

CASE REPORT

Bariatric surgery and the evaluation of subclinical systemic lymphedema

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Abstract

The aim of the study was to report an improvement in clinical lymphedema in a patient who went from morbid obesity to overweight following bariatric surgery. A 52-year-old female patient reported having undergone bariatric surgery with a body mass index (BMI) of 51.2 kg/m², losing 40 kg and arriving at her current BMI of 37.1 kg/m². She would previously awake with bilateral edema that involved her feet and worsened throughout the day, corresponding to clinical stage II lymphedema, and currently no longer had this problem. Eight years after the surgery and weight loss, the patient was submitted to electrical bioimpedance analysis, which revealed an increase in total intracellular and extracellular fluids in the limbs and trunk. Active exercise and further weight loss were recommended. This study paves a path for a new line of investigation in the treatment of obesity and changes in the lymphatic system caused by obesity.

INTRODUCTION

Obesity is a chronic public health problem that affects millions of individuals throughout the world. It is recognized as a heterogeneous condition, as individuals with a similar body mass index (BMI) may have different metabolic and cardiovascular risks [1]. It is a chronic debilitating disease that is particularly serious in the USA, where it affects ~40% of the population [1, 2]. Obesity has a strong causal relationship with a number of comorbidities, leading to a loss of quality of life, a lower life expectancy and socioeconomic costs. Bariatric surgery is a

therapeutic option for select cases and has become a worldwide practice [3].

Animal studies have demonstrated that obesity and its progression are associated with a set of alterations, such as a reduction in contractile mechanisms of the lymphatic system, the inflammatory process as well as changes in capillary permeability and the immune response [4, 5]. Therefore, such findings in humans allow posing the hypothesis of subclinical systemic lymphedema similar to what has been seen in animals [6].

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Table 1 Intracellular and extracellular fluid, fluid in limbs and thorax and reference values.

	Total	Normal water values	Total extracellular water/total body water ratio
Total intracellular water	25.9	19.4–23.6	
Total extracellular water	17.1	11.9–14.5	
Total extracellular water/total body water ratio	0.397	0.36–0.39	
Right arm	2.26	1.58–1.94	0.393 limit (0.36–0.39)
Left arm	2.34	1.58–1.94	0.398 limit (0.36–0.39)
Trunk	18.8	14.4–17.6	0.394 limit (0.36–0.39)
Right leg	7.99	5.0–6.12	0.400 limit (0.36–0.39)
Left leg	7.90	5.0–6.12	0.405 limit (0.36–0.39)

Lymphedema is a clinical condition in which macromolecules accumulate in the interstitial space, resulting in the retention of fluids and the formation of edema. It can have a primary cause that can be detected at birth or secondary causes that emerge throughout one's lifetime [7, 8].

Lymphedema has been associated with obesity, but without a detailed evaluation of its characteristics. In our clinical practice, where we have found that obese patients with lymphedema may have a greater volume of total intracellular and extracellular fluids as well as fluids in the limbs and thorax [6].

The aim of the study was to report an improvement in clinical lymphedema in a patient who went from morbid obesity to overweight following bariatric surgery, but maintained a greater volume of bodily fluids, suggesting the maintenance of harm to the lymphatic system.

CASE REPORT

A 52-year-old female patient reported having undergone bariatric surgery with a BMI of 51.2 kg/m², losing 40 kg and arriving at her current BMI of 37.1 kg/m². She would previously awake with bilateral edema that involved her feet and worsened throughout the day, corresponding to clinical stage II lymphedema, and currently no longer had this problem. Eight years after the surgery and weight loss, the patient was submitted to electrical bioimpedance analysis, which revealed an increase in total intracellular and extracellular fluids as well as fluids in the limbs and trunk (Table 1). Active exercise and further weight loss were recommended.

This study was approved Ethical Committee and Research of Medicine School of Sao Jose do Rio Preto-FAMERP-Brazil no. 2.934.171.

DISCUSSION

The present study describes a patient submitted to bariatric surgery who experienced an improvement in lymphedema, going from clinical stage II to stage 0 lymphedema. In stage 0, the lymphatic system is compromised, but with no clinical manifestations, although bodily fluids remain above the limits of normality. Previous study performing this analysis is found in the literature [6].

The electrical bioimpedance analysis revealed that the patient exhibited generalized edema in all limbs and the thorax, suggesting that obesity caused damage to the lymphatic system. Animal studies have demonstrated a reduction in the pumping mechanism of the lymphatic system with the increase in obesity, along with an inflammatory process as well as changes in capillary permeability and the immune response. Therefore, such findings in humans allow posing the

hypothesis of subclinical systemic lymphedema similar to what has been seen in animals [6].

In our clinical practice, we noticed that obese patients with lymphedema have this characteristic and we began to analyze patients with obesity and no other comorbidities. The present study demonstrates that a reduction in the BMI from obesity to overweight led to an improvement in clinical lymphedema, but not the normalization of bodily fluids.

Animal studies have shown changes in the pumping of the lymphatic system that may be related to damage to lymph vessels or their contractile mechanism. Lymph vessels have valves and the space between two valves has a contractile function that can undergo a mechanical or functional change, which causes a deficiency in the system.

The reduction in obesity can improve the inflammatory process and capillary permeability, thereby reducing the functional overload of the lymphatic system and improving edema, as seen in the patient described herein. However, subclinical lymphedema was found during the electrical bioimpedance analysis, suggesting the occurrence of anatomical damage to the lymph vessels that had not yet been reversed, despite the control of the clinical edema.

CONCLUSION

This study paves a path for a new line of investigation in the treatment of obesity and changes in the lymphatic system caused by obesity.

DISCLOSURE STATEMENT

The authors certify that no have financial support and conflict interest. The authors confirmed participated in all phases of the study.

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