

## Increased levels of abdominal fat in patients with arm lymphedema after the surgical treatment of breast cancer: a quantitative, cross-sectional, randomized study

Author: Edivandra Buzato PhT; Patricia Amador Franco Brigidio PhT, PhD  
Adress: Godoy Clinic ,Avenida Constituição 1306-São Jose do Rio Preto-SP-Brazil  
CEP: 15025-120

E-mail: edibuzato@ig.com.br \* author correspondence

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### Abstract

**Introduction:** The accumulation of fat in the abdominal area (visceral) is a strong risk factor for cardiovascular disease. One of the problems observed in women submitted to mastectomy is an increase in body weight and, consequently, an increase in abdominal fat as these two variables are closely linked, however no references about this correlation were found in the literature. **Aim:** The aim of this study was to evaluate and measure the incidence of abdominal fat (AF) in women submitted to mastectomy. **Method:** Forty-five female patients diagnosed with arm lymphedema in 2011 were enrolled. The measurement of abdominal fat (AF) was by bioimpedance (InBody S 10<sup>®</sup>) the results of which were correlated with the body mass index (BMI). The paired t-test and Fisher exact test were used for statistical analysis with an alpha error of 5% being considered acceptable. **Results:** An association was identified between body mass index and abdominal fat ( $p$ -value < 0.03). **Conclusion:** The authors suggest that an assessment of intra-abdominal fat should be included in preventive evaluations of patients with lymphedema after breast cancer treatment.

**Keywords:** Lymphedema, abdominal fat, bioimpedance, breast cancer

### Introduction

Lymphedema is characterized as an abnormal buildup of protein-rich fluid in tissues, due to dysfunction of the lymphatic system resulting from an imbalance between the formation of lymph and its absorption<sup>(1,2)</sup>.

It is one of the main causes for lost working days due to illness in the world however there is a scarcity of specific clinical studies that reliably guide treatment. It is well known that breast cancer affects hundreds of women throughout Brazil and that one of the major complications of its surgical treatment is lymphedema.

The World Health Organization estimates that more than 1,050,000 new cases of breast cancer occur annually worldwide, thus this is the most common cancer of women<sup>(3)</sup>. The estimate of breast cancer in Brazil for 2012 is 52,680 new cases with a risk estimated at 52 cases per 100 thousand women; the southeast region poses the

highest risk with an estimated 69 new cases per every 100 thousand women<sup>(4)</sup>.

According to the literature, evolution with arm Lymphedema after mastectomy affects up to 50% of patients submitted to axillary lymph node dissection<sup>(5)</sup>. An Association of therapies is recommended for the treatment of lymphedema, including mechanical and manual lymph drainage<sup>(6-11)</sup>, bandaging<sup>(12,13)</sup>, hygienic care<sup>(14)</sup>, exercises<sup>(15,16)</sup>, myolymphokinetic activities<sup>(17,18)</sup> and drug therapy<sup>(19)</sup>.

Studies have demonstrated the effectiveness of using bioimpedance to measure abdominal fat (AF)<sup>(20,21)</sup>.

The accumulation of fat in the intra-abdominal region (visceral) is a strong risk factor for cardiovascular disease<sup>(21)</sup>. One of the problems observed in women submitted to mastectomy is an increase in body weight and, consequently, an increase in AF as these two variables are closely linked, however no references about this correlation were found in the literature.

The aim of this study was to evaluate and measure using bioimpedance, the AF of women with mastectomy-related lymphedema and check whether this is associated to the body mass index (BMI).

## Method

Forty-five female patients with arm lymphedema after the surgical treatment of breast cancer were evaluated in a quantitative, cross-sectional, randomized study. The evaluations were carried out in the Godoy Clinic in São José do Rio Preto in patients diagnosed between January and December 2011.

Patients with unilateral or bilateral arm lymphedema after the surgical treatment of breast cancer were included. The exclusion criteria of this study were lymphedema of other etiologies (congenital, traumatic and secondary to cosmetic surgery), active infections and refusal to participate in the study. Patient selection was by random draw.

Patients were referred for the measurement of the weight and height and bioimpedance was performed. The body mass index (BMI) and abdominal fat (AF) were calculated from this data.

Patients were categorized according to the classification of the World Health Organization (WHO) of BMI as 'underweight' (< 18.5), 'normal weight' (> 18.5 and < 25.0), 'overweight' (> 25.0 and < 30.0) and 'obese' (> 30)<sup>(22)</sup>.

For the classification of AF, 'normal' was considered for values up to 100.0 cm<sup>2</sup> with values greater than 100.0 cm<sup>2</sup> being considered 'above normal'. These reference values follow the recommendations of the manufacturer of the equipment used (InBody S 10<sup>®</sup>).

Prevalence of events was used for statistical analysis. The study was duly approved by the Research Ethics Committee of the Medicine School in São Jose do Rio Preto (FAMERP # 296/2011) and protocol for register in the Brazilian Register of Clinical Trials (ReBEC #305).

## Results

The mean age of the participants was 60.8 years, median 62.5 years and standard deviation (SD) 11.23 years.

Of the study participants (n = 45), 1 was classified as underweight (2.22%), 10 had normal weight (22.22%), 23 were overweight (51.11%) and 11 were obese (24.44%). Of the total cohort, 35 patients (77.7%) had increased IAF.

On comparing the values of BMI with the AF, 100% of patients considered obese, 82.6% of overweight patients and 40% of those with normal weights had increased AF; this was statistically significant (Fischer's exact test; p-value < 0.03; relative risk = 0.4842; 95% confidence interval: 0.2215 - 1.059).

## Discussion

According to the results obtained in this survey there is a close relationship between BMI and AF levels; no study correlating the BMI with the AF was found in the literature. Nor were there any studies that report the presence of increased AF in women with mastectomy-related lymphedema.

The increase in AF of patients classified as 'overweight' and 'obese' was expected, however the statistically significant finding of increased AF rates in 40% of the study sample classified as 'normal weight' was unexpected as this indicates a tendency in this population.

Some hypotheses about the increase in the AF of patients submitted to mastectomy who have developed lymphedema can be raised. One of them is the sedentary lifestyle that is typically attributed to age but also to lymphedema due to functional, emotional or aesthetic issues<sup>(14,16,18)</sup>. Another possibility is the continued use of medications used to prevention relapse (support chemotherapy); it is well known that these medicines can cause an accumulation of visceral fat, especially in the liver. This would explain the fact that women considered as with normal weight present with increased intra-abdominal visceral fat<sup>(23,24)</sup>.

The findings of this study open up great possibilities for further research that may contribute to the management of this population.

Studies investigating whether physical activity helps to keep AF rates within the normal range in patients classified as normal weight are currently being carried out; these studies follow clinical treatment after mastectomy.

## Conclusion

Significant finding of increased AF rates in 40% of the study sample classified as 'normal weight' was unexpected and indicates a tendency in this population.

An assessment of intra-abdominal fat should be included in preventive evaluations of patients with lymphedema after breast cancer treatment.

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