20. Lipedema, Lipo-Lymphedema and Phlebo-Lymphedema

Madelung's disease, clinical evaluation, and subcutaneous ultrasonography.

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Madelung's disease, clinical evaluation, and subcutaneous ultrasonography.

Case studies

Madelung's disease is a rare disorder of progressive, excessive, painless, symmetrical deposits of adipose tissue in the subcutaneous layer; it is also known as multiple symmetrical lipomatosis and Launois-Bensaude syndrome. Madelung's disease is a disease of unknown etiology. The hypothesis of this disease is that lipomas are the result of mitochondrial disorders of brown adipose tissue. It affects predominately men and alcohol abusers.

Aim of this study is to demonstrate the clinical presentation of Type I and Type II Madelung's disease confirmed with subcutaneous ultrasonography of skin and adipose tissue.

Case 1

A 41-year-old female, BMI 42.91 with a progressive, painless, excessive, and symmetrical accumulation of adipose tissue in her upper body giving rise to the pseudo-athletic appearance. Enzi classification-Type I, involvement of the neck, nape, arms, and upper back.

Case 2

A 65 years old woman, with a BMI of 32.61 with Type I and Type II Enzi classification, Type II involvement of abdomen, hips, and thighs. This patient developed progressive, symmetrically distributed subcutaneous adipose masses of her neck, upper shoulders, upper arms, hips abdomen/genitals, giving a grotesque appearance.

Conclusion: The ultrasonographic study revealed increased skin size in the affected areas only, neck, and upper back, adipose back folds, and shoulders with increased hyperechoic subcutaneous tissue space.

Subcutaneous ultrasound is a noninvasive way to quantify the rare adipose subcutaneous tissue changes in Madelung's disease which can be helpful for further management.

20. Lipedema, Lipo-Lymphedema and Phlebo-Lymphedema

Lipedema and the evolution to lymphedema with the progression of obesity

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Lipedema and the evolution to lymphedema with the progression of obesity

Abstract

Background: Lipedema was first described by Allen and Hines in 1940 as a clinical condition associated with the enlargement of the extremities. Individuals with this condition exhibit greater redistribution of fatty tissue to the extremities, which leads to enlargement of the limb. **Objective**: The aim of the present study was to evaluate the prevalence of subclinical and clinical systemic lymphedema in patients with lipedema and different body mass index (BMI) values. **Method:** A cross-sectional study was conducted to determine the prevalence of subclinical systemic lymphedema and clinical lymphedema of the lower limbs detected by multisegmental bioimpedance (*In Body S10* device) in 600 women with clinically diagnosed lipedema. The patients were divided into three groups based on BMI: Group I – BMI below 30 kg/m^2; Group II – BMI between 30 and 40 kg/m^2; and Group III – BMI 40 to 50 kg/m^2. **Results:** Fisher's exact test revealed a statistically significant difference between Group I and both Groups II and III ($p = 0.0001$) regarding the occurrence of lower limb lymphedema. **Conclusion:** Patients with

lipedema can develop edema even when their weight is within the standards of normality. However, obesity is an aggravating factor, as the prevalence of lipedema increases progressively with the increase in weight.

Keywords: Lipedema, Lymphedema, Obesity, Bioimpedance, Multisegmental bioimpedance

20. Lipedema, Lipo-Lymphedema and Phlebo-Lymphedema

Proposed Framework for Research Case Definitions of Lipedema

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Title: Proposed Framework for Research Case Definitions of Lipedema

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Summary:
Lipedema is a common yet under- and misdiagnosed adipose tissue/lymphatic disease, often misconstrued as simple obesity. Lipedema has been estimated to impact approximately 11% of women. Lipedema has a profound, negative impact on quality of life. Despite this, a case definition for lipedema research has not, as yet, been proposed.

This presentation will discuss our manuscript in its final stages prior to submission for publication.

Background: We aim to propose a framework for developing a research case definition of lipedema, based on current literature and observations, that can be applied to future lipedema research, in order to standardize and strengthen the scientific evidence base.

Methods and Results: We conducted a narrative review of the literature and identified consensus characteristics and disputed characteristics that could be included in a research case definition of lipedema. After considering the strength of the evidence and how each characteristic could be measured in a research study, we have recommended this approach for developing a research case definition of lipedema. Based upon three-to-five widely accepted characteristics, these are combined with at least two-to-five disputed or less well-substantiated characteristics as additional evidence in order to improve specificity.

Conclusions: We present a case definition framework for lipedema based on the scientific literature that can be applied to future studies on lipedema. Utilizing our framework will increase the sensitivity and specificity of the research-applied case definition and provide an opportunity for future research aggregation and thereby enhance the contribution to the scientific evidence base.

20. Lipedema, Lipo-Lymphedema and Phlebo-Lymphedema

Multiomics Approaches for Studying Lipedema Pathogenesis

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Multiomics Approaches for Studying Lipedema Pathogenesis

Abstract

Lipedema is a genetic disease that primarily affects women, characterized by the abnormal accumulation of subcutaneous adipose tissue, pain, and anxiety. Steroid hormones are believed to play a role in its pathogenesis, and the AKR1C1 gene was the first to be linked to the disease. Despite its prevalence, the etiology of lipedema remains poorly understood, and a multiomics approach, combining genomics and metabolomics, can greatly improve our understanding of this condition.

In this study, we first employed a genomic approach, sequencing the genomes of 162 Italian and American patients with lipedema. We identified 21 deleterious variants in 12 genes, including PLIN1, LIPE, ALDH18A1, PPARG, GHR, INSR, RYR1, NPC1, POMC, NR0B2, GCKR, and PPARA.

Among the sequenced genes, AKR1C1 was of special interest, due to its relation to steroid hormones metabolism that could drive adipogenesis, anxiety, and pain. We found three AKR1C1 genetic variants in lipedema patients and evaluated their pathogenicity using molecular dynamics simulations. Then, by using information theory and structural biology we were able to predict eight AKR1C1 polymorphisms from the gnomAD database that could predispose individuals to lipedema.

Finally, we employed a metabolomics approach to investigate steroid levels in patients with lipedema, as well as histamine and its metabolites, which are associated with lipedema symptoms. Our findings identified key genes and biomarkers that could be linked to the pathogenesis of lipedema, suggesting that a multiomics approach may enable improved diagnosis and personalized treatments for patients with lipedema.

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Molecular Pathways and Candidate Genes in Primary Lymphedema

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Title: Molecular Pathways and Candidate Genes in Primary Lymphedema

Abstract

Primary lymphedema is a chronic inflammatory disease that primarily affects the lower limbs due to ineffective fluid uptake in peripheral tissues. Understanding the genetic basis of lymphedema is crucial for effective diagnosis and personalized treatment. However, the molecular pathways involved in its pathogenesis remain poorly understood, and the study of candidate molecular pathways and genes may help to identify new diagnostic and therapeutic targets.

In this study, we first analyzed a cohort of 147 Italian lymphedema patients with the current diagnostic genetic tests. However, this led to a correct diagnosis in only 7% of cases, highlighting the lack of reliable genetic tests for this disease. Hence, a thorough understanding of the genetic basis of primary lymphedema is needed, considering both Mendelian and polygenic inheritance.

For this purpose, we first built a molecular pathways diagram based on a literature analysis of candidate and diagnostic genes. We identified the VEGF-C/VEGFR-3 pathway as the most important molecular pathway in lymphedema, considering that mutations in several genes involved in this

pathway result in different forms of lymphedema. Similarly, the HGF/MET, RAS/MAPK, PI3K/AKT pathways are also involved in lymphangiogenesis, and mutations in these pathways are linked to lymphedema and lymphangiectasia. Moreover, several transcription factors influence the lymphatic system, and mutations in SOX18, PROX1, GATA2, and FOXC2 cause various forms of syndromic lymphedema. Finally, the Rho/ROCK, the planar cell polarity (PCP), and the lymph transport pathways emerged as interesting candidates for lymphedema pathogenesis.

We then sequenced promising candidate genes in the cohort of lymphedema patients, and we identified several genetic variants that were predicted to be detrimental. Thus, we studied selected genetic variants using in silico functional studies and segregation analyses, in order to support their pathogenicity and correlation with lymphedema. Furthermore, we used a WES approach to identify a new possible gene correlated with lymphedema in a family of six members with a syndromic form of lymphedema. Finally, we analyzed 64 SNPs in lymphedema patients and healthy controls to identify SNPs with a protective or harmful effect.

Our findings suggest that a multifaceted approach could be a new way forward to identify new diagnostic genes and develop personalized medicine treatments for lymphedema patients. This study highlights the complexity of genetic factors in primary lymphedema and emphasizes the need for further research to better understand its molecular pathways and develop effective diagnostic and treatment strategies.

20. Lipedema, Lipo-Lymphedema and Phlebo-Lymphedema

COMPARISON OF PATIENTS WITH LIPEDEMA AND OBESITY: METABOLIC STATUS, QUALITY OF LIFE AND PSYCHOLOGICAL STATUS

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COMPARISON OF PATIENTS WITH LIPEDEMA AND OBESITY: METABOLIC STATUS, QUALITY OF LIFE AND PSYCHOLOGICAL STATUS

Objective: Lipedema is a chronic painful adipose tissue disease that often affects women and is characterized by symmetrical and excessive adipose tissue in the legs. The etiology of lipedema is unknown. It is known to worsen with obesity but does not respond to diet and exercise like obesity. However, the differences between these two diseases are not clearly understood.

Lipedema has been associated with sex hormones in previous studies. However, the relationship between lipedema and thyroid hormones is not well known. The aim of this study is to evaluate the differences in metabolic status, quality of life and psychological status between groups of patients with lipoedema and obesity.

Material and Methods: A total of 133 people, 70 female patients diagnosed with lipedema and 63 obese female patients with a body mass index (BMI) of 30 and above, were included in our study. Body composition of both groups were evaluated by bioimpedance analysis (TANITA, TBF-

300, Body Composition Analyzer). Volumetric measurements of both lower extremities of the patients with lipedema were performed according to the truncated cone formula. Thigh and pretibial soft tissue thicknesses were measured ultrasonographically and thyroid gland ultrasonography was performed in both groups (7-12 MHz linear-array transducer, Logic P5, GE medical systems, Wisconsin, USA). Complete blood count, blood cholesterol and triglyceride levels, insulin resistance, liver enzymes, glycolized hemoglobin and thyroid function tests were evaluated. In order to evaluate psychological status and quality of life, Short Form-36 (SF-36), Hamilton-Depression (HAM-D), Hamilton-Anxiety (HAM-A) questionnaires were applied and recorded. Pain intensity was determined by visual analog scale (VAS).

Results: The mean age of the lipedema patient group was 52.67±11.09, the mean age of the obese control group was 49.22±9.74 ($p>0.05$). The BMI of the lipedema group was 39.8±6.37 (kg/m^2), the BMI of the obese group was 39.06±4.981 (kg/m^2) ($p>0.05$). The extremity volumes and soft tissue thicknesses were higher in lipedema group than obesity group ($p<0.001$).

Insulin Resistance (IR) ($p<0.001$), Alkaline phosphotase ($p=0.037$), glycosylated hemoglobin ($p<0.001$), triglyceride (TG) ($p<0.001$), low density lipoprotein ($p=0.040$) and high density lipoprotein ($p<0.001$) parameters were significantly impaired in the obesity group. No significant difference was observed between lipedema and obese patients in thyroid function tests ($p>0.05$). In the bioimpedance analysis, no difference was found between the muscle mass of both groups, while fat mass was detected more in lipedema patients ($p=0.08$). Total body fluid was found to be less in lipoedema patients who were thought to have edema than in obese patients ($p=0.04$). Lipedema patients' SF-36 ($p<0.001$), HAM-D ($p<0.001$) and HAM-A ($p<0.001$) scores were significantly worse than obesity patients. The pain intensity was significantly higher in the lipedema patient group (mean VAS 7.057±1.727) than in the obesity group (mean VAS 3.317±1.776). ($p<0.001$).

Conclusion: In our study, we found that lipoedema patients did not have metabolic problems, but their quality of life and psychological status were worse than those of obesity patients without lipedema, and their pain levels were higher in obese patients. We think that the underlying reasons for the unresponsiveness of lipedema to diet, exercise and CDT are due to the absence of edema or metabolic problems in the etiology of the disease.

20. Lipedema, Lipo-Lymphedema and Phlebo-Lymphedema

Effectiveness of Breathing Exercise and Pilates-Based Exercise in Patients with Lipedema; a controlled, randomized clinical trial

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Effectiveness of Breathing Exercise and Pilates-Based Exercise in Patients with Lipedema; a controlled, randomized clinical trial

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Background: Lipedema is defined as the disproportionate and symmetrical distribution of adipose tissue that may involve the upper extremities, most often the lower extremities. It is characterized by pain in the extremities, easy bruising, subcutaneous nodules in adipose tissue, and resistance of fat to conventional diet and exercise. Lipedema is a chronic and progressive disease that can lead to significant disability,

impairment in activities of daily living, and psychosocial distress. Complex Decongestive Therapy is considered the gold standard in conservative treatment. Classical components of conservative treatment management; manual lymph drainage, compression therapy with custom-made, plain knitted pressure garments, physiotherapy and exercise therapy, psychosocial therapy, diet counseling and weight management, and reduce extremity tenderness, pressure-induced pain even though it provides a reduction and reduces the feeling of tension (8).

Aim: The aim of this study is to examine the effect of Pilates-based exercises and breathing exercises on the disease in patients with lipedema.

Materials and Methods: Patients under 50 years of age, with stage 1-2 lipoedema, and with a BMI of less than 30, who applied to the lymphedema polyclinic of Istanbul Cam and Sakura City Hospital between May 1, 2021 and June 30, 2021 were included in the prospective randomized controlled study.
The patients were divided into 2 groups by a simple randomization method. The first group was treated as the control group and self-massage training was given, while the second group was given breathing exercises and Pilates-based exercises, 2 days a week for 6 weeks, via the online program determined with self-massage training. The exercise program that was planned to be applied to the second group for 50 minutes; It was applied as 10 minutes of warm-up, 5 minutes of abdominal breathing exercise, 30 minutes of lower extremity-lower abdomen strengthening exercises and 5 minutes of cool down/stretching exercises. At the end of the 6th and 12th weeks, the patients were called to our outpatient clinic for control; standardized clinical examination form, extremity circumference measurements, lipedema stage, visual pain scale score (VAS), general quality of life scale (EQ-5D-3L), Brief Pain Questionnaire (Short Form) information were re-evaluated. Weight change was recorded as a secondary outcome.

Results: Both the Pilates-based exercise and control group's EQ-VAS Scale scores and visual analog scale scores questioned for pain, heaviness, and tenderness recorded at 6 and 12 weeks showed statistically significant improvement compared to pretreatment. A statistically significant improvement was found in the Pilates-based exercise group compared to the control group. A statistically significant improvement was observed

in BPI-SF parameters in both groups compared to pre-treatment. In BMI, which we considered as a secondary outcome, a statistically significant decrease was observed in the pilates-based exercise group.

Conclusion: Pilates-based exercises and breathing exercises could contribute to improvement in symptoms of lipedema patients, decrease in disease complaints and increase in quality of life.

Competing interests: The authors declare no conflict of interest.

Key Words: Lipedema, pilates-based exercises, breathing exercises, lymphoedema

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20. Lipedema, Lipo-Lymphedema and Phlebo-Lymphedema

Pain from perforators – in lipoedema, hold tight; it feels so right

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Title: Pain from perforators – in lipoedema, hold tight; it feels so right

Introduction

Based on extensive anatomical dissections (Uhl J-F et al. 2021), a perforating vein is defined as one joining the deep to the superficial venous system, which perforates the deep fascia. Perforating veins are provided with one-way valves along the whole limb, and are physiologically oriented from superficial to deep, except for the foot. Valves at not described at the point of perforation.

The reason for calf pain and tenderness in lipoedema is still unexplained. Clinical observations in a dermatology/lymphology practice providing continuity of care over 30 years with over 30,000 high resolution and doppler ultrasound records, suggested specific pain threshold differences between lipoedema and lymphoedema patients. When examining calf perforating veins, it was becoming apparent that locally applied pressure with the ultrasound probe caused pain at the site of perforators in lipoedema patients but not in lymphoedema patients. Constructing extra compression at the site of the maximum tenderness for the relief of pain in practice lipoedema patients has been routine. However only recently have perforators been specifically sought out as a possible initiating factor for this tenderness, pain and aching.

Objective

To determine whether perforators are associated with localized calf tenderness

Method

As the scoping exercise had indicated calf tenderness exactly at the site of perforators in some patients but not in others, high resolution (up to 18 MHz) doppler ultrasonography was used to record the site, appearance and direction of the perforator blood flow and size of the fascial gap. Deep finger pressure was then applied at the gap of the fascia at perforator site and the patient's reaction noted (tenderness/no tenderness). Patients with chronic venous insufficiency were available as controls but the objective was to quantify differences between lipoedema and lymphoedema sufferers.

Results

Over a six-month period (Winter 2022/3), ultrasound pictures of calf perforating veins were collected in routine patient visits, with permission for anonymized publication. Direction of blood flow was variable. No valves were ever seen or recorded at the site of vein perforation. The average diameter of the fascial gap was 4.1 mm varying between 1.7 mm and 7.9 mm. Perforators in chronic venous hypertension were usually visible near the skin surface, with associated signs of varicosities (pigmentation, induration, inflammation etc) and typical symptoms if inflamed, thrombosed or infected. Perforators in lymphoedema were not associated with pain on localized pressure at the site. In contrast, lipoedema patients immediately responded to localized fingertip pressure with "that's it!", "that's exactly where I feel pain!". Extra targeted compression was then incorporated into the compression hosiery. With this extra localised support, lipoedema patients reported considerable relief, being able to work/stand for longer in the day and having less evening discomfort.

Conclusion

Objective investigations on the characterisation of pain/tenderness as one of the diagnostic criteria for lipoedema are in progress (Hucho T, pending publication). em Prim Döller (Wolfsberg) points out the effectiveness of pressure for reduction of discomfort in lipoedema patients but offers no explanation. As regards the name lipoedema, as oedema is never if ever found, Lipohyperplasia dorosa (LiDo) may better as a descriptive term, as it incorporates the characteristics of excess lipid deposition along with tenderness on pressure, discomfort, spontaneous pain and feeling of heaviness particularly in the evening. However the reason for the pain and tenderness is still unexplained. Could perforators be key, and if so, why? While further investigations proceed, the present conclusion for clinical care has to be hold tight; it feels so right!

ASSESSMENT AND PHYSIOTHERAPY INTERVENTION IN THE IMMEDIATE POSTOPERATIVE PHASE OF LIPEDEMA SURGERY.

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Background: Lipedema is a painful adipose tissue disorder, with an abnormal fat deposition in lower limbs and occasionally upper limbs. That results in pain, bruising, and mobility impairment. It affects on a physical and psychological level.

Purpose: The aim of this study was to evaluate the effects of a modified CDT physiotherapy protocol with Godoy Method on after lipedema surgery.

Patients and methods: The study included 293 participants who underwent liposuction surgery for lipedema. The postoperative physiotherapy protocol included Godoy cervical stimuli, MLD based on Godoy maneuvers, mechanical lymphatic drainage, compression with bandages, skin care, therapeutic education and active movement as soon as possible.

Outcomes: pain (VAS), complications, mobility.

Statistical analysis was performed using means, standard deviations, percentages, and T-test, ANOVA, and chi-square tests.

Results. The study found that the number of physiotherapy sessions had a significant effect on reducing pain (from 7.8 to 2.2 in VAS) and other complications and increasing mobility. The number of physiotherapy sessions received showed significant differences in pain intensity at 90 days post-treatment. The 47.24% were already independent on the third day after the physiotherapy intervention. 40.96% of the participants developed some acute type of complication. A relationship between inadequate compression and complications was found in the 36.52% of the sample.

Conclusion: The study concludes that the modified CDT physiotherapy protocol with Godoy Method had synergic effects that favored faster reabsorption of edema and improved functionality and quality of life in lipedema surgery patients. Overall, the study suggests that physiotherapy may be effective in reducing pain and improving mobility in patients undergoing lipedema surgery.

Keywords: Lipedema, physiotherapy, liposuction, complications, therapeutic approaches, management.

Background: Lymph is produced 2,000 ml daily and transported to the heart, emptying into the venous angle at subclavian veins. Having only one exception, the central nervous system with cerebrospinal fluid, any body part or segment is not allowed to contain or hold a volume of lymph or interstitial fluid for a prolonged period of time; otherwise, it is considered a disease, such as a cystic fluid in ganglion cyst or Baker cyst, glandular retention cyst, synovial collection, pleural effusion, ascites, seroma, hydronephrosis, hydrocephalus, hydromyelia, meningocele, hydrocele, lymphocele, and so on. The bone marrow that contains fluid, initially often subclinical, interestingly has been found to be associated with many clinical entities.

Patients and Methods: Taking advantage of the MRI technology, the presence of non-flowing fluid could be shown in the marrow cavity by T2W, short tau inversion recovery with fat suppression (STIR/fs) mode. We reviewed our poor lymph disorder patients who have been diagnosed elsewhere as, for instance, osteoarthritis, myoma uteri, urinary cystitis, pruritus, chronic eczema, psoriasis, SLE, dermatomyositis, migraine, alopecia, lipedema, et cetera, and correlated with the state of bone marrow edema (BME).

Results and Discussion: Bone marrow normally appeared with hypointense signal in T2W STIR/fs. However, in individuals with known diseases, the hyperintense signals were identified here and there. Typically, osteoarthritis was bright at proximal end of tibia and distal end of femur, facing the joint facet. Huge myoma, more than 15 cm diameter, surprisingly was always present with BME that

prevailed the pelvic bone and the proximal half of femur shaft, seen as a geographic or diffuse pattern, occurring bilaterally. In patients with recalcitrant itch at a lateral aspect of a thigh, the femoral BME was obvious and ipsilateral. Habitual recurrent cystitis was found with pubicoischial BME, in association with the usually untold complaint of hotness in the perineum. The temporal bones including the petrous portions were brightly hyperintense in alopecia patients; they complained of heated scalp for unidentified etiology. Moth-eaten pattern of BME in distal end of femur, and/or distal and proximal end of tibia, was distinct in autoimmune disorder, especially the dermatomyositis and SLE. Spotty- or curvilinear-shaped BME in the talocalcaneal and navicular-cuneiform-cuboid complex was associated with psoriasis, cutaneous eruptions, itchiness, lymphorrhea, and hyperpigmentation. Sometimes whole length of tibia and metatarsal bone 4 and 5 were often recognized with total whiteness, suggestive of bone marrow contusion caused by physical impact as in football players or by repetitive injury as in ankle sprain or pes planus. Such lymph-containing marrow lesions were structurally led to subcutaneum through tiny channels as demonstrated by 3D reconstruction rotated on the display. In lipedema patients, the metatarsal, naviculo-cuneiform, cuboid, talocalcaneal bones showed striking hyperintense signals throughout the foot bone complex, suggesting a massive source of old lymph steadily released from the marrow. Theoretically, the inflammatory lymph that remained stationary in a confinement could cause heat build-up as felt from the skin. We applied a variety of cryo, icing, and cooling therapy, in combination

with lymph drainage by a compression-decompression therapy, the Twisting Tourniquet© Technique using certified Schnogh®, and could cure them satisfactorily. In conclusion, the pooling of interstitial fluid if present in bone marrow cavity is abnormal. This study is an attempt to relate the pathognomonic potential of “old lymph” or “poor lymph” to cause disease in the organs either distant or nearby. The untreatable diseases are becoming treatable as we clarify the presence of BME and eradicate it by the lymphological principle.

Topic 20

Correlation between Pregnenolone and pain in Lipedema.

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Lipedema is an inflammatory disease of the adipose tissue, despite the fact that the WHO has recognized it among the non-inflammatory diseases of fat tissue.
Pain is one of the most important symptoms in people suffering from lipedema. It is present in over 80% of patients unlike subjects with obesity who do not present this symptom. Already present in the morning, it increases during the day to reach the maximun level in the evening and is accentuated by the physical exercise. It is perceived with varying intensity. There is much debate about the causes of pain (chemical mediators of inflammation, first of all histamine, by peripheral pressure neuropathy, etc.). In view of Pregnenolone's role as an inhibitor of GABAa channels involved in pain transmission, the authors investigated the correlation between the patient's average perceived pain and plasma Pregnenolone levels in a group of 110 Lipedema patients (age ranging from 17 and 60 years old) at various clinical stages (I, II, III moderate and III severe). Pain perception was measured according to the NRS scale (Numerical rating scale) differentiating the numerical value in the morning from the evening one.
Considering that in more than 30% of the patients examined, the basal value of the hormone was below the lower limit of the normal range, the results of the study showed an inverse proportionality between the substance's plasma concentration and perceived pain, irrespective of the clinical stage of development of the pathology.
This first preliminary study, which needs further checks on a larger population, highlights one of the possible causes of the pain perceived by patients with lipedema, susceptible to possible therapeutic corrections.

Topic 20

Morphological characterization of adipose tissue from patients affected by lipedema

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Lipedema is a pathology of unknown origin that mainly affects women. It is characterized by abnormal bilateral symmetrical increased subcutaneous fat in the limbs, with no involvement of the trunk. While fat accumulation in obese patients does not cause specific symptoms, in patients with lipedema the abnormal increase of fat causes pain, increased vascular fragility and easy bruising. A specific ultrastructural characterization of fat from patients suffering for lipedema has not been reported jet.

We sought to compare adipose tissue of 10 normal weight patients affected by lipedema (stage II) by comparing the morphology of affected and healthy areas (20 biopsies). We also studied fat biopsies from 10 obese and 15 lean patients for comparison.

We performed: light microscopy, morphometry and ultrastructural (TEM) analyses.

Data showed, as common characteristic feature of affected areas, a peculiar aspect of capillary vessels. They showed: 1-hypercellularity either due to endothelial as well as perivascular cells; 2-thickened and reticulated basal membrane; 3-irregular shape with apparent hyperplasia of endothelial cells; 4-degenerative aspects in endothelial cells; 5-presence of several pericytes embedded in the basal membrane; 6-dense calcium deposits.

Adipocytes showed: variable amount of cytoplasmic calcium deposits and frequent signs of degenerative alterations.

Morphometry data showed an increased size of adipocytes from affected area compared to non-affected area in 8/10 patients.

Our data showed that the adipose tissue from normal weight women affected by lipedema has characteristic morphological alterations, not found in lean and obese patients of this study and quite specific of the affected areas. Considering our previous data on the origin of adipocytes from endothelial cells, our results strongly point to endothelial cells of fat capillaries as the key abnormal cell type in the lipedema pathogenesis.

Topic 20

Treatment of Lipedema with IPC pants – An Interventional Study Assessing Quality of life and Sonographic Dermal Thickness

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Abstract

Introduction

Lipedema is a chronic condition affecting mainly women with varying prevalence around the world. The disease is characterized by bilateral symmetric enlargement of the lower body due to adipose tissue mal-deposition, hypertrophy and hyperplasia. The biology and pathogenesis of the disease is still poorly understood which in turn results in underdiagnoses and limited treatment options for those affected.

The use of intermittent pneumatic compression for patients suffering from lipedema has been shown to reduce pain, decrease leg volume and capillary fragility.

Objective:

The aim of this prospective interventional study was to assess the efficacy of treatment of lipedema patients with Lympha Press ™.

Methods & materials: This prospective study included patients diagnosed with lipedema who underwent a four-week daily treatment using Lympha Press ™ pants. Patients were seen at the clinic before treatment, after 1 month of treatment and at 3 months after cessation of treatment. Analysis of dermal tissue thickness in predetermined regions of both lower extremities (thigh, knee, shin and ankle) was conducted by ultrasound at each visit. Patients completed a lipedema directed quality of life (QOL) questionnaire composed of 15 domains (Scale of 1-10) at each visit.

Results: A total of 10 patients were included in this study. The average age was 53.4 (range 37-67) with mean BMI of 32.76 kg/m^2.

Analysis of dermal thickness showed a mean reduction in all areas of both lower extremities following one month of treatment (range 25-74 mm per region). After cessation of treatment (3 months follow up) dermal thickness changes were variable and the majority of regions returned to baseline or ceased to improve.

QOL assessment showed an improvement following one month of treatment in 14/15 domains. The average improvement ranged from 1-3 points per domain. The only domain that did not improve was the general satisfaction of legs appearance. When assessing the change in QOL 3 months after cessation of treatment, only 5/15 domains continued to improve and by 1 or less points per domain.

Conclusion: The use of Lympha Press ™ pants for the treatment of Lipedema is noninvasive and led to a change in both dermal thickness and QOL following therapy. Discontinuation of therapy halted this improvement and led to a return to baseline state. We proved that the use of

Lympha Press ™ pants in an orderly and according to protocol can improve lipedema patients QOL and may improve dermal thickness. Further research is needed to assess and characterize subpopulations who can benefit more from this treatment.

Keywords: Lipedema, Lympha Press ™, Quality of life,