTICAL MANAGEMENT CONSIDERATIONS

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Objective: Cancer-associated thrombosis (CAT) is a leading cause of death amongst people with cancer. Treatment decisions have become increasingly complex with introduction of direct oral anticoagulants, and existing guidelines are limited to evidence from patients meeting stringent trial-entry criteria. The objective is to review the data that underpin the current consensus guidelines for the treatment of CAT and discuss the limitations of the data and practical approaches to managing challenging cases.

Summary: Current expert consensus guidelines recommend that patients with cancer-associated thrombosis (CAT) are treated with therapeutic anticoagulant therapy for a minimum of 6 months unless there is a specific contraindication. Clinicians can choose between low molecular weight heparins, DOACS or even warfarin depending on circumstances. Methodical review of risk factors should include (i) status of main organs involved in drug elimination (kidney, liver) ii) type of cancer and metastatic profile (e.g. brain) (iii) bleeding risk; (iv) patient quality of life and personal preferences; (v) nature of ongoing cancer treatment and life expectancy. Patients should be involved in shared decision making at every step of the way particularly when management decisions need to be taken in the absence of clear guidelines. Examples include the extension of treatment beyond 6 months, the choice of agent in the presence of a 'luminal' malignancy, the risk assessment of drug-drug interactions etc.

Conclusions: Making anticoagulation decisions in people with cancer can be challenging; it is important that healthcare providers can discuss where there is a lack of evidence and ensure that patient preference is given priority

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THE CHALLENGES OF PRACTICING THROMBOPROPHYLAXIS FOR PATIENTS WITH CANCER

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Objective: Cancer is the most important risk factor (RF) for venous thromboembolism (VTE), and RFs arise from the patient characteristics (e.g. age, previous history of VTE) the treatment (e.g. chemotherapy, surgery), cancer characteristics (e.g. type, stage) and tumour inflammatory properties (e.g. D-dimers, FBC indices). Although the hospital is a high-risk environment, most VTEs occur in the outpatient setting. The objective is to review the existing evidence and discuss the challenges of selecting the right patients to offer Thromboprophylaxis (TP) by considering, a) VTE risk and how to define the balance between numbers needed to treat compared to numbers harmed, b) type of TP and c) optimal dose, length and timing of TP.

Summary: Inpatients should be assessed for TP, and TP should be considered for ambulatory cancer patients with high-risk cancers such as pancreatic and multiple myeloma. Clinical prediction rules (CPRs) are in development to predict high risk of VTE. Recent data suggest that the Khorana Score-(KS) can predict a 10-11% VTE risk over 6 months in ambulatory patients and DOACs (Apixaban or Rivaroxaban) can prevent a proportion of VTEs. Patients with KS ≥2 merit a discussion on the risks and benefits of TP.

Conclusions: All cancer patients should be informed of the symptoms and the risks of developing a VTE Pancreatic cancer patients, myeloma patients and some high-risk patients as defined by clinical prediction rules (CPRs) should be considered for pharmacological TP. Better CPRs to target TP to when the risks are highest in a cancer journey remain an unmet need.

GUIDELINES ON VTE PROPHYLAXIS IN MEDICAL PATIENTS WHILE HOSPITALIZED AND AS OUTPATIENTS

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The risk of thrombosis in medically ill patients is not as high is in some surgical patients, but the risk is extended over a longer period. This is due to the fact that medically ill patients are rarely cured from the illness and have more comorbidities. With extended anticoagulant prophylaxis the exposure time to bleeding complications increases. It is therefore often a challenging task to select the subset of medical patients that benefit the most from prophylaxis against venous thromboembolism (VTE).

The prophylactic agent preferred in hospitalized patients is low-molecular-weight heparin (LMWH), due to somewhat better efficacy, lower risk for heparin-induced thrombocytopenia, compared to unfractionated heparin, less frequent administration and it is probably more cost-effective in most settings. Direct oral anticoagulants appear to cause more bleeding in hospitalized medical patients, are equally effective and usually less expensive than LMWH.

Risk assessment models are helpful in selecting patients that may benefit from prophylaxis, but it is unclear if their application leads to fewer clinical outcomes of importance in a variety of settings. It is clear that VTE prophylaxis in medically ill, hospitalized patients does not reduce mortality. The incidence of non-fatal pulmonary embolism is reduced and probably also the incidence of symptomatic deep vein thrombosis. In critically ill medical patients the benefit of chemoprophylaxis is stronger with possible reduction of mortality and reduction of pulmonary embolism without any increase in the risk of bleeding. Addition of mechanical prophylaxis can further reduce the risk of symptomatic proximal deep vein thrombosis. Randomized clinical trials in stroke patients have shown that elastic compression stockings alone

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are not effective, whereas intermittent pneumatic compression devices reduce the risk of VTE. In other medically ill patients with active or high risk of bleeding any of these devices probably provide some benefit with little risk of harm.

Patients in long-term care or nursing homes there is only one small randomized trial evaluating LMWH and no solid conclusions can be drawn regarding any benefit from VTE prophylaxis in this population, unless there are circumstances with augmented risk for VTE.

Non-hospitalized medically ill patients do in general not benefit from VTE prophylaxis. Extended prophylaxis after hospitalization for medical illness is in general not recommended. The reduced risk of VTE is balanced by an increased risk of bleeding. Even with careful selection of patients for extended prophylaxis the absolute risk reduction is very small. For patients hospitalized with COVID-19 pneumonia the indication for post-discharge prophylaxis is also unclear and randomized clinical trial results are eagerly awaited.

MONSTREOUS SCROTALEDMEA: A CHALLENGE FOR CONSERVATIVE AND SURGICAL TREATMENT

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Objective: Mostly genital edema in men develops after prostate cancer surgery. In our cases the genital edema is due to severe obesity as dependency edema and one after infection with filariasis.

Method-Material: Our treatment protocol contains weight reduction with ketogenic nutrition, daily MLD 7 days per week, IPC 7 days per week, compression exercises and psychological therapy. The MLD is a challenge for two therapists and it is totally different to our normal MLD. We do strong and powerful pressure at the involved scrotal parts, but the biggest and most complicated challenge is the compression which has to be for 22 hours per day and is applied daily and readjusted several times a day. After the complete decongestion phase the patients were forwarded to a specialized plastic surgeon for scrotoplasty. The main problem of the obese patient is to keep and even reduce the weight to normal at home. Even with psychotherapy one of our patients gained about 60kg weight again due to Covid 19 as he apologized himself.

Results: Case No 1: born 1968, 19th 2019 with severe scrotal edema and a weight of 260,1kg. Starting with phase 1 DLT with difficulties in MLD, bandaging and taping. Reduction of weight to 213,8kg till April 5th, 2019, edema reduction of scrotum of more than 30kg. Skin resection of 39,6kg scrotum performing new genitals with perfect result. Case No 2: born 1981, weight 290,6kg, height 172cm, monstreous scrotal swelling since 5 years. Treatment started February 21st 2019. Reduction of weight to 228,7kg, about 30 kg edema out of the scrotum, good result with Velcro bandage, no pitting after conservative treatment lef, June 19th 2019. Decision for surgery, reduction of 33,8kg tissue performing new genitals with perfect result. Case No 3: born 1968, weight 218,3kg, height 176cm, 25l out of scrotum, surgery due to Covid 19 not possible yet, patient under control. Case No 4: 1952 filariasis with scrotal edema, urologists told the patient he has to live with it. Reduction of 5,7l edema, then plastic surgery, reduction of 2,6kg.

Conclusions: Monstreous genital edema is a big interdisciplinary treatment challenge, especially for physiotherapists and plastic surgeons as well as for psychotherapists.

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LIPOSUCTION IN COMBINATION WITH CONTROLLED COMPRESSION THERAPY REDUCES THE INCIDENCE OF ERYSIPELAS IN PRIMARY AND SECONDARY LOWER EXTREMITY LYMPHEDEMAS

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Objective: Skin infections are a recurring problem for people suffering from lymphedema, and lymphedemas have been proven to be the single most important risk factor for developing erysipelas in the leg. This study aims to determine whether liposuction for late-stage lymphedema reduces the rate of erysipelas in lower extremity lymphedema (LEL).

Material-Method: One hundred twenty-four patients with a median age of 49 years who had liposuction and controlled compression therapy (CCT) for LEL were included. Median preoperative and postoperative patient years at risk were 11 and 5 years, respectively.

Results: With a total of 1680 preoperative person years at risk and 335 bouts of erysipelas experienced in 67 patients, the preoperative incidence rate was 0.20 bouts/person/year, and the period prevalence was 54%. Postoperatively, the patients were followed over a total of 763 person years at risk, and 27 patients experienced a total of 53 bouts of erysipelas, resulting in a postoperative incidence rate of 0.07 bouts/person/year, and a period prevalence of 22%. This represents a 65% decrease in the erysipelas incidence rate ($p<0.001$).

Conclusions: Liposuction and CCT significantly reduce the risk for erysipelas in LEL. This finding is similar to our previous research including patients with upper extremity lymphedema. The underlying physiological reason for this reduction in erysipelas incidence after liposuction and CCT is still unknown.

LyMB BANDAGING FOR ACUTE LYMPHANGITIS

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Objective: Treatment of lymphangitis and lymphatic ulcers include two main approaches: prescribing antibiotics and bandaging. The choice of antibiotics depends on the severity of the symptoms or signs. The main goal of the bandaging is to reduce edema and improve peripheral lymphatic flow. There are various types of bandaging that differ in terms of execution and materials used.

Material-Method: Is described the use of a particular type of bandage used on patients suffering from lymphangitis or lymphatic ulcer. The eight-point "lymphangitis score" is used to diagnose lymphangitis.

Results: The bandaging arises from the interaction between the specific knowledge of the materials used in each single layer (hysteresis and textile properties), the use of a specific bandaging technique to create a high static rigidity index (SII) and the indications given by patients. on their needs and requirements. In fact, this type of bandaging results to have reached 99.8% of comfort felt up to 7 days from packaging.

Conclusions: The correct execution of the bandaging and the knowledge of the materials to make it are the fundamental requirements to obtain an effective and well tolerated bandaging.

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A PRELIMINARY STUDY OF QUALITY OF LIFE, FUNCTIONAL AND PSYCHOLOGICAL STATUS IN PATIENTS WITH LOWER LIMB LYMPHEDEMA: ASSOCIATIONS WITH BODY MASS INDEX

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Objective: The aim of this study was to assess quality of life, lower extremity functions, self-reported anxiety and depression in patients with lower lymph lymphedema and investigate the associations with body mass index (BMI).

Material-Method: 18 adult patients (15 women and 3 men; aged 19-75) with primary or secondary lower limb lymphedema were included into this preliminary study. A cross-sectional, hospital based design was conducted. Sociodemographic and clinical characteristics of the patients were recorded and (BMI) was calculated. Quality of life was assessed using the Lymphedema Quality of Life Questionnaire-Leg (LYMQOL-Leg), lower extremity functions and anxiety and depressive symptoms were assessed using the Lower Extremity Functional Scale (LEFS) and Hospital Anxiety and Depression Scale respectively. All of the data were collected before complete decongestive treatment. Data were analyzed using SPSS 22.0 and correlations were verified using Spearman's Rank Correlation Test ($p<0,05$).

Results: Regarding to etiology, 3 (16,7%) of the 18 patients had congenital/hereditary lymphedema, 9 (50%) had cancer-related lymphedema and 6 (33,3%) had phlebolymphedema. According to WHO classification, 2 (11,1%) of the 18 patients were morbid obese, 9 (50%) were obese and 7 (38,9%) were non-obese. Visual analog scale scores for "overall quality of life" and LEFS scores were significantly and inversely correlated with BMI.

Conclusions: A significant proportion of lower lymph lymphedema patients have higher than normal BMI. Patient with higher BMI report poorer "overall quality of life" and diminished lower extremity functions. Health professionals should encourage lymphedema patients to maintain healthy weight. Further research is needed to establish these associations.

THE EFFICACY OF COMPLEX DECONGESTIVE THERAPY IN REGARD TO VOLUME, FUNCTIONAL STATUS AND QUALITY OF LIFE IN PATIENTS WITH LOWER EXTREMITY LYMPHEDEMA

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Objective: The aim of this study was to evaluate the effects of complex decongestive therapy (CDT) in patients with lower extremity lymphedema, in regard to volume reduction, functional status and quality of life (QoL).

Material-Method: Forty-one patients with unilateral GCRL were included. The demographic variables focusing on lymphedema were recorded from the files. All patients received combined phase 1 CDT including skin care, manual lymphatic drainage, multilayer bandaging and supervised exercises, five times a week for three weeks, as a total of 15 sessions. Patients were assessed by limb volumes and excess volumes at baseline and at the end of third week. The functional disability was evaluated by lower extremity functional scale (LEFS). QoL was assessed by the LYMQOL-Leg questionnaire.

Results: Thirty females and 11 men with a mean age of 52.63±16.6 years were included. The median duration of lymphedema was 60 months. There were 3 patients in stage-1, 34 in stage-2 and 4 patients in stage-3. The

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mean baseline limb and excess volumes were significantly decreased at the end of therapies (11161±2774cm^3 vs 8588±2038cm^3 and 37.2±32.7% vs 14.3±16.1%, p=0.000,respectively). The LEFS and LYMQOL scores were also decreased significantly (p<0.05). The improvements in volumes were negatively related with the duration of lymphedema.

Conclusion: In conclusion phase-1 CDT in a combined manner performed daily for 3 weeks, greatly reduces the volumes as well as improves the disability and QoL, especially when performed earlier in patients suffering from lower extremity lymphedema.

ACUTE EFFECT OF COMPLEX DECONGESTIVE PHYSIOTHERAPY APPLIED TO A PATIENT DEVELOPING LYMPHEDEMA IN LOWER EXTREMITY DUE TO MUSCULAR DYSTROPHY: CASE REPORT

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Objective: A 34-year-old female patient was admitted to the physical medicine and rehabilitation clinic due to swelling in both lower extremities. The patient, who has had muscular dystrophy for 23 years, also has hypothyroidism. After detailed examination, bilateral lymphedema was detected in the legs of the patient. Our aim in this case report was to investigate the acute effect of complex decongestive physiotherapy (CDT) applied in a patient with bilateral lower extremity lymphedema and muscular dystrophy.

Material-Method: The patient had been suffering from lymphedema for 9 months and the lymphedema stage was stage 2. Before and after the treatment, bilateral lower extremity edema assessment of the patient was performed by circumferantiol measurement. Quality of life scores and functionality scores assesed by Lymphedema Quality of Life Questionnaire and Lower Extremity Functional Scale respectively were found to be improved at the end of the treatment.15 sessions of CDT were applied for 5 days/3 weeks.

Results: Quality of the scores were: functionality subscale 3.3 vs 3.1, apperance subscale 1.4 vs 1.1, symptom subscale 2.2 vs 1.6, emotional status subscale was 1.66 vs 1.5, general quality of life 5 vs 7. Volume assessed by circumferantiol measurement were reduced in both legs (right leg: 7190 cm^3 vs 6213 cm^3, left leg: 7121 cm^3 vs 6984 cm^3). The lower extremity functional scale was 13 vs 18.

Conclusions: In conclucion CDT appled 5 times a week for 3 weeks improved both the volume, quality of life scores and functionality in our patient who had suffering from muscular dystrophy and lymphedema.

PLEURAL EFFUSION DUE TO MESOTHELIOMA DURING PREGNANCY: A RARE CASE

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Objective: Pleural mesothelioma during pregnancy is an extremely rare and serious condition, often causing significant problems in the management of cases as the outcome of pregnancy depends on the application of therapeutic interventions that are potentially harmful to the fetus. For this reason, depending on the trimester in which the tumor is diagnosed, the appropriate treatment is followed, with most of the restrictions existing during the first trimester of

pregnancy, with a poor prognosis for the mother.

Case report: A 39-year-old woman, Gravida I, in the 26th week of pregnancy, was admitted due to vaginal bleeding with a history of placental abruption. She had thrombophilia, in vitro fertilization resulting in pregnancy, while for a week she reported intense shortness of breath, weakness and a feeling of malaise. From the performed clinical laboratory examination, pleural effusion of the left hemithorax with abundant macrophages and lymphocytes, as well as thickening of the left pleura with incomplete expansion of the corresponding lung was found. Epithelioid mesothelioma was diagnosed by pleural biopsy. Ultrasound confirmed the existence of a placenta, without other pathology for the fetus. The patient was hospitalized for a long time in our clinic, with the ultimate goal of continuing the pregnancy until the 34th week, when a caesarean section would be performed. Earlier use of chemotherapy and radiation was not found to significantly alter the prognosis of the disease, as the biopsy showed a malignant tumor, which would otherwise be potentially harmful to the fetus. After relevant consultation with the patient and her family, it was decided to continue the pregnancy with all possible disadvantages for the malignancy but on the contrary with benefits for the embryo. Nevertheless, the woman around the 32nd week presented with sudden massive vaginal bleeding due to placenta abruption and underwent an emergency cesarean section with excellent perinatal result. The woman underwent chemotherapy and radiation.

Conclusion: Pleural mesothelioma during pregnancy is an extremely rare case. The therapeutic approach is decided depending on the period during which the disease occurs, ie whether it is the 1st or the 2nd and 3rd trimester, always guided by the optimal result for the patient and the safety of the fetus.

VENOUS LEG ULCERS AND LYMPHEDEMA, HOW TO IMPROVE THE HEALING PROCESS

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Objective: When the venous leg ulcer (VLU) is combined with Lymphedema, the healing process becomes prolonged and complicated. 93% of VLU will heal in 12 months, and 7% remain unhealed for more than 5 years1. The discrepancy in the results raises a lot of questions: Are the patients realizing the importance of their role? Are they followed by experts in venous ulcer and lymphedema management? The aim of study is to establish a survey and a therapeutic protocol engaging all the medical team and the patient.

Material-Method: 29 patients met the inclusion criteria: Admitted for venous ulcer with oedema, suffering for at least 6 months, Ankle Brachial Pressure (ABPI) > 0.6. The assessment begins with a precise diagnosis, Duplex ultrasound, Biopsy, Cleaning, disinfection and debridement of the ulcer if necessary; measuring the ulcer's dimensions , taking circumferential measurements of the limb, Complex Decongestive Therapy (CDT) (Manual Lymphatic Drainage (MLD), Compression therapy, circulatory exercises program (CEP), personalized advises based on the survey's answers with the aim of improving the Quality of life (QOL).

Results: The survey showed a lack of information and knowledge in the field, affecting ALL levels: After adhering to the treatment protocol, 25 / 29 patients healed between 3 and 8 weeks.

Conclusions: These observations, highlighted several crucial points: The importance of the expertise and the knowledge of all team members. The importance of the decongestive treatment: "Where there is EDEMA there is NO optimal healing". The importance of empowering patients to participate actively in their treatment: "Listen to the Patient - Explain it to the Patient - Do it With the Patient".

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LYMLYM STUDY TO INVESTIGATE EFFICACY AND SAFETY OF LYMPHOTROPIC TREATMENT (INDIRECT ENDOLYMPHATIC INJECTIONS) OF SECONDARY AND PRIMARY LYMPHEDEMA

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Objective: Indirect Endolymphatic Injection of modified drug solutions (Lymphotropic Injection) in different diseases (from cancer to respiratory tract infection) is a key clinical research focus of the Lymphatech Clinic (Perm, Russia). This is based on the theory of lymph dynamics and interstitial transport published at WCOL 2015 proceedings (Gariaeva et al, 2015). The ongoing commercial single-site study focuses on the effectiveness and safety of the Lymphotropic Treatment of Lymphedema (LTL).

Material-Method: In 2018-2021 we enrolled 79 patients with lymphedema: 14 - primary, 65 - secondary. 29 patients were at stage IIa, 49 patients - stage IIb, 1 patient - stage III. 56% tried CDT, MLD, LVA and hosiery before and claimed improvement to last less than 3 months. LTL involved 10 days of treatment in non-erysipelas cases and 15 - in erysipelas. Lymphotropic injections with electrolytes, anesthetics, antibiotics, alpha-adrenomimetics, micro- and macroelements were administered in the site of edema and in the area of regional lymph nodes.

We studied tolerability and safety, subjective response (SR) and objective partial (PR) and complete response (CR) rates, progression-free rate (PF) after 3 and 6 months after 1 course of treatment. Objective response was determined as decrease in circumferences and improved condition of the subcutaneous tissue on ultrasound.

Results: 72 patients completed the course. The SR was achieved in all patients: decrease in the feeling of burst, softer skin, more mobility in joints, ease of movement and a feeling of purity in the limb. PR achieved in 49 patients, CR - in 17 patients. 59 of 72 patients remained PF at 3-month follow-up. As of 1 July 2021, only 45 of 59 patients reached 6-month follow-up. 31 of 45 had only 1 course of treatment remained PF, and 5 patients went for a second course of supportive treatment and remained PF, 8 patients had progression of disease, 1 patient died of comorbidity.

Conclusions: Lymphotropic Treatment of Lymphedema is a pathogenetic, minimally-invasive approach with promising results in primary and secondary lymphedema stages I-II with no severe side effects and 92% overall response. Amongst responders 3-month progression-free rate was 89% and 6-month PF rate is 60% up to date.

SEAFOOD ACTIVATED ERUPTIONS AND EXACERBATES LYMPHORRHEA IN PSORIASIS

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Objective: At Day Care Center, many patients observed that eating seafood or animal products would aggravate symptoms of psoriasis, the disease that involves immune system so complicated that no cure is known to exist. Taking advantage of large-size database, we investigated the effect of food on its pathology.

Material-Method: From 8,900 cases about 2% came with guttate, pustular, plaque, inverse, scalp, or erythrodermic. All individuals undertook treatment of compression-decompression therapy, Twisting Tourniquet® Technique using Schnogh (Chanwimalueang et al.,2015), cooling therapy, and vegan food; the latter was strongly recommended as the most effective natural medicine. Unenhanced MRI T2W stir/fs was conducted to visualize lymphatic system, from which the results were read individually by the physician to maximize patient compliance.

Results: The year/decade-long suffering from lymph-oozing, itchy lesion steadily resolved. Typically, the eruptions

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diminished and disappeared by early days, whereas lymphorrhea and pruritus gradually declined and stopped within 1-2 weeks. Some patients happened to ingest contaminated food or intentionally challenged shrimp, crab, or shellfish. Such violation caused the symptoms to recur and exacerbate with profuse leakage of lymph fluid. The recurrence readily vanished after the culprit food was eliminated.

Conclusions: The understanding that psoriasis has no cure is not true. We have demonstrated that vegan diet with no seafood nor animal products is the solution. This must be practiced with Twisting Tourniquet® Technique which we regard as a valuable tool in lymphology.

FACIAL CUTANEOUS ERUPTIONS ARE ASSOCIATED WITH "PYROGENIC" FOOD CAUSING HEAT IN HEAD AND LYMPHADENOPATHY IN NECK

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Objective: Patients with facial cutaneous eruptions, often expressed a hot feeling from inside, especially in head and neck region. They concurrently manifested other heated symptoms such as dried hair, dehydrated mouth, cracked lips, etc. We focused on the type of food that could underly the conditions.

Material-Method: Based on patients at least 0.7% from 8,900 cases, aged between 16-64 years, had chief complaint as facial cutaneous eruptions. History taking was emphasized on food preference. Some were investigated for MRI to visualize the cervical and axillary lymph nodes with T2W stir/fs thin slice, unenhanced, sagittal and coronal series. All patients were subject to three basic treatments, compression-decompression therapy, cooling therapy and vegan diet therapy.

Results: In most patients the facial eruptions diminished and disappeared in a week or two. The feeling of internal heat reduced steadily. They simply looked more beautiful. On MRI, lymph nodes showed up as hyperdense to varying degrees in cluster found at preauricular, deep and superficial cervical, submandibular, submental, supraclavicular, or subclavian and axillary regions. In particular cases like SLE, lymph nodes were extensively enlarged symmetrically covering multiple regions. The severity appeared to correspond with the 'butterfly rash. Some patients violated the slaengh food prohibition. They challenged certain "pyrogenic" food as pork, shrimp, fish, egg, etc. As a result, eruptions recurred, heat returned, face swollen.

Conclusions: Facial cutaneous eruptions are not dermatological problems, but represent head-neck-axillary lymphadenopathy. Therefore, Lymphologists should realize our potential roles more than just treating lymphedema.

GIGANTIC LYMPHEDEMA OF LOWER EXTREMITIES IS ALWAYS ASSOCIATED WITH DIETARY HABIT PREFERRING ANIMAL FLESH

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Objective: This study is to evaluate dietary habit preferring animal flesh in severe gigantic lymphedema. For an edema to develop there must be excessive extracellular fluid. Water surplus can be enhanced by renal factor. Upon that we suspect food preference could modify the formation of lymphedema especially of gigantic grade.

Material-Method: Gigantic is defined as edema severity grading above 100% (Chanwimalueang, et al, 2015). From database of 8,900 cases, we collected 55 lymphedema patients with BMI 45 kg/m^2 or more. Either unilateral or bilateral,

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lymphedema came with three patterns: 1) leg only 2) thigh only, and 3) leg and thigh. Food preference was interviewed focusing on meat which included pork, beef, calf, mutton, lamb, etc., seafood, fish, eggs, and dairy products. Every individual enrolled the compression-decompression therapy, cryotherapy, and vegan diet therapy. We surveyed dietary habit also during follow-ups.

Results: Almost all gigantic lymphedema patients revealed unusual dietary behavior. The leg-only pattern was associated with pork and other meat, while the thigh-only pattern, with poultry and/or eggs. On the other hand, the leg-and-thigh pattern possessed the combined habits. Unexpectedly, fish, seafood, and dairy products did not show any correlation with the gigantic severity. For those who violated vegan diet during follow-ups, the swelling rebounded.

Conclusions: You are what you eat. Food habit definitely exacerbated gigantic lymphedema. The more meat you eat, the more lymphedema overwhelms the leg; the more chicken you consume, the more swelling the thigh balloons.

LIPOMA IS LINKED TO INGESTION OF ANIMAL FAT

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Objective: Lipoma is a neoplastic tissue of fat origin recognized as a concrete globule(s). Large lipoma also exists, but of unknown etiology. We suspected the food factor and investigated its relationship.

Material-Method: About 2.5% of 8,900 cases were picked up for small or large lipoma(s); large if more than 2cm. We elicited history of food consumption, some of which run through decades.

Results: Small lipomas occurred throughout body. At heel edges, cystic fat globules of 0.5 cm diameter were found, the piezogenic pedal papules. Solitary or multiple lipomas could be identified elsewhere, such as thigh, arm, abdomen, flank, back and gluteal area. The most number ever counted was 75 units. All patients were disclosed to be pork lovers; some beef eaters. Following vegan diet 3-6 months, lipomas became soft and thin, and the number decreased, whereas the piezogenic pedal papules did not diminished. Large lipoma, 15-22cm, were found associated with joint injury or blunt trauma of body part. A pediatric patient with Klippel Trenaunay syndrome was found with huge lipomatosis over both shoulders traversing nuchal segment. Large lipoma patients revealed themselves to be eccentric pork lovers. The tumor did not appear to reduce after years of follow-up. We referred them for surgical resection.

Conclusions: Lipomas are the true product of eating pork. Small lipoma certainly responded to vegan diet therapy, whereas large size might take longer years before we can see the reduction.

PORK IS THE MAJOR CULPRIT FOOD OF CELLULITIS

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Objective: Inflammation of subcutaneous adipose tissue is a common complication of lymphedema, sometimes repeated and near life-threatening. Certain food of animal origin has been associated, but lacking quantitative analysis.

Material-Method: From database of 8,900 cases, demographic information was collected from year 2015~2021, to focus on lymphedema-related cellulitis of lower and upper extremities and frequently-consumed food items. The correlation was analyzed accordingly.

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Results: During latest seven years operation, 3,724 visitors were admitted. There were 44 patients with lymphedema-related cellulitis exhibiting swelling, pain, erythema, with/without fever, lymphorrea, or lymphadenopathy. The studied population had the sex ratio, female to male, 57:43, and the age range between 18~81 years, with a mean 69 years. Mean BMI was 33.4 kg/m^2. Cellulitis was 91% located in lower extremities. The most preferred animal-based food items were elicited as pork 86%, beef 30%, poultry 57% seafood 34%, eggs 43%, and dairy products 20%.

Conclusions: Clearly there are multiple culprit food items associated with cellulitis in lymphedema patients. Pork alone can account for the majority of cases.

PEAR-SHAPE BODY IS A SYMBOLIC PREFERENCE FOR POULTRY AS VIEWED FROM A FOOD CONSCIOUS LYMPHOLOGIST STANDPOINT

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Objective: Such characteristics as, slender leg, thunder thigh, and wide hip, are reminiscent of chicken. We investigated the effect of food on the phenotype of body appearance.

Material-Method: From database of 8,900 patients, hundreds of cases were picked up for food preference analysis and studied for fat/lymph deposition pattern from their MRI T2W fs/STIR.

Results: All individuals were unmistakably chicken and/or eggs lovers; only some combined pork/beef and or seafood. In normal-looking female, subcutaneous fat layer at hip joint level had thickness within one third of thigh musculature, whereas in male, one tenth would appear proportionate. In our study group the laterofemoral adipose tissue was tremendous. The thickness grew outstandingly, double or even more, adding to the gluteal fat mass. Following the development there appeared lymphatic dilatation along the vastus lateralis fascia in early stage. Sometimes a new pathway was formed floating inside the subcutaneous adipose layer. Isolated lymph pooling emerged at the lumbosacral and high lateroguetal region. When these structures merged, a vast horse-shoe shape lymphatic pathway traversed from lateral malleoli, ascending the side of lower extremities, bending widely around hip joints to fuse at back of waist. Along these lines, abundance of fat deposits was identified.

Conclusions: Where there is fat there is lymph. We are what we eat. It appears as if the animals we consume are expressing their species-specific Dee En Aey in our body part, manifesting phenotype in human body building. Why very much less males are affected is still unknown.

LYMPHOMA PATIENTS ARE FOUND PREFERENTIALLY TO BE PORK OR MEAT LOVERS

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Objective: Non-Hodgkin lymphoma (NHL) is listed among top ten "malignant" neoplasms in many countries, such as Thailand, Japan, India, Singapore, Mexico, USA, UK, France, Germany, Italy, and South Africa, to name but a few. The diagnosed patients have no choice, but to follow the protocol of lymph node biopsy, chemotherapy, and/or radiotherapy. We reexamined those who refused conventional medicine and sought alternative to improve the lymph quality.

Material-Method: About 0.5% of our 8,900 patients were known NHL cases who either abandoned or denied hospital treatment elsewhere, with age span ranging between 15~56 years. Their food history was taken and whole-body MRI of lymphatic system was critically assessed.

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Results: Most NHL patients identified themselves as pork lovers or beef eaters. In mild cases, enlarged lymph nodes were palpated in armpit, supraclavicular fossa, and lateral neck. In moderate cases, lymph nodes clustered, uni- or bilateral. In severe cases, one single lump could measure 7~11 cm located in groin and/or axilla. In MRI, initially the lymph nodes were hyperdense in T2W, suggesting surplus fluid. The local nodes then became a huge mass of ground-glass appearance traversing 24 cm across the inguinal ligament. Bilateral paraaortic mass expanded a wide area of 10 x 20 cm, apparently without compressing adjacent organs.

Conclusions: Lymphoma, non-Hodgkin, grows large in individuals who were fond of eating pork or meat. As the tumor tends to not distress neighboring structures, we do not consider it as a malignancy, which supports a more friendly treatment strategy.

FISH CONSUMPTION AGGRAVATES LYMPHEDEMA IN BREST CANCER PATIENTS

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Objective: Japan has 4.8 times higher incidence rate of breast malignancy than Thailand. We testified if fish consumption could aggravate breast cancer-related lymphedema.

Material-Method: Of 8,900 visitors at Thailand Lymphedema Day Care Center, there were more about one thousand cases with breast cancer. Some of them specifically changed dietary pattern to fish, from which we could elicit certain signs and symptoms preferentially.

Results: After diagnosis many Thais tended to shift to a food habit consuming more fresh-water and/or sea fish. We noticed four major groups who developed prominent clinical manifestations. Group I, swelling spread to the dorsum of hand, which was readily reduced upon abstaining from fish. Eating fish again edema prevailed the hand almost the same day. Group II strong pain developed in forearm, armpit, shoulder, and or breast. If the individual kept eating, erythema, eruptions, cellulitis, and lymphorrhea followed. Group III, after being diagnosed with breast cancer and switching to eat particular fish preferentially, the cancer grew vigorously, and sometimes transformed into a fungating tumor with offensive odor. Group IV, varying degrees of breathing difficulty was associated with pleural effusion. The latter was found on MRI to accumulate 10~90% of the ipsilateral pleural cavity. Occasionally the affected lung became fibrotic and the contralateral pleura involved.

Conclusions: Fish as a food item definitely affects the pathology of lymphedema in breast cancer patients. The amazing observation is that when voided the signs and symptoms recover, to how much degree, however, is rather individual.

PRURITOGENIC FOOD AS IDENTIFIED LYMPHOLOGICALLY

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Objective: Every so often lymphedema patients experience itch to different degrees. Some were so recalcitrant that they scratched to bleed. Slaengh food generally aggravates symptoms. We investigated if slaengh food items similarly intensified the itchiness in poor lymph disorder.

Material-Method: As a manifestation, pruritus or itch could come solitarily or accompany other signs and symptoms. Out of 8,900 cases, almost one thousand had itch. Representative patients were picked up, their respective itch quality analyzed, in association with the animal-based food.

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Results: There were five groups of patients who typically exhibited pruritus: 1) bad lymph sickness, 2) eczema/dermatitis, 3) psoriasis, 4) arthritis, 5) others, such as liver disease and malignancy. Group 1 had an early onset since childhood that continued to adolescent and adult. Group 2 concentrated in flexor fossa and spread throughout body. Group 3 had itch in accord with psoriatic rash. Group 4 released inflammatory lymph from ankles mostly and other diseased joints. Group 5 generated organ-specific pruritus. Each group was tested against pork, beef, poultry, fish, shrimp, crab, shellfish, squid, eggs, and diary products. Shrimp had strongest pruritogenicity, followed by chicken; eggs shared similar effect with chicken. Other food items were not consistent. However, when pork was combined with shrimp, the itchiness intensified to full extent. Likewise, pork mixed with chicken/eggs itchiness heightened.

Conclusions: Pruritogenic food are shrimp and chicken/eggs as identified by lymphology. Pork, if mixed with shrimp or chicken/eggs, can be fairly pruritogenic.

MYOMA UTERI AND CHICKEN LOVERS

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Objective: The superfamily of poor lymph disorder comprises sixteen categories of phenotypic manifestation, such as swelling, cellulitis, myalgia, arthritis, eruption, pruritus, dysesthesia, lymphorrea, ulcer, varicosis, neoplasm, and so forth. Among the non-malignant tumors, we encountered myoma uteri most frequently. It is conceivable that abundance supply of certain food could be associated to the tumor growth. We tested this hypothesis

Material-Method: Taking advantage of the large-size database of 8,900 patients, we hit more than one hundred with myoma uteri. Some severe cases were picked up for analysis of food preference and their MRI studied.

Results: Almost all patients were the chicken lovers, and/or fond of eggs. Their menstrual history was so eventful that routine life was altered. On MRI, we observed many patterns of leiomyomas, intramural, subserosal, and submucosal, highly protruded or pedunculated. As revealed by T2Wstir/fs, there was a pelvic congestion. The uterine body was rather hyperdense, suggesting excessive accumulation of tissue fluid that flooded the fibroids. A female 34y/o had more than 50 tumors packed in edematous uterus enlarged to 17.5 x 8.1 x 19.8cm; she was fond of chicken wing since childhood. A 42y/o female had a single fibroid measured 11.5 x 8.8 x 15.2cm; she enjoyed fried chicken often. A 48y/o female had multiple nodules, the largest one measuring 12.3 x 8.8 x 11.8cm; she ate eggs regularly.

Conclusions: The myoma uteri is the product of eating chicken, or eggs. It exists in an edematous uterus in a congestive pelvic cavity, a perfect combination of organ lymphedema.

THE PLACE OF GRADUATE DEGRESSIVE COMPRESSION GARMENTS IN AMATEUR ATHLETICS AFFECTED BY LYMPHEDEMA OF LOWER LIMBS

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Objective: The practice of some sports improves the quality of life in patients affected by lymphedema of lower limbs (LLL).The principal objective of this study is to determinate the place of graduate degressive compression garments (GDCG) in running in amateur athletics affected by LLL. The secondary objective is to evaluate the microcirculation of the feet in these athletics after exercise .

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Method-Material: A monocentric observational study in 5 amateur athletics men aged from 28 to 50 years, affected by LLL (4 of left limb, the fifth of both leg) who practice running .All men are treated daily by GDCG. Duplex ultrasound, TcPO2, ankle-brachial-index (ABI), toe brachial-index (TBI) are normal. All men ran on treadmill in 3 exercises: 1 exercise without garment , he ran during the 2 and 3 exercise with GDCG on the leg affected by lymphedema (the 2 exercise with 20 mmHg, the 3 with 32 mmHg). We appreciated the effect of GDCG during exercise by questionnaire (pain, heaviness and mobility of leg affected by lymphedema).The calf circumference (CC), TcPO2, ABI and TBI are measured after each exercise.

Results: In terms of results, we have confirmed our objective of improving performance with GDCG during the exercise. All men reported reduction of pain and heaviness and performance of mobility with GDCG. CC is increased without garments and remains stable after the 2 and the 3 exercise. No significant change of TcPO2, ABI and TBI after exercise.

Conclusions: GDCG can improve the performance during exercise in amateur athletics affected by LLL. However a multicentric study with graduate degressive compression garments versus graduate progressive compression garments would be necessary.

INDICATIONS OF ELASTIC GARMENTS

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Although the pathophysiology of edema varies, static and dynamic compression are the cornerstone of lymphedema management. However, the evidence base for the optimal application, duration, and intensity of compression therapy is lacking. Compression can be used by the means of intermittent pneumatic compression, bandages or compression garments. Different scientific groups have tried to summarize the recommendations for prescribing compression.

Compression garments can be prescribed in Upper and Lower limb, for prevention of lymphedema, during Decongestive Lymphatic Therapy to achieve volume reduction and during maintenance treatment.

For long-term care, low-stretch elastic garments are essential to maintain lymphedema reduction after decongestive therapy. For upper limb lymphedema, flat-knitted class 2 garments and for lower limb lymphedema flat-knitted class 3, are preferred. A trained practitioner should check that a newly prescribed garment fits properly and fully covers the area requiring treatment. Another important issue about compression garments is the patient's adherence to them.

In lipedema, as fat is not reducible by compression, the garments are meant to avoid the accumulation of fluid in order to prevent the progression of the disease. In first stages, circular knit in class 2 is enough to help drain the edema and improve the heaviness symptoms. In advanced stages, a pantyhose in class 2, in circular knit is recommended, except in cases with deformity of the limbs that may need a flat-knitted tissue.

LYMPHEDEMA OF MALE GENITALS: MATERIALS AND TECHNIQUES IN ELASTIC COMPRESSION

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Objective: Primary and secondary lymphoedema involving male genitals , represent always a real challenge due to different aspects. First of all, locations are rather different among the different cases notwithstanding the limited interested area (scrotum only, penis only, both or half section of them). Also, consistency can create an obstacle for a proper compression, because, for example, a soft oedema could be reduced in few hours but in this case is necessary to renew the bandage to adapt it to the new dimensions, but this is not possible in the majority of cases. Hard consistency

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(generally of the scrotum), on the contrary, is an advantage for the permanence of bandage for a longer time, but results are expected not so early. A real problem is represented in case of penectomy or in case of a real big dimension of the scrotum up to include penis inside, covering it. It is the situation in which bandage, covering all the surface, became wet at the first urination and must be removed.

Material-Method: Materials of bandage in male genitals are, due to the shapes, for the most part, cohesive, integrated often with short stretch bandage for, i.d. , overlapping around hips. Also, thin polyurethane is useful to avoid slipping between bandage and skin without create an excessive volume. In case of acute DLA, zinc oxide base layer is useful too, with its peculiar action against the phlogosys. Also in choice of the final garment, customization is fundamental . Great difficulties are represented again by the shape of the area. In the most part of cases most effectiveness tissue is made of tubular knitting, to obtain a passive effect of compression.

Results: Among 27 treated cases, 17 showed an oedema involving scrotum and penis, 6 involved penis and upper pubis, in 4 was located only on scrotum. In 15 cases also tigh was proximally bilaterally swollen. This put important conditions to project a garment considering the interaction of the two different needing.

Conclusions: Lymphedema of the male genitals represents a great challenge in all affected patients, not depending on dimensions but on difficulties to apply a compression above all the final one represented by garment.

E-POSTERS SESSION I

Lymphedema: From history to Diagnosis MONDAY 20 SEPTEMBER 2021 14:00-15:30

PP01 WHAT IS THIS HYPERLYMPHOREA

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Objective: To determine the meaning of HYPERLYMPHOREA, the cause of its development, and propose methods of elimination.

Material-Method: we have examined 10 patients deceased due to lymphorea of 3 to 11 liters per day. Lymphorea cases have developed due to the injured ductus thoracicus on the neck (3 patients), ribcage (3 patients), and peritoneal cavity (4 patients). Lymphorea exceeding the two-fold loss of lymph within 24 hours (3.0 l/day) shall be hereinafter referred to as hyperlymphorea. The most pronounced case of hyperlymphorea occurred after subtotal stomach resection with D2 lymphadenectomy in the form of early post-operational external transabdominal lymphatic leakage of 11 liters within 24 hours. With lymphatic leakage, there was a loss of lymphocytes, proteins (albumin), electrolytes (potassium, sodium, and other elements), which led to the development and progression of multi-organ failure. The endolymphatic lymphostatic therapy using Sodium Etamsylate 5.0 ml was introduced into the complex of treatment measures twice. The administration of Sodium Etamsylate was carried out via the catheterized lymphatic vessel on the right foot. The lymph composition was studied. The fluorescent lymphography and magnetic resonance imaging lymphography were carried out.

Results: The complex intense therapy led to reduced lymphorea from 7.6 l/day to 4.3 l/day after 2 days. The endolymphatic therapy became impossible due to the peripheral lymphatic vessel thrombosis. Levels of hypoproteinemia (32 g/l), hypoalbuminemia (11.37 g/l), and lymphocytopenia (4.7%) accrued. Hyperlymphorea reached 11.000 ml per day. According to MR-lymphography, there were signs of interstitial lymphatic duct damage on the gastro-hepatic ligament level with retrograde lymph flow from the cysterna chyli. In order to stop lymphorea, relaparotomy and through-out suturing of the damaged lymphatic duct were carried out.

Conclusions: The word hyperlymphorea means more than two-fold loss of lymph within 24 hours (3.0 l/day). Hyperlymphorea is caused by an injury of a large lymphatic vessel. The retrospective analysis of the obtained results confirmed that intensive therapy of the hyperlymphorea syndrome does not give a chance for recovery without lymphatic leakage elimination through ligation of the injured lymphatic duct.

PP02 DOES LYMPHEDEMA EDUCATION AFFECT THE KNOWLEDGE LEVELS OF PHYSIOTHERAPY STUDENTS ABOUT LYMPHEDEMA? A PILOT STUDY

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Objective: The aim of the study was to investigate the effect of lymphedema education on knowledge levels of physiotherapy students about lymphedema.

Material-Method: This study was carried out at Kutahya Health Sciences University, Department of Physiotherapy and Rehabilitation. An evaluation form with 27 questions examining the knowledge of physiotherapy students about

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lymphedema (general information, risk factors, assessment and treatment of lymphedema) were consituted. A 120-minute lecture covering the topics included in the evaluation form was given to the students by a lymphedema therapist. The evaluation form was applied twice to the students; just before and 4 weeks after the lymphedema education. Paired sample t test was used to compare the scores of two evaluations before and after the education.

Results: 122 physiotherapy students were included in the study. The mean age of the students was 22.55± 2.41 years, ranging between 20 and 34 years. 61% of the students were women (n=74), and 39% of them were male (n=48). There was a statistically significant difference (t=14.59, p=0.00) between pre-education (9.51±5.32) and post-education (17.22±3.87) scores.

Conclusions: According to our study, lymphedema education given to undergraduate physiotherapy students improved their level of knowledge about lymphedema. Therefore, it will be beneficial to add education programs about lymphedema into the physiotherapy undergraduate curriculum.

PP03 VENA CAVA INFERIOR AGENESIS AND DEEP VEIN THROMBOSIS OF THE LOWER EXTREMITIES DURING PREGNANCY: A CASE REPORT

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Objective: The incidence of deep vein thrombosis increases significantly during pregnancy and in most cases is attributed to pregnancy-induced changes in coagulation.

Case report: A 29 years old, 35^{+4} week pregnant woman (twin pregnancy) was admitted complaining of severe swelling and pain in the lower extremities. There was no known pregnancy pathology. The vein triplex showed an evolving thrombus from the saphenofemoral junction until the middle of the femur, without detecting blood flow in both vena saphena magna. Due to the urgency of the situation and after consultation with the vascular surgeons, it was recommended to terminate the delivery after first placing a filter in the vena cava inferior. During the placement of the filter, however, it was found that vena cava inferior was not existing and a significantly reduced lateral network was developed. The diagnosis of vena cava inferior agenesis was made and immediately the patient was placed on continuous intravenous infusion of standard heparin to achieve aPTT 80-110sec. The patient underwent a caesarean section 48 hours after and after the heparin injection was stopped 2 hours before the surgery and gave birth to a male newborn. BW: 2370g, pH: 7.32, AS: $2^{1}/5^{5}$ and a female newborn BW: 2740gr, pH: 7.30, AS: 8^{1} and 9^{5}. The patient received low molecular weight heparin in a prophylactic dose 24 hours after the completion of the surgery.

Conclusion: The coexistence of another thrombogenic cause during pregnancy should not be ruled out and in any case a complete clinical laboratory examination and investigation of the pregnant woman with a thrombotic episode should be performed.

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PP04 FETAL DYSRHYTMIA AND ACUTE FETAL HYDROPS: A RARE COMPLICATED PERINATAL CASE

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Objective: Fetal dysrhythmia complicates 1-2% of all pregnancies. We describe a rare case of fetal dysrhythmia that led to the appearance of fetal hydrops.

Case report: A woman GII-PI was diagnosed with dysrhythmia of the embryo during the second trimester. The glucose tolerance test was abnormal (183 at 60΄ and 162 at 120΄). The fetal echocardiogram showed frequent early atrial contractions, each of which was followed by abdominal contraction. The HR was 161-300 / min and was followed periodically by a bradycardia episode (~ 96 / min). Between episodes of dysrhythmia, the fetus had a sinus rhythm (146-154 /min), and there were no signs of valvular insufficiency, pericardial effusion, interventricular fibrillation, or heart failure. The patient was advised to repeat the echocardiogram weekly. During the 3rd trimester ultrasound, no dysrhythmia or sign of heart failure was found. Four days later the patient arrived due to reduced fetal movements and an abnormal CTG. For this reason the pregnancy was terminated immediately by caesarean section (BW 4.410g, pH: 7.31, and Apgar score 0 at birth, so for this reason the female newborn was intubated immediately in the first minute. The newborn was very hydropic and after his recovery he was immediately transferred to the neonatal intensive care unit. 500ml of peritoneal and pleural fluid were punctured and amiodarone was administered immediately. On the 2nd day of hospitalization propranolol was added to the treatment and from the 3rd day the newborn showed sinus rhythm. One and a half years later the child is free of symptoms and shows normal neuromotor development. Antiarrhythmic therapy was modified to flecainide and atenolol due to elevated TSH values and recurrent episodes of bronchospasm.

Conclusion: Fetuses with arrhythmia should be monitored intensively during pregnancy as in case of tachycardia fetal hydrops may occur within a few days. The decision about when and how to terminate a pregnancy should be made based on the gestational age as well as the total duration of tachycardia episodes during a day.

PP05 OVARIAN THECOMA WITH MEIG'S SYNDROME AND ELEVATED CA 125 SERUM LEVELS

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Objective: CA125 levels in Meig's syndrome can either increase or remain constant. In the case described, elevated levels of CA125 were found in Meig's syndrome due to the presence of an ovarian thecoma.

Case report: A 49-year-old woman was diagnosed with diffuse abdominal pain, flatulence and fever. A mass in the left ovary with heterogenic characteristics and dimensions 98 x 111mm with a significant amount of free peritoneal fluid was diagnosed with ultrasound. A chest x-ray showed a small pleural effusion in both lungs, while the punctured ascites fluid did not show any malignancy. CA125 levels were significantly elevated (587 IU /mL). The patient underwent a laparotomy

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during which the above described ovarian mass was identified. There were adhesions with colon descendens, small intestine and the bottom of the pelvis. Rapid histological examination described an ovarian thecoma, as suspected, while the whole mass was excluded within healthy limits. In the immediate postoperative period there was a significant remission of symptoms and CA125 levels decreased to 17 IU/mL. The patient was free of symptoms and disease two years later.

Conclusion: Meig's syndrome should always be included in the differential diagnosis of patients with pelvic masses, elevated CA125 levels, pleural effusion and ascites fluid without cytological confirmation of malignancy.

PP06 ACUTE MYELOGENOUS LEUKEMIA IN THE FIRST TRIMESTER OG PREGNANCY: A CASE REPORT AND REVIEW OF THE LITERATURE

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Objective: Leukemia occurs most often in adults after the age of 40. However, acute leukemias occur more frequently in young women and their incidence during pregnancy is 1 in 100,000. Prior to 1970, maternal mortality was 100% and perinatal mortality was 34%. Mortality has declined over the years despite the fact that the prognosis remains poor. Unfortunately, acute leukemias recur within a year. Although the perinatal outcome has improved morbidity remains a serious problem. About 75% of cases involve the 2nd and 3rd trimester of pregnancy and rarely the disease manifests itself in the 1st trimester. In 50% of patients it is myelogenous leukemia.

Case report: A 26-year-old woman, Gravida I, in the 8th week of pregnancy came to the clinic with vaginal bleeding and discharge. Anemia, neutropenia and thrombocytopenia were detected in the laboratory examinations and acute myelogenous leukemia was diagnosed after a blood test. The woman and her relatives were informed about it and it was decided to terminate the pregnancy and start chemotherapy.

Conclusions: Acute myelogenous leukemia is a rare tumor during pregnancy. In case the disease manifests itself during the 1st trimester, termination of pregnancy and immediate initiation of chemotherapy is the appropriate way of treatment.

PP07 ADVANCED EPITHELIAL OVARIAN CANCER: ASSOCIATION OF PREOPERATIVE ASCITES WITH POSTOPERATIVE COURSE AND MORBIDITY

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Objective: Epithelial ovarian cancer in advanced stages is associated with high postoperative morbidity. It is not clear whether the presence of ascites affects the patient's postoperative course.

Material-Method: The study included seventeen nine patients. Three study groups were defined: Group A: without any

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ascites (n = 36), group B: with a small amount of ascites (<500ml, n = 28), and group C: with a large amount of ascites (> 500ml, n = 15).

Results: Group C had a statistically higher risk of transfusion with blood red cells (Group A mean value MV: 0 [range 0-2]-Group B: MV 0 [range 0-2] and Group C: MV 3 [range 1-4], p <0.001) or with fresh frozen plasma (Group A: MV 0 [range 0-2], Group B: MV 0 [range 0-4] and Group C: MV 2 [range 2- 6], p <0.001). Also, patients with ascites were given more frequently and in higher doses of adrenaline intraoperatively and in the immediate postoperative period. In group A the length of stay in the intensive care unit was lower than in both group B and group C to a statistically significant degree (mean value of group A: 1 [range 0-1] versus group B: 1 [range 0 -2] and group C: 2 [range 1-5] days of hospitalization, p <0.001). Total hospitalization time was longer in group C than in group A (mean group A: 16 [range 13-20] versus group B: 17 [range 14-22] and group C: 21 [range 17-41] days of hospitalization, p = 0.004). Postoperative complications were also increased in the group postoperatively diagnosed with ascites (p = 0.007).

Conclusion: The presence of ascites is associated with a larger number of transfusions, and longer treatment in the intensive care unit.

PP08 PLEURAL EFFUSION DUE TO MESOTHELIOMA DURING PREGNANCY: A RARE CASE

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Objective: Pleural mesothelioma during pregnancy is an extremely rare and serious condition, often causing significant problems in the management of cases as the outcome of pregnancy depends on the application of therapeutic interventions that are potentially harmful to the fetus. For this reason, depending on the trimester in which the tumor is diagnosed, the appropriate treatment is followed, with most of the restrictions existing during the first trimester of pregnancy, with a poor prognosis for the mother.

Case report: A 39-year-old woman, Gravida I, in the 26th week of pregnancy, was admitted due to vaginal bleeding with a history of placental abruption. She had thrombophilia, in vitro fertilization resulting in pregnancy, while for a week she reported intense shortness of breath, weakness and a feeling of malaise. From the performed clinical laboratory examination, pleural effusion of the left hemithorax with abundant macrophages and lymphocytes, as well as thickening of the left pleura with incomplete expansion of the corresponding lung was found. Epithelioid mesothelioma was diagnosed by pleural biopsy. Ultrasound confirmed the existence of a placenta, without other pathology for the fetus. The patient was hospitalized for a long time in our clinic, with the ultimate goal of continuing the pregnancy until the 34th week, when a caesarean section would be performed. Earlier use of chemotherapy and radiation was not found to significantly alter the prognosis of the disease, as the biopsy showed a malignant tumor, which would otherwise be potentially harmful to the fetus. After relevant consultation with the patient and her family, it was decided to continue the pregnancy with all possible disadvantages for the malignancy but on the contrary with benefits for the embryo. Nevertheless, the woman around the 32nd week presented with sudden massive vaginal bleeding due to placenta abruption and underwent an emergency cesarean section with excellent perinatal result. The woman underwent chemotherapy and radiation.

Conclusion: Pleural mesothelioma during pregnancy is an extremely rare case. The therapeutic approach is decided

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depending on the period during which the disease occurs, ie whether it is the 1st or the 2nd and 3rd trimester, always guided by the optimal result for the patient and the safety of the fetus.

PP09 INTRAUTERINE GROWTH RESTRICTION (IUGR) AND IMPACT ON THYMUS GLAND FUNCTION

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Objective: Intrauterine growth restriction (IUGR) is quite a common problem during pregnancy. The etiology of fetal developmental disorder has not been fully elucidated, as well as the safe distinction between this complication and a "normal" fetal development with a genetically programmed smaller body type (SGA, Small for Gestational Age).

Material-Method: Review and analysis of the existing literature.

Results: As possible causes of the complication are mentioned the unregulated diabetes, hypertension and heart diseases, perinatal infections (rubella, cytomegalovirus, toxoplasma, etc.), liver disease, sickle cell disease, malnutrition, smoking, alcohol, drugs, etc. Furthermore, smaller thymus gland in cases of premature birth (before the 34th week of pregnancy), is associated with respiratory distress of the newborn, neonatal sepsis and generally prolonged hospitalization in the neonatal intensive care unit. In addition, smaller thymus gland on ultrasound around the 20th week of pregnancy is associated with women who later developed preeclampsia, a serious complication after the 24th week of pregnancy characterized by hypertension, proteinuria and edema. In this case it seems that the immune disorder of the thymus gland as a result of the fetal restriction contributes to the different immune response of the fetus and to the manifestation of preeclampsia later. Finally, a lower number of T-lymphocytes is reported in neonates with a restricted thymus gland.

Conclusion: Intrauterine growth restriction (IUGR) is being associated with disorders of the immune system in the adult life. Due to the complexity of the pathogenetic mechanisms, furthermore investigation is needed to clarify the exactly role of the thymus gland in the fetal immune response during and after pregnancy.

PP10 THE DISTINGUISHED GREEK SURGEON THEODOROS ARETAIOS (1829-1893) AND THE LYMPHATIC SYSTEM

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Theodoros Aretaios (1829-1893) is considered among the most important figures of Greek surgery during 19th century and one of the most respectful Professors of the University of Athens. He sought the identification with the ancient Greek physician, Aretaios of Kappadokia, and therefore with a Royal Decree in 1856 received the surname Aretaios, instead of his family one, Konstantinidis. He began his studies in medicine at the University of Athens in 1849, but after a scholarship awarded by King Otto he completed them in Berlin in 1853, when he received his Doctorate there. He continued his medical education in Vienna and Paris, while in 1856 he would be appointed head of the surgical department of the newly

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established "Astyclinic". He was elected Assistant Professor of Surgery and Epidemiology in 1863 and in 1864 Associate Professor of Surgery. In 1870 he was elected Full Professor. He served the academic year 1873-74 as Dean of the Medical School and in 1879-1880 Rector of the University of Athens, at that time called the National University. He was a very skilled surgeon, whose reputation exceeded the limits of the Greek state and many patients from the East came to Athens to be operated by him. He bequeathed to the National University from his great fortune one million drachmas, a huge amount for the time, with the aim of creating a surgical and gynecological clinic, a project that took place with the establishment of Aretaieio Hospital, the first purely university hospital in Greece. His manuscript entitled, Handbook of Surgery (1880) is the first Greek treatise on surgery. In this book Theodoros Aretaios reserves special mention of the lymphatic system. Although there is no separate chapter on the anatomy, physiology and pathology of the lymphatic system, he would emphasize its role in the metastasis of cancer. He described the lymphatic system as a separate parallel one to the vascular one. He dedicated a separate chapter on lymphangiomas, and in Greek he used the term "Λυμφαγγειώματα". He noticed that they were rare and that they appear more on the cheeks and eyelids. He emphasized the accumulation of lymph to the formation of the lymphatic tumor and paralleled the over-concentration of lymph in the lymphatic vessels with that of the blood for the formation of varicose veins. We can reach the conclusion, regarding the presentation of the lymphatic system in his textbook, that he followed the principles of international surgery of his time and despite the fact that communications were made with great difficulty, nevertheless he remained aware of international developments in surgery.

PP11 HIPPOCRATES OF KOS (460-377 BC) AND THE DESCRIPTION OF THE LYMPH NODES

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Hippocrates of Kos (460-377 BC), in 5th century BC was one of the first to mention the existence of lymph nodes. In his treatise "on glands" (in Greek: Περί αδένων), which belongs to the Hippocratic Corpus, he identifies lymph nodes using the term "glands" (in Greek: αδένες). They are located in various parts of the body, such as in the armpit, near the jugular vessels, around the ears and near the kidneys. Their substance is spongy and they are rarefied and fatty. Their tissues don't look like the rest of the body; instead they are friable and possessing many vessels. In appearance they are white, phlegmy and can be easily squeezed by the fingers. According to Hippocrates, they have the ability to "attract and receive" fluids. When the body is suffering from a disease, they could become swollen and inflamed. It is worth mentioning that Hippocrates also described the drainage mechanism of intestinal glands. Hippocrates should be recognized as a pioneer in the "discovery" of the lymph nodes.

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PP12 RESULTS OF TEACHING THE BASICS OF CLINICAL LYMPHOLOGY

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Objective: He died of teaching the basics of clinical lymphology almost m doctors and nurses vvide postgraduate education.

Material-Method: Teaching was carried out on the basis of the Republican Scientific Center of Clinical Lymphology of the Ministry of Health of the Republic of Uzbekistan in the form of 72, 36 credit (for doctors) and 36, 18 credit (for nurses) cycles of thematic advanced training.

Results: During the period 1989-2013 years training took place 1350 doctors and 250 nurses. About tdelnoe attention was paid moose formation of study groups from representatives of a profession or a medical institution. Taking into account the implementation of a number of methods by nursing staff, the presence of a team of a doctor and a nurse who knows the methods of regional lymphatic therapy makes it possible to provide advisory and therapeutic assistance within the entire medical institution. The cadets mastered the anatomy, pathophysiology of the lymphatic system, the basics of clinical lymphology, treatment methods, forms of organization of the lymphological service. In total, representatives of 16 specialties underwent training. Of these, 49.4% were general practitioners, 16.4% were pediatricians. 65% of students work there in outpatient care. In accordance with the program s health reforms created a block program for specialists of primary health care, outpatient care, emergency medicine services. Since 1998, a program has been created for graduate students.

Conclusions: The data obtained indicate not only the versatility, but also the availability of the proposed treatment methods, their adaptation to the possibilities of practical health care (polyclinic and hospital at all levels, a primary health care institution, an emergency medicine unit).

PP13 GENETIC PREDISPOSITION AND CANCER-RELATED LYMPHEDEMA: A SYSTEMATIC REVIEW

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Objective: Lymphedema is a debilitating and progressive illness characterized by abnormal accumulation of lymph and fluid within the extracellular space. Most of the cases in western population are related to cancer treatment. Research on Cancer - Related Lymphedema (CRL) is mounting for potential risk factors related to disease, treatment, or patient. However, only one out of six cancer survivors with the same risk factors will develop lymphedema, giving rise to the hypothesis that inherited genetic susceptibility may play a role in CRL pathophysiology. This systematic review aimed to identify, critically appraise, and summarize the results of individual studies that have examined the genetic predisposition to CRL.

Material-Method: A comprehensive literature search in MEDLINE, Cochrane, and Scopus was conducted from inception to February 2021. Screening of available studies and quality of the included studies was carried out by two reviewers independently.

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Results: Eight studies fulfilled eligibility criteria, involving 573 women with Breast - Cancer Related Lymphedema (BCRL) among 1.481 participants. Associations between the development of cancer-related lymphedema and genetic factors were observed for variations in 23 genes in patients with BCRL.

Conclusion: The present systematic review is the first examining specifically the genetic predisposition in CRL. Statistically significant genetic variations were found in 23 genes in patients with BCRL. These preliminary findings highlight the importance of genetic susceptibility in the development of CRL, altering the traditional perception of its traumatic etiology. Additional well-designed research, aiming toward the confirmation of previously performed genetic analyses and functional assessment of the genetic variations, is required.

PP14 INVESTIGATION OF COMMON POSITIONING OF POSITIVE AXILLARY SENTINEL LYMPH NODESS AND CORRELATION BETWEEN FROZEN SECTIONS AND HISTOLOGICAL BIOPSIES

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Objective: The Sentinel Lymph Node Biopsy (SLNB) has been considered such a valuable alternative to surgery conservative approach when encountering breast cancer. The aim of the study is to assess the agreement between SLNB in breast cancer patients and pathology results following ALND and to provide correlation between the sentinel lymph nodes (SLN) anatomical topography and biopsy positivity according to SLNBs.

Material-Methods: 215 female breast cancer patients (30 to 85 years of age) underwent partial or simple mastectomy with or without subsequent ALND. All patients were randomized against selection criteria and underwent SLNB.

Results: 97% of patients presented identical results between SLNB and pathology. 38% of them were confirmed with positive SLN through both approaches. Regarding the SLN topographic anatomical position, 71% of samples were located in the front axillary position, 23% in the front thoracic position, whereas 6% was located in the central axillary position.

Conclusions: The majority of the SLN accumulates in the front axillary region. However, there is need of further investigation in larger patient population in order to statistically support this association.

PP15 THE IMPACT AND RISK FACTORS OF LYMPHOEDEMA AFTER AXILLARY CLEARANCE FOR BREAST CANCER

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Objective: Lymphedema is a common and debilitating condition experienced by breast cancer survivors. Axillary lymph node dissection (ALND) and axillary radiation therapy have been cited as the most important risk factors for lymphoedema. However, the exact mechanisms and risk factors do remain unclear.

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Material-Methods: This is retrospective study, was conducted between 1987-2021, with a total number of 615 patients from 2 hospital institutions that underwent surgery for breast cancer. The aim of the study is the investigation of the incidence of lymphedema and its potential risk factors.

Results: 98 patients developed lymphoedema, corresponding to 15.7%. 2/3 those developed in the first year after surgery, and 90% within the first 24 months. The majority of the patients that developed lymphoedema were between 40-60 years old (n=67). 56 patients that developed lymphoedema underwent a level III axillary clearance, while 42 patients were stage II.

Conclusions: In our study the risk factors that are strongly connected with the formation of lymphoedema are level III axillary clearance, radiation in the breast and the axilla and the stage of the disease, while potential complications are increased BMI. Of great importance is the prospective registration and evaluation of lymphoedema formation factors in the future.

PP16 DISTINGUISHING AXILLARY LYMPH NODE METASTASIS FROM BREAST PARENCHYMAL LESIONS SOLELY WITH THE KEY ANATOMICAL STRUCTURE OF THE CLAVIPECTORAL FASCIA

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Objective: In cases of axillary cancerous masses physicians are called on to postulate a definite diagnosis prior to any invasive procedure. The present study aims to highlight the clavipectoral fascia as the unique anatomical boundary for adequate differential diagnosis.

Material-Methods: During 2019-2021, 4 post-menopausal women proceeded to our institution with a same clinical presentation, a palpable nodule in the axillary fossa. Our team was facing a diagnostic dilemma, was the lesion a primary breast cancer arising from the tail of Spence or was it a metastatic lymph node mass extending into the tail of the breast? Even though preoperative biopsies did not identify lymphatic tissue, we were not absolutely convinced that the lesion was not complete infiltration of lymph nodes, given the radiological findings. Destruction of the normal lymphatic structure due to complete infiltration would still give the impression of a primary breast cancer under microscopic examination. The diagnostic question could only be answered during surgery.

Results: In 3 out of 4 cases, the mass was located superficial to the clavipectoral fascia and a diagnosis of adenocarcinoma of Spence's tail was established. In one case, the mass was beneath the fascia due to breast cancer with lymph node metastasis. Hence, patient had to receive neo-adjuvant chemotherapy prior to surgical resection.

Conclusions: According to our observations, any histologically confirmed axillary breast malignancy that is found superficial to the clavipectoral fascia confirms an axillary tail of Spence tumor, while any mass beneath the fascia confirms axillary lymph nodes.

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PP17 THERAPEUTIC APPROACH OF ADVANCED STAGE LYMPHEDEMA FOLLOWING BREAST CANCER TREATMENT: CASE PRESENTATION

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Objective: Lymphedema represents a serious late complication of breast cancer treatments, and is usually associated with axillary lymph node dissection and axillary radiotherapy. The present case aims to report the results of Complete Decongective Physical Therapy (CDPT) in a patient with breast cancer treatment - associated ipsilateral limb lymphedema.

Material-Method: A 58 years old woman who underwent Left Mastectomy, ALND, adjuvant chemotherapy and radiotherapy, presented 16 months postoperatively with significant L limb lymphedema. Following standard measurements, CDPT was commenced with manual lymph drainage, compression, decongestive and breathe exercise and skin care.

Results: During the initial evaluation, the patient had Stage II lymphedema. Following 2 sessions, the patient had significant clinical improvement, with improvement in all standard measurement points (thumb, metacarpal, wrist, elbow), significant improvement in the range of movement of her left upper limb and improved sensation. Specifically, the reduction in the diameter of the four measurement points was 1,5cm (thumb), 4 cm (metacarpal), 3cm (wrist), and 4,5cm (elbow), with a mean reduction of 16,2% in all points.

Conclusions: Special physical therapy approaches of lymphedema following breast cancer treatment can bring on immediate results with reduction in the lymphedema volume, and result in significant improvement of the patient's clinical status and quality of life.

PP18 USEFULNESS OF LOW COMPRESSION CORSETS IN THE PREVENTION AND TREATMENT OF LYMPHEDEMA IN PATIENTS AFTER AXILLARY LYMPHADENECTOMY

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Introduction: There is no fully effective treatment for secondary lymphedema. In patients with breast cancer, lymphedema presents after axillary dissection. It typically occurs in a limb, but also in the torso. Currently used compression therapy has varying efficiency. Better solution is still missing.

Material-Method: The study was carried out in 50 randomly selected patients classified as candidates for surgery. They were randomly divided into two subgroups: one received compression corsets 1-month following the surgery and the other didn't. Size of truncal lymphedema was measured using ultrasound. The patients were examined four times. The follow-up was for 7 months in total. The results were statistically analyzed. Both subgroups noticed reduction of pain.

Results: Class I compression corsets are an effective treatment for lymphedema, could be used for antiedematous prevention in patients who underwent removal of axillary lymph nodes and radiotherapy, also could reduce pain associated with surgical treatment of breast cancer.

Conclusion: The aim was to find whether compression corsets therapy could prevent truncal lymphedema on the operated side after axillary lymph node dissection as the standard for breast cancer treatment and whether it is efficient in prevention and treatment of truncal lymphedema in patients who underwent mastectomy and additional radiotherapy.

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PP19 CHANGES IN MICROCIRCULATION IN POST-MASTECTOMY SYNDROME

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Objective: To study changes in the microcirculatory bed in patients with post-mastectomy syndrome (PMES) as the basis for the development of post-radiation fibrosis.

Material-Method: Group 1: 36 patients with PMES. Group 2: 20 healthy female volunteers, whose microcirculation indicators are taken as normal. The method of laser Doppler flowmetry of the upper extremities (Biopac LDF 100C system) was used. To assess the regulatory mechanisms, the parameters of microcirculation at rest and during the load test were studied. The expression of cell adhesion molecules (PECAM and ICAM) as markers of endothelial dysfunction was determined.

Results: In group 1, at rest and after a stress test, there was a decrease in the endothelial component as a marker of endothelial dysfunction - the cause of microcirculation disorders. An increase in the microcirculation index and an increase in the respiratory component ($p<0.05$) indicates venous congestion. A decrease in the myogenic component ($p<0.05$) indicates the development of a spasm of the precapillary sphincter-the cause of a decrease in nutrient blood flow, which, in combination with an increase in the neurogenic component, is characteristic of an increase in shunt blood flow, which causes tissue hypoxia. In group 1, a twofold increase in the expression of cell adhesion molecules was observed, which confirms the presence of endothelial dysfunction.

Conclusions: In PMES, the regulatory mechanisms of microcirculation associated with the development of endothelial dysfunction are disrupted, and low adaptation of the microvascular bed to the load is determined. This is the cause of the development of tissue hypoxia, the formation of trophic disorders, which is one of the links in the pathogenesis of fibrosis.

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PP20 LYMPHOTROPIC DIAGNOSIS AND TREATMENT OF RADIATION XEROSTOMIA

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Objective: To study the effectiveness of lymphotropic diagnostics and treatment of radiation xerostomia.

Material-Method: 124 patients aged 35 to 90 with radial xerostomia were observed. The main group included 74 and the comparison group 50 patients. There were 42 men and 32 women. Their dental status was studied using bioimpedance analysis, lymphotropic fluorescence lymphography and biomicroscopy. The patients were divided into 3 subgroups according to the course of radiation xerostomia: 1st -with mild severity (40), 2nd - with moderate severity (61), 3rd - 23 patients with severe xerostomia. Direct thrombin inhibitors were used in the complex of treatment measures in 74 cases.

Results: Fluorescence lymphography revealed functional and morphological changes in irradiated organs and tissues of the mouth, development of collateral blood and lymph flow, salivary glands lesions, reduction of salivary flow. Mouth irrigation with heparin solution increased salivary flow in 7 of 10 cases with mild severity, in 2 of 4 with moderate severity and no effect have patients with severe radiation xerostomia. Oral rinsing with heparin and hyalurenate was effective in 9 of 10 cases with mild xerostomia, in 3 of 4 with moderate severity, and no effect was obtained in cases with severe radiation xerostomia. Enteral usage of dabigatran ethixylate was effective in all 12 cases with mild xerostomia, in 17 of 22 cases with moderate severity, and no effect was obtained in 7 of 8 cases with severe radiation xerostomia.

Conclusions: Radiation xerostomia occurred when the salivary glands and oral mucosa were damaged by ionizing radiation. The use of fluorescence lymphography allows to diagnose a disorder of stomatological status in oral tissues. Lymphotropic therapy with direct anticoagulants allowed to achieve clinically significant effect in 68.9% of patients with radiation xerostomia.

PP21 COMPLETE DECONGESTIVE THERAPY (CDT) WARRANTS SAFETY AND GREAT LYMPHEDEMA REDUCTION

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Objective: To assess the efficacy and safety of treatment phase, or phase I, of complete decongestive therapy (CDT) in Greek patients with lymphedema.

Material-Method: This was a prospective, observational study. Participants were patients with unilateral lymphedematous upper or lower limb. All participants underwent daily CDT. The program was administered 5 days a week for 20 sessions. Excess volume (EV) and percent of excess volume (PEV) were assessed 4 times during the whole program (once per week), while percent reduction of excess volume (PREV) only at the end of CDT. Moreover, a meticulous skin and nail evaluation was performed at each session.

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Results: One-hundred five patients were included (33 patients with lymphedema in the upper limb and 72 patients in the lower limb). Both EV and PEV values were significantly decreased, between pre-CDT and post-CDT measurements, in both limbs ($p<0.001$). Lymphedema reduction was 66.5% (interquartile range, 57.3%-80.6%) after upper-limb CDT and 71.5% (interquartile range, 64.5%-80.7%) after lower-limb CDT. It was also observed that the largest decrease was evident between the first week, achieving a reduction greater than 50% of the total reduction. In terms of safety of CDT, no episodes of infection, sore, or pain during the treatment were recorded as a result of the proper skin and nail care, contributing to success of CDT intervention.

Conclusions: Treatment phase of CDT has a great positive effect on lymphedema reduction. Error-free use of all of the CDT components is essential to avoid delays and local complications.

PP22 NEW LYMPHO-FLUOROSCOPIC PATTERNS IN LYMPHEDEMA

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Objective: To assess the qualitative patterns of images observed in the lymphedema (LE) of lower limbs, we used Indocyanine green fluorescent lymphography, enabling the real-time evaluation of functionality and the mapping of the superficial lymphatic system and substitution pathways.

Material-Method: 37 patients with primary (1st) or secondary (2nd) LE underwent lympho-fluoroscopy according to a standardized time and sites protocol. All images were qualitatively analyzed by two independent evaluators for recurring patterns.

Results: The 326 acquired images confirmed 8 known patterns (straight, dilated and tortuous lymph channels, horizontal precollectors +/- stasis, vertical precollectors with stasis, diffuse pattern, demarcated signal at the injection site, and lymph nodes) and identified 3 additional patterns: a) fluorescent spots of lymphatic capillaries on a black background with intense center and fine peripheral filaments, in 53% of 1st and 50% of 2nd LE (however, n.s.): due to collector obstruction or to lymphatic capillary fragility secondary to inflammation; b) vertical precollectors without stasis/diffusion of tracer, in 18% of 1st and 29% of 2nd LE (however, n.s.): due to tracer migration via the deep/subfascial network stemming from a poorly performing superficial system; c) enlarged dye patch at site of injection (> 3 cm) with interdigital reflux and/or drainage via the sole of foot, in 95% of 1st and 43% of 2nd LE (statistically significant): due to difficulties in absorbing the tracer because of an underlying hypo/aplasia of the lymphatic structures.

Conclusions: These findings help in the differential diagnosis of LE origin and provide information to adapt the manual drainage.

PP23 DOES DURATION OF LYMPHEDEMA HOLD BACK THE SUCCESS OF COMPLETE DECONGESTIVE THERAPY (CDT)?

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Objective: To compare the short-term efficacy of complete decongestive therapy (CDT) in patients with lymphedema duration ≤1 year (group A) and >1 year (group B).

Material-Method: A retrospective cohort study of patients with limb lymphedema treated with CDT was performed. The database included patients who were treated in "Sotiria" General Hospital between March 2017 and April 2019. All patients received 20 sessions of CDT for a period of 4 weeks (weekends were excluded). The effective index and the main outcome measure of the study was the percent reduction of excess volume (PREV), also known as relative edema reduction, and it was calculated at the end of CDT.

Results: A total of 105 patients were enrolled [48 patients (45.7%) in group A and 57 patients (54.3%) in group B]. Lymphedema was significantly reduced in both groups of patients but significantly more in group A ($p<0.001$). In patients with upper limb lymphedema PREV was 80.8% (interquartile range, 79.1-105.0%) in group A and 62.0% (interquartile range, 56.7-66.5%) in group B ($p<0.001$). Similar developmental patterns were observed in the lower limb lymphedema with PREV median value of 80.7% (interquartile range, 74.9-85.2%) and 64.5% (interquartile range, 56.0-68.1%) in groups A and B, respectively ($p<0.001$). Severity of lymphedema was also improved to lower grades in both groups.

Conclusions: Duration is a factor that holds back the CDT efficacy. Early diagnosis and treatment must be primary goal in the rehabilitation of lymphedema, with physicians and physiotherapists being key players.

PP24 TREATMENT OF PRIMARY LOWER LIMB LYMPHEDEMA WITH CDPT

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Objective: Primary lymphedema is an entity that affects the lymphovascular system in a form of developmental anomaly in the lymph nodes and / or lymphatics. Its incidence is around 1,15 / 100,000 and its presentation occurs early in the adult life. Women are affected three times more frequently than men. Here we present our experience in the treatment of lower limb primary lymphedema with Complete Decongestive Physical Therapy (CDPT).

Material-Method: 15 women with a mean age of 50 years presented in our Clinic for consultation and treatment of primary lymphedema. The therapeutic approach involved lymphatic drainage in the morning and custom made compression. In the afternoon the patients presented for additional drainage therapy without removing the compression. Then the patients were treated with group exercise and walking. On the next day the process was repeated. Measurements of the movement range of the hip, knee and ankle were conducted, as well as the limb length and perimeter in standard points. Measurements were conducted before the first therapy session and after the 15th.

Results: The therapy sessions were completed by all 15 women. All women had some improvement in their lymphedema. The mean difference in the limb perimeter measured in the ankle, knee and thigh was 1,0cm, 1,3cm and 2,7 cm respectively, whereas the mean improvement in the flexion of hip and knee was 17,5 and 20 degrees, respectively.

Conclusions: Primary lymphedema is a rare condition, and the technique of CDPT is the mainstem therapeutic approach, as it is an effective and safe method for managing this challenging condition.

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PP25 PRIMARY CHYLOTHORAX, A MULTIDISCIPLINARY APPROACH: A CASE REPORT

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Objective: Chylothorax is an uncommon form of pleural effusion that can appear in patients with primary lymphedema. It may have poor prognosis if not properly treated. A multidisciplinary approach is the best option for its management.

Material-Method: A 60-year-old male patient with a history of lower-limb primary lymphedema, showed a severe pleural effusion relapsing several times for one year. Pericardial effusion that occurred one year before, could have been chylous effusion, as well. Because the physical and chemical examination of the pleural fluid revealed high levels of triglycerides and cholesterol, a conservative treatment with pleural drainage, total parenteral nutrition and nihil per os was attempted. As this treatment failed and the patient worsened, he underwent talc poudrage without success. Octreotid was associated to reduce the leak. A transnodal lymphography with lipiodol was performed to close the pleural leak. The patient is recovering.

Conclusions: In primary lymphedema patients, systemic involvement must always be discarded. Chylothorax is a serious condition that compromises patient's life and primary chylothorax is more difficult to resolve than secondary. Conservative therapy aims to reduce lymphatic flow to the point that the leakage will spontaneously close up. This can be achieved by either a medium-chain-triglyceride diet, by total parenteral nutrition, or octreotid. When conservative therapy fails, talc poudrage or interventional radiological techniques with Transnodal Lymphography with Lipiodol and selective embolization of thoracic duct can be considered. The multidisciplinary approach (Internal Medicine, Radiology, Thoracic Surgery and Lymphologists) can be of great help for the patient' survival.

PP26 ASSESSMENT OF DIET EFFECTIVENESS AMONG LIPEDEMA PATIENTS

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Objective: The aim of the study was to asses diet effectiveness among lipedema patients.

Material-Method: The study group consisted of 70 women (mean age: 42.3 ± 12.0 years) with lipedema of lower limbs. The participants were divided into two groups following two interventional diets for 16 weeks: high-carb diet (LFHC; 40-45% energy from carbohydrates) and high-fat diet (LCHF; 65-70% energy from fat), which were applied to indicated caloric restrictions. Anthropometric measures were made at the baseline and at the end of an intervention.

Results: In both groups body weight decreased; however, only in the LCHF group was the change statistically significant (9.1 ± 5.3 kg vs 3.1 ± 3.8 kg; p<0.0001). In the LCHF group, the diet brought about a statistically significant change in the mass body fat (7.1 ± 4.1 kg vs 2.0 ± 3.0 kg; (p<0.0001), waist (8.3 ± 5.3 cm vs 3.8 ± 5.1 cm; p=0.004) and hip circumference (7.8 ± 4.3 cm vs 2.7 ± 4.7 cm; p=0.0003) compare to LFHC diet. The lipedema of lower limbs decreased in both groups but only in the LCHF group was statistically different from baselines. In the LCHF group, the left hip circumference decreased

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by 5.1 ± 2.4 cm, and by 1.3 ± 5.0 cm in the LFHC group (p=0.002). The right hip circumference decreased by 4.8 ± 2.7 cm in the LCHF group, and by 1.5 ± 5.2 cm in the LFHC group (p=0.01). The left and right calf decreased by 2.0 ± 1.2 cm and 1.9 ± 1.1 cm in the LCHF group and 1.0 ± 1.7 cm and 0.9 ± 1.7 cm in the LFHC group (p=0.02).

Conclusions: LCHF diet was more effective in decreasing lipedema than LFHC diet.

PP27 PHYSIOLOGICAL STIMULATION OF THE SYNTHESIS OF PRE-ELASTIC FIBERS IN THE DERMIS OF A PATIENT WITH FIBROSIS

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Objective: The aim of the present study was to report the physiological stimulation of the synthesis of pre-elastic fibers in the dermis of a patient with fibrosis.

Material-Method: The clinical trial was conducted involving the analysis of histological changes in pre-elastic fibers following before and after treatment of fibrosis in primary lymphedema, using lymphatic stimulation of the lower limbs, the slides were stained with orcein and resorcin-fuchsin and evaluated under an optical microscope using the Weibel multipoint morphometric method in university hospital of the São Jose do Rio Preto School of Medicine in 2020.Was evaluated the histological changes in pre-elastic fibers following treatment for stage II primary lymphedema of the lower limbs, using the Godoy Method® for the clinical reversal of lymphedema and fibrosis. The slides were stained with orcein and resorcin-fuchsin and evaluated under an optical microscope using the Weibel multipoint morpheme significance level.

Results: A visible, significant difference in the percentage of pre-elastic fibers was found between the pre-intervention and post-intervention slides, which was confirmed by the microscopic evaluation and quantification (4.95 ± 0.64% and 14.70 ± 1.06%, respectively).

Conclusions: The physiological stimulation of the lymphatic system using a specific method resulted in the clinical reduction of fibrosis, the return of the elasticity of the skin, and the stimulation of the synthesis of pre-elastic fibers.

PP28 THE MANAGEMENT OF PATIENT WITH LYMPHATIC DISEASES AND LIPEDEMA DURING COVID-19 PANDEMIC. RECOMMENDATIONS OF THE SPANISH GROUP OF LYMPHOLOGY

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Objective: Pandemic COVID-19 is a challenge for the management of non-COVID pathologies such as lymphatic diseases and lipedema. The promotion of telemedicine can prevent the spread of the coronavirus and future pandemias. A system is needed to help us determine the clinical priority and the selection of in-person or telematic assistance for each patient and the way to carry them out during the pandemic.

Material-Method: The Spanish Lymphology Group *(Grupo Español de Linfología, GEL)* (https://grupoespanoldelinfologia.es/) has made a Consensus document with recommendations based on the bibliography and clinical experience, as clinical guidelines in the management of lymphatic abnormalities and lipedema during the COVID-19 pandemic. These recommendations must be adapted to the characteristics of the patient, the local conditions of the health centers and the decisions of health care professionals.

Conclusions: he document includes the recommendations to help select the type of consultation (telephone or video call or in-person) and the urgency of care according to the pathology. It is a document of minimum criteria, expandable according to the characteristics of the patient, the decision of the health professional and the specific resources of each health center. It is a document subject to modification, according to the capabilities of each service, the new recommendations from medical societies, as well as the scientific evidence that is emerging in this regard. Depending on the evolution of the pandemic, the general principles may be modified.

PP29 ANALYSIS OF A SURVEY ON COMPRESSION GARMENTS IN PATIENTS WITH LIPEDEMA

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Objective: In the management of lipedema, compression garments are prescribed to reduce symptoms and prevent progression. We investigate the experience, needs, perceived benefits, secondary effects and main complaints with compression garments.

Material-Method: An online survey in lipedema patients was performed.

Results: 161 lipedema patients completed the survey, median-age 42 (range:19-74). Garments were used by 87.6% of the patients; Pantyhose was the most frequent (72.2%). A quarter of patients didn't know their garment's fabric and 1/3 the compression class. Self-perceived fitting was Good or very good in 62.7%. Only 52.8% wear their garments daily, and 67.7% during >8 hours/day. The main benefit reported with the use of garments was the reduction of edema (78.9%), and it was more frequent in younger patients ($p<0.0001$) and in patients with a lower BMI ($p=0.003$). Other benefits: Reduction of pain (65.8%), of fat (60.9%), of heaviness (55.9%). Secondary effects were reported: difficult mobility (60.2%), difficult standing-up (47.2%), chafing (22.4%), cutting (5.0%). The main complaints were: doff-and-donning (77.7%), garments were too warm

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(72.1%), ugly (65.9%), popliteal pain (62.8%), discomfort (62.7%), poor body image (45.3%), itchy (42.3%), irritations (37.9%), bad fitting (32.9%), bad toleration to compression (13.7%). Patients with higher BMI complained more about doff-and-donning, discomfort and bad toleration to compression, than patients with lower BMI.

Conclusion: Despite the fact that Compression garments seem to benefit lipedema patients reducing edema and symptoms, their satisfaction with their use is poor. Younger and thinner patients report more benefits and less complaints than older patients and patients with higher BMI.

PP30 PRESENTATION OF A RARE CASE OF COEXISTENCE OF LEIOMYOMATA PERITONEALIS DISSEMINATA AND OVARIAN LEIOMYOMA

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Leiomyoma is one of the most common tumor in women, arising in the reproductive age group and are composed of interlacing bundles and fascicles of smooth muscle cells. Leiomyomatosis peritonealis disseminate (LPD) is a very rare benign condition in women of reproductive age, that is characterized by multiple granular nodules of pelvic and abdominal peritoneum, of varying sizes.

We present a case of LPD in a premenopausal woman, 41-year-old, involving the right colon retroperitoneum, mesentery, and right ovary with a history of left sided congenital primary lymphedema and chylothorax (treated with repeated (X6) paracentesis). Clinical examination revealed a palpable mass in the lower right quadrant and was confirmed by imaging examination (upper-lower abdominal CT, gastrointestinal endoscopy). The patient underwent an exploratory laparotomy with a medial incision and right hemi-colectomy with excision of right ovary and fallopian tube. The patient was discharged on the 6th postoperative day in good general condition.

Conclusions: Leiomyomatosis peritonealis disseminate is often an incidental finding at the time of caesarian section. In some cases, patient may have symptoms related to uterine leiomyomas. Coexistence of leiomyomata peritonealis disseminata and ovarian leiomyoma is a very rare condition and requires treatment either surgically or medically with GnRH agonists.

PP31 LYMPHADENECTOMY FOR DIFFERENTIATED THYROID CANCER

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Objective: Lymphatic metastases at the time of diagnosis are common in differentiated thyroid cancer (DTC). Routine prophylactic central and/or lateral lymph node dissection is not advocated with exception of central neck dissection for locally advanced tumors. Regarding recurrent disease, reoperations are usually necessary in order to remove the affected lymph nodes.

Material-Method: A 3-year retrospective analysis of cervical lymph node dissections (CLND) in a series of patients with DTC. All thyroid cancers were papillary except one which was medullary. Neck lymph node dissection was guided by preoperative sonographic lymphatic mapping.

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Results: CLDN was performed in eight patients. No major postoperative morbidity was recorded. The mean number of dissected lymph nodes was 18 (5 - 38). Risk factors for lymphatic metastases included the tall cell variant of papillary carcinoma and multifocality of the primary tumor. All patients postoperatively received radioactive therapy and were monitored by measuring serum thyroglobulin. Two patients had lymphatic recurrence during follow-up and needed reoperation.

Conclusions: Prophylactic central neck dissection is recommended only in locally advanced DTC. Lymphadenectomy with a therapeutic intent, especially in cases of recurrent disease should be performed selectively based on comprehensive preoperative workup.

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PP32 SUCCESSFUL RELIEF OF A MALE BREAST LYMPHEDEMA BY SUPERMICROSURGICAL LYMPHATICOVENULAR ANASTOMOSIS

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Objective: Breast lymphedema is a common issue after breast cancer surgery but remains understudied because it is difficult to be quantified. Untreated breast lymphedema may lead to severe form of delayed breast cellulitis. Supermicrosurgical lymphaticovenular anastomosis is one option for the treatment of breast cancer–related lymphedema but has not been described for the treatment of breast lymphedema.

Material-Method: This report presented a rare case of male breast lymphedema secondary to axillary lymph node dissection for the treatment of a forearm melanoma. Deep lymphatic vessels and adjacent venules were individualized under high magnification in the periareolar area. Six lymphaticovenular anastomoses were performed using supermicrosurgical techniques. A clinical examination and a volume assessment under magnetic resonance imaging were used to assess the efficiency of surgery.

Results: Postoperative outcome was uneventful. The patient was followed-up during 1 year. Swelling relief was clinically significant 3 months postoperatively. The pinch test reduction was 2cm after 12 months. The breast volume reduction rate was 47.2%.

Conclusions: Supermicrosurgical lymphaticovenular anastomosis may be efficient for the treatment of postoperative breast lymphedema, even in male patients.

PP33 MODIFIED INTRAOPERATIVE DISTAL COMPRESSION METHOD FOR LYMPHATICOVENOUS ANASTOMOSIS WITH HIGH SUCCESS AND A LOW VENOUS REFLUX RATES

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Objective: For successful lymphaticovenous anastomosis (LVA), it is important to create anastomoses with high flow to maintain patency. To ensure that this can be achieved, we compared the efficacy of a modified intraoperative distal compression (IDC) technique with the conventional no-compression (NC) method for lower limb lymphedema.

Material-Method: In the IDC group, compression was applied to an area of the foot distal to the first LVA site. After completion of the first LVA, the distal compression was extended over the first LVA site to the distal end of the second LVA site.

Results: There was no significant difference between the IDC (n=25) and NC (n=25) groups in detection rate. However, significant differences were observed in lymphatic vessel diameter and LVA success rate. No intraoperative anastomotic obstruction was seen at the conclusion of surgery. Intraoperative congestion with blood was detected in lymphatic vessels in 8 of 79 anastomoses (10.1%) in the NC group but not in any cases in the IDC group (p=0.002). There was a significant between-group difference in the rate of improvement in lymphedema between the IDC (16.1±3.6) and NC groups (14.0±3.4) (p=0.03).

Conclusions: IDC during LVA is thought to increase lymph flow in larger-caliber lymphatics, leading to a high success rate and a low rate of venous reflux. IDC is beneficial when performing LVA.

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PP34 COMBINED LYMPHOVENOUS ANASTOMOSIS AND GREAT SAPHENOUS VEIN STRIPPING FOR COMORBID LYMPHEDEMA AND VARICOSE VEINS

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Objective: Treatment for patients with comorbid lymphedema and varicose veins is controversial. Surgical options for these patients are limited. The aims of this study were to investigate the validity of combined lymphovenous anastomosis (LVA) and great saphenous vein stripping (GSVS) for comorbid lymphedema and varicose veins.

Material-Method: The study involved 13 patients (with 21 edematous lower limbs with coexisting varicose veins and lymphedema; the varicose vein and lymphedema [VL] group) who underwent combined GSVS and LVA therapy. Fifteen patients (with 30 edematous lower limbs and lymphedema only; the lymphedema [L] group) who underwent LVA only were included as a control group. GSVS was performed before LVA in the VL group.

Results: The two groups were no significant between-group differences at baseline. There were no cases ICG lymphography pattern deteriorated after GSVS. There was no significant between-group difference in lymphatic detection rate;129.71 ± 58.27 (67–333) % in the VL group and 122.27 ± 39.47 (50–250) % in the L group (P=0.59>0.05), respective lymphatic diameters 0.66 ± 0.13 [0.45–0.9] mm and 0.75 ± 0.17 (0.45–1.0) mm (P=0.07>0.05), and respective lymphedema improvement rate 12.17 ± 7.35 [0–27.4] % and 12.65 ± 7.43 [3.7–22.3] %(P=0.86>0.05).

Conclusions: In this study, stripping surgery does not cause lymphatic impairment, at least to the extent that would impede the success of an LVA procedure. Comorbid varicose veins and lymphedema can be treated surgically by a combination of LVA and GSVS.

PP35 LYMPHOVENOUS ANASTOMOSIS FOR MORBIDLY OBESE PATIENTS WITH LYMPHEDEMA

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Objective: Although patients with obesity-induced lymphedema can be treated by weight loss therapy, they find it difficult to lose the required amount of weight. The aims of this study were to clarify the characteristics of the lymphatic vessels in patients with obesity-induced lymphedema and to determine the feasibility and efficacy of lymphovenous anastomosis (LVA) in these patients.

Material-Method: Twenty-two of patients (44 edematous lower limbs) with a body mass index (BMI) >35kg/m^2 (obese group), 91 patients with lymphedema (141 edematous lower limbs) and BMI <25 kg/m^2 were also enrolled as a control group (non-obese group) and underwent LVA. The diameter and depth of lymphatics, the effect of LVA were compared.

Results: Lymphatics were detectable within 10 mm depth in the non-obese group and obese group (3.0 ± 1.4 mm vs 3.5 ± 2.1 mm; P<0.01). The lymphatic diameter was significantly greater in the obese group than in the non-obese group (0.79 ± 0.30 mm vs 0.54 ± 0.22 mm; P<0.01). There was no significant difference in the rate of improvement in lymphedema after LVA between the non-obese group (9.1 ± 9.2 percent) and the obese group (8.9 ± 7.3 percent; P=0.84).There was no correlation between the improvement rate of lymphedema and that of BMI in the obese group (P=0.57).

Conclusions: LVA is a feasible procedure even in morbidly obese patients. Considering that substantial weight loss is a difficult and time-consuming task for patients, LVA combined with not gaining weight is a good option for these patients.

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PP36 LYMPHATICOVENULAR ANASTOMOSIS AND VENOUS ARTERIALIZATION IN COEXISTING RAYNAUD'S PHENOMENON AND LYMPHEDEMA; A CASE REPORT

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Objective: Raynaud's phenomenon is highly prevalent in the general population. The optimal medical management for patients with severe Raynaud's phenomenon remains unclear. Venous arterialization (VA) may be considered as a salvage procedure when no distal vessels are available for vascular reconstruction. Surgical treatments for lymphedema, including lymphovenous anastomosis (LVA), are becoming popular alternatives to conservative therapy. Here we report on a patient with comorbid primary Raynaud's phenomenon and lymphedema in whom both VA and LVA were performed.

Material-Method: The patient was a 60-year-old woman with an edematous right upper limb and pain and cold sensitivity in the middle, ring, and small fingers that was refractory to medication. Indocyanine green lymphography and computed tomography angiography suggested coexistence of lymphedema and primary Raynaud's phenomenon. VA and LVA were performed to reduce the risks of cellulitis and amputation. Computed tomography angiography was performed regularly after surgery to examine the arterialized venous system and Doppler echography to search for developing branches.

Results: Five months later, three branches of the arterialized veins that flowed proximally at the level of the hand and wrist were ligated. By around one year after surgery, the lymphedema index in the affected upper limb had improved from 116 to 103 and the patient's Numerical Rating Scale score for intractable pain and cold sensitivity had improved from 6 - 7 to 1- 2.

Conclusions: We believe that the combination of VA and LVA in the early stages of primary Raynaud's phenomenon and lymphedema was effective in this case.

PP37 LYMPHATICOVENULAR ANASTOMOSIS FOR RECURRENT CELLULITIS IN A DEMENTIA PATIENT WITH LYMPHEDEMA

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Objective: Recurrent cellulitis is a frequent and challenging complication of lymphoedema. Decongestive lymphatic therapy is difficult to administer in a patient with dementia. Lymphaticovenular anastomosis (LVA) is considered to be promising for the management of cellulitis secondary to lymphoedema. In this report, we describe a patient with comorbid recurrent cellulitis and lymphedema in the left lower limb who was treated successfully for recurrent cellulitis using LVA.

Material-Method: The patient was an 83-year-old woman with lower extremity lymphedema who suffered from recurrent cellulitis three times a year on average for about 15 years prior, which lead to necrotizing fasciitis in the left lower extremity.

LVA was performed to reduce the risk of cellulitis, but compression therapy was impossible even after LVA.

Result: So far, there has been no recurrence of cellulitis for 2 years as of this writing.

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Conclusions: Obstructed lymphatic flow will result in the immune system being unaware of an inflammatory process occurring in the afferent tissue and will remain unengaged, thereby resulting in immune ignorance. Expression of acquired immunity is impossible in the presence of lymphedema. LVA is considered to create a bypass to the lymph nodes via which dendritic cells can transmit antigen information to T-cells from the blood circulation. It is difficult to administer decongestive lymphatic therapy in some patients, such as patients with dementia. LVA is a promising treatment for reducing the risk of recurrent cellulitis in a dementia patient with lymphedema.

PP38 ROLE OF LYMPHATICO VENULAR ANASTOMOSIS FOR TREATMENT OF LYMPHORRHEA IN LOWER LIMBS

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Objective: Once established, lymphorrhea typically persists and can present as an external lymphatic fistula. Lymphorrhea occurs in limbs with severe lymphedema, as a complication after lymphatic damage, and in obese patients. Some cases are refractory to conservative treatment and require surgical intervention. Reconstruction of a lymphatic drainage route is considered ideal treatment for lymphorrhea. In this study, we reviewed the efficacy of lymphaticovenous anastomoses as a treatment for lymphorrhea of any etiology.

Material-Method: The study included 12 patients with lymphorrhea: primary lymphedema (n=3), age-related lymphedema (n=4), lymphorrhea due to lipedema (n=3), or iatrogenic lymphorrhea (n=2). Compression therapy had been performed preoperatively in 10 patients. Compression therapy was difficult to apply in 2 patients. The lymphatic vessels and the veins were anastomosed end-to-end using 12-0 nylon suture under a microscope.

Results: The lymphaticovenous anastomosis was successful in all cases and there were no perioperative complications. The volume of lymphorrhea decreased within 5 days after the surgery in all cases and resolved completely by 2 weeks postoperatively. The compression therapy applied preoperatively was continued postoperatively. There has been no postoperative recurrence of lymphorrhea or cellulitis.

Conclusions: LVA is a promising treatment for lymphorrhea because it can treat both lymphorrhea and lymphedema simultaneously. The focus when treating lymphedema has now shifted to risk reduction and prevention, so it is important to consider the risk of lymphedema when treating lymphorrhea.

PP39 INDOCYANINE GREEN LYMPHOGRAPHY FINDINGS IN OLDER PATIENTS WITH LOWER LIMB LYMPHEDEMA

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Objective: Lymphedema is classified as primary or secondary according to the underlying cause. Primary lymphedema is hereditary and is considered a consequence of an inherited abnormality of the lymphatic system. Secondary lymphedema, however, is a consequence of lymphatic failure resulting from trauma, parasitic infection, or iatrogenic obstruction. Primary lymphedema is divided into three broad groups, namely, lymphedema congenita, lymphedema praecox, and lymphedema tarda. With the exception of lymphedema tarda, it is thought that age-related deterioration in lymphatic pump function is caused by oxidative stress. The aim of this study was to evaluate and to classify indocyanine green (ICG) lymphography findings in patients with lower limb lymphedema to ascertain whether there is a pattern to age-related deterioration.

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Material-Method: There were 56 patients (104 edematous lower limbs) who had undergone ICG lymphography and for whom the lower extremity lymphedema (LEL) index had been calculated enrolled in this study. Specific inclusion criteria were used to exclude other causes of edema. ICG lymphography images were recorded in the plateau phase (12-18 hours after injection), when no further changes of images would be expected. The LEL index was calculated by summation of the squares of the circumference for five areas in each lower extremity divided by the body mass index.

Results: The clinical lymphedema pattern was determined as bilateral in 48 patients and unilateral in 8 patients. Patients with bilateral lymphedema were significantly older than those with unilateral lymphedema (76.40 ±8.03 years vs 53.13 ±14.12 years; $P < 0.01$). The ICG lymphography pattern was categorized as linear, low enhancement (LE), distal dermal backflow (DB), or extended DB in bilateral lymphedema. ICG lymphography showed the DB pattern on both the thigh and lower leg regions in all eight legs with unilateral lymphedema. There were also significant between-group differences in the LEL index (linear vs distal DB, $P <0.05$; linear vs extended DB, $P < 0.01$; linear vs unilateral, $P < 0.01$; LE vs extended DB, $P < 0.01$; LE vs unilateral, $P < 0.01$; distal DB vs extended DB, $P < 0.05$; and distal DB vs unilateral, $P < 0.01$).

Conclusions: In this study, unilateral lymphedema, with its younger age at onset, severity, and unilateral dominance, corresponded to lymphedema tarda. In contrast, bilateral lymphedema corresponded to senile lymphedema, which is distinct from primary lymphedema in general and lymphedema tarda in particular. Age-related deterioration in lymphatic pump function rather than iatrogenic obstruction or genetic abnormality is likely to account for the characteristic older age at onset of lymphedema and its progression from the distal region.

PP40 LYMPHOVENOUS ANASTOMOSIS AIDS WOUND HEALING IN LYMPHEDEMA: RELATIONSHIP BETWEEN LYMPHEDEMA AND DELAYED WOUND HEALING FROM A VIEW OF IMMUNE MECHANISMS

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Objective: Delayed wound healing in lymphedema is asuumed to be caused by two reason, path-ophysiologic and Immunologic effects of lymphedema. The aim of this review is to establish how impaired lymphatics alter wound healing pathophysiologically and immuno-logically, and to propose treatment modalities that can promote wound healing in lymphedema.

Material-Method: Lymphatico Venular Anastomosis LVAs were performed to the patients who had recurrent cellulitis several times with lymphorrhea and developed severe ulcers that were refractory to skin grafts, flaps and conservative therapy.

Results: The lymphorrhea and the ulcer had healed by 4 weeks. Moreover, the lymphedema improved without compression therapy.

Conclusions: Lymphedema is characterized pathophysiologically by localized peripheral edema that compresses the microvasculature and lymphatic vasculature and impairs tissue remodeling. Another suspected mechanism is an imbalance in the differentiation of participating immune cells. Profound suppression of Th1 cells is likely to increase the risk of infection, and excessive differentiation of Th2 cells, including M2 macrophage polarization, may promote fibrosis, which disrupts the carefully orchestrated wound healing process. Although Negative Pressure Wound Therapy (NPWT) is useful for treatment of delayed wound healing in lymphedema, LVAs may be necessary to treat the fundamental problem of lymphedema. LVAs are considered to create a bypass to the lymph nodes via which DCs can transmit antigen information to T-cells. LVAs are considered to neutralize chronic inflammation by allowing more DCs to return into the circulation, thereby improving wound healing.

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PP41 COMPRESSION IN THE PREVENTION OF LOWER LIMB OEDEMA DURING PREGNANCY AND POSTPARTUM PERIOD. A PROSPECTIVE RANDOMIZED TRIAL

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Objective: The aim of this study was to evaluate the role of light (ccl1, 18-21mm) round-knit compression stockings in the prevention of lower limb oedema in women during pregnancy and postpartum period.

Material-Method: 51 eligible pregnant women were randomly grouped as CG (compression group, n=27) or NCG (no compression group, n=24). Both groups underwent Doppler ultrasound of lower limb vessels, limb volume measurements and physical activity assessment (IPAQ). When oedema occurred (volume increase by ≥10%) in NCG, compression was introduced. The mean time of wearing compression was 6 hours per day.

Results: No oedema was diagnosed in CG despite the diagnosed venous reflux in ultrasound at the beginning in CG vs 5 patients in NCG during 3rd trimester. Significant reduction of subjective symptoms (pain, feeling of heaviness, tingling) was observed in CG. Major decrease in physical activity was observed for all women during 3rd trimester. Significant interdependence was found between limb volume increase and lack of physical effort.

Conclusions: Light compression has a positive impact on oedema prevention and symptoms intensity in women during pregnancy and postpartum period. Use of compression in oedema prevention and reduction during pregnancy requires further studies.

PP42 VERTICAL RECTUS ABDOMINAL FLAP (VRAM) FOR PERINEAL RECONSTRUCTION FOLLOWING PELVIC SURGERY: A HELLENIC SINGLE CENTRE EXPERIENCE

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Objective: Extended primary or locally recurring malignant tumours of the pelvis require radical surgical excisions leaving significant large perineal defects. Vertical rectus abdominis flap (VRAM) are the most suitable options in the armamentarium of the plastic surgeon to cover large tissue of the perineum, pelvis, and sacrum.

Material-Method: This is a retrospective review of a prospectively maintained database of 23 patients who received perineal reconstruction with VRAM between January 2007 to February 2021. The mean followed up period was 5 years (range, 1 month-15 years). This case series involved patients who presented with anorectal, vulvar, penile, inguinal, sacral cancers.

Results: The overall perineal flap morbidity was quite high (51%) including seroma (8), wound dehiscence (2), deep tissue infections (8), tissue necrosis (1), and lastly a total flap loss (1) requiring surgical intervention. Mean donor site morbidity was significant as well, with an abdominal dehiscence rate of 7% yet without incisional hernias.

Conclusions: These operations are considered as rescue operations with a relatively low long-term survival expectation

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and an accordingly high complication rate. However, some patients may truly benefit from such an extensive approach both in terms of survival and of quality of life.

PP43 INITIATING COMPLEX DECONGESTIVE THERAPY (CDT) WITHOUT PHYSICAL INTERACTION

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Objective: Complex Decongestive Therapy CDT) can it be intiated without physical contact - a case report.

Material-Methods: A 25 year old software consultant from Tamilnadu, India, contacted us in February leg lymphedema. She was preliminarily counseled through video conference after entry of clinical details into a special software MedicAid™ (www.amlamed.com). Online prescription was provided. She did not start the full prescription as she had planned to come to our clinic in New Delhi. She could not come because the lockdown started. Due to her urgency, she agreed to try out online training of self care. Appropriate bandage materials and a measurement form were couriered to her and she was given appointments for regular Zoom™ (www.zoom.us) meetings. She was asked to start penicllin tablets (as injection was not possible locally) before initial. After reassessment and counselling, the patient was tought how to take limb circumference measurements at fixed points which could be fed into MedicAid™. Following that online training on leg cleaning, Bandaging and exercizes per provided.

Results: A total of 8 online sessions were conducted between 14th and 25th April. On May 8th we found a recurrence and lymphorrhoea, as antibiotics had not been started! She improved with a course of oral penicillin and re-instruction on bandage application

Conclusion: Totally Online CDT initiation is possible

	Left (N)	Right (Involved)			
Date	15-04-2021	16-04-2021	22-04-2021	08-05-2021	23-05-2021
1u cms	20.00	32.50	31.00	30.00	28.50
-10 cms	19.50	27.00	25.00	23.80	23.20
15 cms	21.00	35.00	32.00	31.00	30.00
-15 cms	19.50	25.00	23.70	23.30	22.70
20 cms	23.50	36.50	33.00	32.00	32.00
25 cms	26.50	39.00	35.00	34.00	34.80
30 cms	30.00	39.50	36.60	36.00	36.00
35 cms	32.00	39.00	38.10	37.00	37.00
40 cms	31.00	38.00	38.00	38.00	36.00
45 cms	33.00	39.50	36.00	39.00	37.00
50 cms	35.50	43.50	41.00	42.00	43.00
55 cms	39.50	47.50	44.50	48.00	45.50
60 cms	44.00	52.50	50.00	51.00	50.00
65 cms	47.00	55.50	53.50	54.00	54.00
70 cms	51.00	59.00	58.00	56.50	57.50
75 cms	56.50	63.00	60.50	62.50	61.00
Calc Volume	7561.40	11610.10	10478.00	10654.10	10361.40
Cross on Heal	28.00	36.50	32.90	31.50	30.30

Figure 1. showing the serial wise limb volume measurements


LYMPHOLOGY
LYMPHATICS • LYMPH • LYMPHOCYTES • LYMPH NODES