



## Obesity in breast cancer surgery and the development of lymphedema

José Maria Pereira de Godoy, MD, PhD<sup>1</sup> Ana Carolina Pereira de Godoy MD<sup>2</sup>

Livia Maria Pereira de Godoy, MD<sup>3</sup> Maria de Fátima Guerreiro Godoy, OT, PhD<sup>4</sup>

<sup>1</sup>Professor Adjunct of Cardiology and Cardiovascular Surgery Department of the Medicine School in São José do Rio Preto (FAMERP), SP and ), CNPq (National Council for Research and Development) Brazil

<sup>2</sup>Resident of the Pediatrics Unit Intensive Therapy of Santa Casa de São Paulo, Brazil and Research Group of Clínica Godoy, São Jose do Rio Preto, Brazil

<sup>3</sup>Resident of Clinical General in Medicine School of Marilia-FAMEMA-Brazil and Researcher Group of the Clínica Godoy, Sao Jose do Rio Preto, Brazil

<sup>4</sup>Occupational Therapist, professor of the Post-Graduate in Medicine School in São José do Rio Preto (FAMERP) and Researcher Group of the Clínica Godoy, São Jose do Rio Preto- Brazil

### Corresponding Author:

José Maria Pereira de Godoy

Avenida Constituição 1306 São José do Rio Preto,  
Brazil Cep: 15025120

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### ABSTRACT

**Introduction:** Lymphedema of the upper limbs is one of the complications in breast cancer treatment and is associated with risk factors such as axillary surgery, obesity and infection and is chiefly correlated with postoperative radiotherapy and the number of lymph nodes resected.

**Objective:** The objective of the current study was to evaluate the association of obesity with lymphedema after breast cancer surgery.

**Methods:** Ninety patients, randomly selected from the hospital records of a government healthcare clinic in Catanduva-Brazil, who were submitted to the surgical treatment of breast cancer, were interviewed. The inclusion criterion was to have been submitted to breast cancer surgery with axillary lymphadenectomy. The patients' weights and body mass indexes at the time of the surgery were evaluated as was the presence of lymphedema diagnosed by clinical and volumetric criteria. The Fisher's exact test was utilized for statistical analysis, with an alpha error of 5% (p-value < 0.05) being considered significant.

**Results:** The mean age of the patients was 54.8 ± 11.7 years, the mean weight was 69.2 kg ± 12.5 kg and the mean body mass index was 27 kg/m<sup>2</sup>. The body mass index was > 25 kg/m<sup>2</sup> in 60/90 patients, > 30 kg/m<sup>2</sup> in 22/90 and > 35 kg/m<sup>2</sup> in 5/90 patients. Lymphedema occurred in 23/60, 9/22 and 4/5 patients, with p-values of 0.059, 0.049 and 0.001, respectively.

**Conclusion:** Obesity at the time of breast cancer surgery indicates a greater probability of developing lymphedema with the risk increasing together with the body mass index.

**Keywords:** Lymphedema, Breast cancer, Obesity.

### INTRODUCTION

Lymphedema of the upper limbs is one of the complications in breast cancer treatment and is related to certain risks, such as axillary surgery, obesity and infection and is, in particular, correlated with postoperative radiotherapy and the number of lymph nodes resected <sup>(1)</sup>. Approximately 28% of breast cancer survivors evolve into lymphedema which significantly affects the physical, psychological and sexual aspects <sup>(2)</sup>. These individuals can suffer from an increase in the volume,

pain, tension or weight of the affected limb and may eventually become handicapped. Effects on the Quality of Life are observed; however, as this is a non-lethal disease, it receives little attention compared to the other complications of breast cancer treatment <sup>(3)</sup>.

Weight is another aggravate with studies showing that above normal body mass indexes (BMIs) at the time of surgery are associated with the development of lymphedema <sup>(4)</sup>.

The objective of the current study was to evaluate the prevalence and association of lymphedema with breast cancer surgery in women with BMIs above that is considered normal.

**Methods**

Interviews were carried out with patients after breast cancer treatment with the objective of investigating any relationship between lymphedema and BMI at the time of surgery. The patients were randomly selected from the records of a government healthcare clinic in Catanduva, Brazil. After identifying the patients and informing them about the nature of the study, they were invited to participate in this study. This study design was approved by the local Research Ethics Committee. The inclusion criterion was to have been submitted to the surgical treatment

of breast cancer with axillary lymphadenectomy. The weight and BMI at the time of the surgery were evaluated and correlated to development of lymphedema. Prevalence and Fisher’s exact test were used in the statistical analysis with an alpha error of 5% (p-value < 0.05) being considered acceptable.

**Results**

The time between diagnosis and surgery varied between 2 to 141 months with a mean of 47.8 months. The mean weight of the women was 69.2 kg ± 12.5 kg and the mean BMI was 27 kg/m<sup>2</sup> ± 4.4 kg/m<sup>2</sup>. An association was observed between obesity and lymphedema. With BMI greater than 35 kg/m<sup>2</sup>, the prevalence of lymphedema was significantly higher compared to BMIs of less than 25 kg/m<sup>2</sup>, Table 1.

**Table 1. Body mass index (BMI) and patients with lymphedema**

|            | IMC<25 | IMC>25 | IMC>30 | IMC>35 |
|------------|--------|--------|--------|--------|
| Patients   | 30(90) | 60(90) | 22(90) | 5(90)  |
| Lymphedema | 7(30)  | 23(60) | 9(22)  | 4(5)*  |

BMI = Body mass index \* statistically significant using Fisher’s exact test

**Discussion**

The current study showed a significant association between lymphedema and obesity at the time of the surgery, thus, obesity may already be considered a higher risk for the development of lymphedema. It highlights the necessity of greater control of the weight of these patients at any phase of the disease. One publication reported, in a study of 923 women, that infection of the arm and weight gain after the surgery were the only two predictive factors for lymphedema (p-value < 0.001 and p-value = 0.02, respectively) <sup>(5)</sup>. Another study of 245 women confirmed this association considering BMIs greater than 25 kg/m<sup>2</sup> <sup>(6,7)</sup>. A study carried out with 45 women showed a correlation between BMIs of more than 30 kg/m<sup>2</sup> with lymphedema <sup>(8)</sup>. There are few published studies that evaluate this relationship with the sample size of these studies being very important; as the number of patients increased the lowest BMI associated to lymphedema drops.

Thus, the greater the BMI the greater the probability of evolving with lymphedema. The current study

warns about the relationship between obesity at the time of the surgery which is a risk factor for lymphedema. The sample size of the current study is small but highlights this situation. Even so, further studies with larger numbers of patients are necessary which will perhaps better stratify BMI as a risk for lymphedema.

Moreover, it is known that obesity, or at least being overweight, increases the risk of recurrent breast cancer <sup>(9)</sup>. Thus, obesity can contribute to greater complications after breast cancer treatment. <sup>(10,11)</sup>

**Conclusion**

Obesity at the time of breast cancer surgery is associated with a higher probability of developing lymphedema with the risk increasing together with the body mass index.

**Disclosure Statement**

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

## References

- 1-de Godoy JM, Godoy Mde F. Evaluation of a new approach to the treatment of lymphedema resulting from breast cancer therapy. *Eur J Intern Med.* 2013 Jan;24(1):59-62. doi: 10.1016/j.ejim.2012.08.008. Epub 2012 Sep 7.
- 2-Ridner SH. Breast cancer lymphedema: pathophysiology and risk reduction guidelines. *Oncol Nurs fórum.* 2002 Oct; 29(9):1285-93. *Lymphology* 2002 jun;35(2):59-71.
- 3-Pérez Pérez JA, Salem Z C, Henning L E, Uherek PF, Shultz OC. Linfedema de miembro superior secundario al tratamiento de cáncer de mama / Lymphedema of upper extremity secondary to breast cancer treatment. *Cuad. Cir* 2001; 15(1):107-115.
- 4- Johansson K, Ohlsson K, Ingvar C, Albertsson M, Eksahl C. Factors associated with the development of arm lymphedema following breast cancer treatment: a match pair case-control study. *Lymphology* 2002 jun;35(2):59-71.
- 5-Petrek JA, Senie RT, Peters M, Rosen PP. Lymphedema in a cohort of breast carcinoma survivors 20 years after diagnosis. *Cancer* 2001 Sep 15;92(6):1368-77.
- 6-van der Veen P, De Voogdt N, Lievens P, Duquet W, Lamote J, Sacre R. Lymphedema development following breast cancer surgery with full axillary resection. *Lymphology.* 2004 Dec;37(4):206-8.
- 7-Segerstrom K, Bjerle P, Graffman S, Nystrom A. Factors that influence the incidence of brachial oedema after treatment of breast cancer. *Scand J Plast Reconstr Surg Hand Surg.* 1992;26(2):223-7.
- 8-Kopanski Z, Wojewoda T, Wojewoda A, Schlegel-Zawadzka M, Wozniacka R, Suder A, Kosciuk T. Influence of some anthropometric parameters on the risk of development of distal complications after mastectomy carried out because of breast carcinoma. *Am J Hum Biol.* 2003 May-Jun;15(3):433-9.
- 9-McTiernan A. Obesity and cancer: the risks, science, and potential management strategies. *Oncology* 2005 Jun;19(7):871-81; discussion 881-2, 885-6.
- 10-de Fátima Guerreiro Godoy M, Silva EB, de Godoy JM. Bioimpedance to screen for abdominal fat in patients with breast cancer treatment-related lymphedema. *Breast Dis.* 2016 Jul 28;36(2-3):73-6. doi: 10.3233/BD-160215.
- 11-Pereira de Godoy JMP, da Silva SH, Guerreiro Godoy MdF. Interference of the surgical treatment of breast cancer on personal hygiene. *Breast J.* 2008;14(6):607.