



Subclinical systemic lymphedema in patients with obesity and lipedema

Abstract

Obesity is a clinical condition that affects millions of people around the world and is associated with inflammatory processes. The aim of the present study was to report the association between obesity, lipedema, and systemic fluid retention, characterizing subclinical systemic lymphedema with aggravating factors. A 50-year-old female patient weighing 150 kilograms (body mass index: 60.2 kg/m²) reported being obese since childhood, but more located on the hips. She had a family history of this body configuration. Electrical bioimpedance analysis revealed generalized edema, constituting systemic lymphedema. Subclinical systemic lymphedema is caused by obesity and lipedema is also associated with this condition.

Keywords: lymphedema, lipedema, obesity, inflammation

Introduction

Obesity is a clinical condition that affects millions of people around the world and is associated with inflammatory processes [1]. Clinical weight loss is the best option, but surgical procedures, such as bariatric surgery, have emerged over the years. Lymphedema is a clinical condition involving dysfunction of the lymphatic system affecting both the formation and drainage of lymph. The accumulation of macromolecules in the interstitial space is associated with the retention of fluids and the consequent formation of edema. Treatment involves therapies that mobilize these macromolecules, such as specific lymphatic therapeutic techniques and compression mechanisms combined with exercise and lymphomyokinetic activities [2].

Lipedema is a physical aspect characterized by greater fat distribution in the upper and lower limbs. It is not characterized as a disease and occurs in approximately 10% of the population. As the main physiopathological change, however, such individuals can develop lymphostasis and fat necrosis [3].

Animal studies have demonstrated that the progression of obesity is associated with changes in the lymphatic system involving the pumping mechanism (lymphangions), an inflammatory

process as well as changes in capillary permeability and immunological defense [4,5]. A case study involving lymphoscintigraphy reports an association between lower limb lymphedema and both lymphatic changes and clinical lymphedema [6]. Subclinical systemic lymphedema caused by obesity manifests earlier in patients with lymphedema and worsens with the progression of obesity [7].

Electrical bioimpedance analysis has revealed a greater amount of intracellular and extracellular water in cases of lymphedema that can involve segments of the body or the entire body itself. The aim of the present study was to report a case of obesity, lipedema, and lymphatic dysfunction.

Case Report

A 50-year-old female patient weighing 150 kilos and with a body mass index of 60.2 kg/m² reported being obese since childhood, but more located on the hips. She reported losing weight in adolescence but became obese again soon afterward. She had a family history of the body configuration. The patient sought our clinic due to leg pain. The physical examination revealed obesity with lipedema located in the thighs and hips, edema in the legs and no important edema in the feet. Electrical bioimpedance analysis revealed generalized edema, characterizing

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TABLE 1. Intracellular and extracellular fluid, fluid in limbs and trunk and reference values.

	Total	Normal water values	Total extracellular water/total body water ratio
Total intracellular water	28.1	16.9 to 20.7	
Total extracellular water	19.5	10.4 to 12.6	
Total extracellular water/total body water ratio	0.41	0.36 to 0.39	
Right arm	2.46	1.39 to 1.69	0.384 limit (0.36-0.39)
Left arm	2.41	1.39 to 1.695	0.388 limit (0.36-0.39)
Trunk	20.0	12.6 to 15.4	0.399 limit (0.36-0.39)
Right leg	7.28	4.37 to 5.35	0.399 limit (0.36-0.39)
Left leg	7.11	4.37 to 5.35	0.419 limit (0.36-0.39)

systemic lymphedema with more intracellular and extracellular water in the limbs and thorax. It is noteworthy that the bioimpedance evaluation revealed lower limb lymphedema without the presence of edema below the knee **TABLE 1**, characterizing subclinical systemic lymphedema. This is an intermediate stage involving the increase in bodily fluids without the progression to lymphedema of the upper limbs but in the trunk and lower limbs.

Discussion

The present study describes a patient with lipedema and morbid obesity as well as generalized fluid retention that we denominate subclinical systemic lymphedema, which is a novel concept of lymphedema. The lymphatic system is a functional reserve of the venous system and edema emerges when this reserve is surpassed. In such cases, edema is generalized in all limbs and the thorax.

Animal studies have demonstrated an association between the progression of obesity and changes in the lymphatic system involving the pumping mechanism (lymphangions), capillary permeability and changes in the immune response [3-5]. These studies report findings that suggest mechanical changes involving a reduction in the pumping of the lymphatic system, which is a dynamic process characterized by changes in capillary permeability. A case study involving lymphoscintigraphy found an association between obesity and lymphatic dysfunction that

were not reversed with weight loss, suggesting that obesity may cause irreversible harm to the lymphatic system.

Regarding lipedema, studies have detected lymphostasis, which may have contributed to the systemic edema found in the patient described herein. No lymphedema was found below the knee and the edema was concentrated in the thigh. Therefore, the diagnosis was thigh lymphedema caused by obesity and the lymphostasis of the lipedema. These findings suggest microcirculation lymphedema in patients with lipedema that may become aggravated by inflammatory processes and the involvement of the lymphatic system in cases of obesity. The interference of gravitational pressure may also contribute to the greater aggression to the lower limbs, constituting a multifactor etiology of this edema. Other conditions that affect capillary permeability should also be considered in patients with lymphedema, such as idiopathic cyclic edema [8].

With regard to treatment, weight loss and active exercise are the most indicated option. However, there is a need for studies identifying a medication option for the control of permeability and lymphatic dysfunction.

Conclusion

Subclinical systemic lymphedema is associated with obesity, but lipedema and negative interferences on venolymphatic circulation contribute to the aggravation of the edema.

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