

Avaliação da sensibilidade de membros superiores em pacientes com linfedema pós mastectomia radical

Evaluation of upper limb sensitivity in patients with lymphedema after radical mastectomy

Patrícia Greve¹, Karin L. Dalaruvera¹, Fernando B. Benvenuto², Henrique Jorge Guedes Neto³

RESUMO

O objetivo deste trabalho foi avaliar a sensibilidade de membros superiores com linfedema pós- mastectomia radical. Foram avaliadas nove pacientes, com média de idade de 60,7 anos, para verificar se ocorre diferença de sensibilidade entre o membro com linfedema e o membro sem linfedema. Para o teste de sensibilidade foram utilizados 6 monofilamentos de Semmens-Weinstes (modelo de bolso) “sensi kit”. As áreas testadas foram aquelas correspondentes aos dermatômos ligados à distribuição dos nervos ulnar, mediano e radial. Como resultados tivemos que o tempo decorrido desde a cirurgia foi em média de 8,9 anos, e o aparecimento do linfedema ocorreu em média 5,5 anos após a cirurgia. Utilizou-se a estatística não-paramétrica, empregando-se o Teste de Fisher para pequenas amostras, das frequências encontradas. Para cada lado testado evidenciou que a frequência de pacientes que apresentaram sensibilidade no lado acometido foi significativamente menor (0,0045; $p > 0,005$) do que a observada no lado controle, quando testado o Ponto 1, cor verde; não houve diferenças estatisticamente importantes entre os lados avaliados nos demais pontos e cores testados; com relação ao grau de incapacidade, conforme o Ministério da Saúde, não houve qualquer diferença significativa entre os lados acometido e controle em qualquer dos sete pontos testados.

PALAVRAS-CHAVE

sensibilidade, linfedema, monofilamentos.

ABSTRACT

The objective of this work was to evaluate the sensitivity of upper limbs with lymphoedema after radical mastectomy. Nine patients were evaluated, whose mean age was 60.7 years, to verify the presence of sensitivity difference between the limb with lymphedema and the control limb. For the sensitivity test, a six-monofilament Semmens-Weinstes “sensi kit” (pocket model) was used. The tested areas were those that corresponded to the dermatomes connected to the distribution of the ulnar, medianus and radialis nerves. Our results showed that the elapsed time since the surgery was on average 8.9 years and that the onset of lymphedema occurred on average 5.5 years after the surgery. Statistical analysis was non-parametrical and used Fisher’s Test for small samples of the observed frequencies.

For each tested side it was evidenced that the frequency of patients who presented sensitivity in the affected side was significantly smaller (0.0045; $p > 0.005$) than the one observed in the control side, when Point 1, green color, was tested; there were no statistically significant differences between the evaluated sides in the remaining tested points and colors; regarding the incapacity degree, according to the Health Ministry, there were no significant differences between the affected and control sides in any of the seven tested points.

KEYWORDS

sensitivity, lymphedema, monofilaments

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Address all correspondence to:

Rua Joaquim Martins Coelho, 255 - Socorro - Mogi das Cruzes - SP - CEP: 08790-650
Phone: 4796-2965 (home) / 9408- 4838 (mobile) / 4798-2037 (office) - e-mail: patygreve@uol.com.br

¹ Specialists in Neuromusculoskeletal Physical Therapy of Irmandade Santa Casa de Misericórdia de São Paulo Hospital

² Physical Therapists from the Department of Rehabilitation of Irmandade Santa Casa de Misericórdia de São Paulo Hospital

³ Assistant Physician, Head of the Outpatient Clinic of Lymphedema and Angiodysplasia of the Discipline of Vascular Surgery of the Medical Science School of Santa Casa de São Paulo.

Introduction

Breast cancer is one of the most frequent neoplasias among women worldwide. Its incidence has been growing around 1% a year in the last decades¹.

In Brazil, breast cancer is the malignant neoplasia that results in the majority of deaths among women. According to the National Cancer Institute, 234,570 new cancer cases are expected for the year 2006, and 49,000 of these cases are expected to be female breast cancer ones. The radical mastectomy is still the treatment of choice in our country, which can be explained by the difficulty in diagnosing these tumors at an early stage¹⁻⁴.

Due to the increasing incidence of breast cancer associated to the reduction of its mortality rates and the consequent longer survival, a larger number of women have the risk of developing post-mastectomy lymphedema⁵⁻⁷.

Limb lymphedema is defined as the increase of protein-rich fluid in the interstitium, leading to increased volume, weight increase, decreased functional capacity and alteration of the esthetics of affected region⁸. Several factors are determinant for the onset of post-surgical lymphedema, such as: infection, lymphangitis and cellulitis, radiotherapy, obesity, seroma, positive lymph nodes, delayed wound healing, extended axillary dissection, compressive dressings and limb immobilization in the post-operative period⁹.

The limb with lymphedema can make it difficult to perform activities of daily living and work activities, as well as causing emotional alterations such as anxiety, low self-esteem and depression¹⁰.

The increase in interstitial fluid can lead to a possible loss of local sensitivity, due to the compression of peripheral nerves. Therefore, evaluating the sensory system in a quantitative way can be useful to establish the initial process of a sensitive injury¹¹. The test with the monofilaments has been described as one of the most objective tests to evaluate sensitivity¹² and it is the most accurate test to detect an early nervous compression¹³.

Objective

The present study aims at identifying the sensitivity alterations in upper limbs of patients submitted to radical mastectomy and classify the degree of sensitive impairment presented by these patients.

Methods

The study was carried out from June to December 2003 and nine female patients, aged 30 to 80 years, with a mean age of 60.7 years and a clinical diagnosis of post-surgery lymphedema after mastectomy for breast cancer, were prospectively assessed. The patients were followed at the Lymphedema Ambulatory of the Discipline of Vascular Surgery of the Department of Surgery of the School of Medical Sciences of Santa Casa de São Paulo.

The inclusion criteria consisted of patients who had undergone radical mastectomy, aged 21 to 80, and presented controlled basal disease. Exclusion criteria included the presence of peripheral

nervous injury, previous upper limb surgeries, associated shoulder, elbow, wrist and hand pathologies, and grade 3 fibroedema. There was no difference regarding the affected side and time of surgery.

All patients were informed on the aims of the study and signed a free informed consent form. The volunteer participant was assigned a day to attend the Rehabilitation Center of Irmandade da Santa Casa de Misericórdia de São Paulo, Physical Therapy Sector of the Central Hospital.

The patient was informed on the procedure and filled out a questionnaire that included questions regarding time of surgery, time of lymphedema onset, affected side, and whether there was a complaint on loss of sensitivity. After the questionnaire, the volunteer was comfortably seated on chair with dorsal support, with the feet placed on the floor and both upper limbs placed on the table.

For the sensitivity test, a six-monofilament Semmens-Weinstes "sensi kit" (pocket model) was used, made of nylon number 612, 38 mm; it is also known as an extensometer, which exerts a specific force on the tested areas.

The monofilament with the smallest pressure has a calculated force of 0.05 g, equivalent to a normal tactile sensitivity, which is registered as the green color; the second, with a force of 0.2 g, shows decreased sensitivity to a light touch, registered as the blue color; the third, with a force of 2.0 g, shows decreased protective sensitivity, registered as the purple color; the fourth monofilament, with a calculated force of 4.0 g, shows absent protective sensitivity, registered as the red color (closed); the fifth has a force of 10 g (red X) and the last, with a force of 300 g, shows absence of deep pressure sensation and is registered as the black color.

The parameter utilized by the Ministry of Health was used to identify the degree of impairment, in which the perception of the monofilaments of 0.05 g (green), 0.2 g (blue) and 2.0 g (purple) indicate 0 degree of impairment. The absence of perception of the monofilament of 2.0 g (purple) and the perception or absence of perception of the other monofilaments (4.0 g; 10.0 g; 300.0 g) indicates degree of impairment 1.

The tested areas correspond to the dermatomes in line with the distribution of the ulnar, median and radial nerves (Fig. 1), standardized according to the manufacturer's instructions. To perform the test, basically the nylon monofilaments of several thicknesses are pressed until a curvature is obtained against the subject's skin (Fig. 2) and this touch is verbally identified by the subject.

The analysis of the frequencies obtained for each tested point (1 to 7), comparing the affected side and the control side, is carried out by non-parametric statistical analysis, using Fisher's test for small samples¹⁴, setting the significance level at $p \leq 0.05$.

Results

The results showed that 55.5% of the individuals presented a familial history of cancer. The most affected side was the right side, with 5 patients (55.5% of the cases); the time of surgery was on average 8.9 years and the onset of lymphedema occurred on average 5.5 years after the surgery. Most of the patients did not complain of sensitivity alterations.

The statistical analysis of the frequencies found for each tested side (Table 1) showed that: a) the frequency of patients who presented lack of sensitivity in the affected side was significantly lower than the one observed in the control side, when Point 1, green color, was tested; b) there were no statistically significant differences between the assessed sides in the remaining points and colors that were tested.

Even though there was no statistically significant difference between the limbs in the remaining points, it is noteworthy that in points 2, 3, 4, and 5, the frequency of negative perception of the smallest filament was 66.6%, 44.6%, 77.7% and 66.6%, respectively.

Points 6 and 7 yielded false-negative results, as, despite the fact that 100% of the patients reported the non-perception of the green filament in the affected limb, 77% of them did not perceive the filament in the control limb at both points, either.

Concerning the perception of the blue filament, 11.1% of the cases also had a false-negative result in points 2 and 7 and in 22.2% of the cases, in points 1, 3 and 5.

Regarding the degree of impairment, according to the Ministry of Health, there were no significant differences between the control and affected sides in any of the seven points tested (Table 2).

Discussion

At first, it is not possible to make any comparison with the literature on the sensitivity of patients with post-radical mastectomy lymphedema, as there is a lack of studies on such purpose. There are many reports on the assessment of sensitivity in diabetic foot, Hansen's disease, and even breast sensitivity, but there are no reports on sensitivity in lymphedema. Therefore, some considerations on the obtained results will be discussed.

Despite the large age range, only one patient was younger than 45 years, which corroborates the study by Freitas Junior¹⁵ that showed a significant association between the presence of lymphedema and patients' age, reporting that women older than 45 presented a higher risk of developing lymphedema.

Even though there was no significant degree of impairment, the non-perception of the thinnest filaments (green and blue) indicates decreased sensitivity in the hand, with difficulties in epicritical touch and stereognosia¹⁶. The decreased sensitivity for fine discrimination, shape and temperature presented by some patients can lead to functional impairment when one considers the risk of small injuries such as rubbing against rough surfaces and slight burns.

Kissin¹⁷ reports that the post-mastectomy lymphedema causes not only an esthetical injury, but also the functional injury of the

Table 1
 Distribution of the frequencies relative to the presence of sensitivity in the affected side and control side, and "p" value according to Fisher's test

Point tested	Side	Cores											
		Green		Blue		Purple		Red Fch		Red X		Red O	
		+	-	+	-	+	-	+	-	+	-	+	-
Point 1	Affected	0	9	5	4	8	1	8	1	8	1	9	0
	Control	6	3	7	2	9	0	9	0	9	0	9	0
	"p" value	0,0045		0,2443		0,5000		0,5000		0,5000		1,0000	
Point 2	Affected	3	6	6	3	9	0	9	0	9	0	9	0
	Control	6	3	8	1	9	0	9	0	9	0	9	0
	"p" value	0,1419		0,2470		1,0000		1,0000		1,0000		1,0000	
Point 3	Affected	5	4	6	3	9	0	9	0	9	0	9	0
	Control	5	4	7	2	9	0	9	0	9	0	9	0
	"p" value	0,3628		0,3529		1,0000		1,0000		1,0000		1,0000	
Point 4	Affected	2	7	7	2	8	1	8	1	9	0	9	0
	Control	4	5	9	0	9	0	9	0	9	0	9	0
	"p" value	0,2443		0,2352		0,5000		0,5000		1,0000		1,0000	
Point 5	Affected	3	6	7	2	8	1	8	1	8	1	9	0
	Control	6	3	7	2	9	0	9	0	9	0	9	0
	"p" value	0,1491		0,4235		0,5000		0,5000		0,5000		1,0000	
Point 6	Affected	0	9	7	2	7	2	7	2	9	0	9	0
	Control	2	7	9	0	9	0	9	0	9	0	9	0
	"p" value	0,2352		0,2352		0,2352		0,2352		1,0000		1,0000	
Point 7	Affected	0	9	5	4	8	1	8	1	8	1	9	0
	Control	2	7	8	1	9	0	9	0	9	0	9	0
	"p" value	0,2352		0,1323		0,5000		0,5000		0,5000		1,0000	

(+) Sensitivity: present / (-) Sensitivity: absent / Bold = statistical significance

Table 2
 Distribution of the frequencies relative to the degree of impairment, according to the Ministry of Health (Degree 0 and Degree 1), in the affected side and in the control side, and "p" value according to the Fisher's test

Side	Points and degrees of impairment													
	Point 1		Point 2		Point 3		Point 4		Point 5		Point 6		Point 7	
	0	1	0	1	0	1	0	1	0	1	0	1	0	1
Affected	8	1	9	0	9	0	8	1	8	1	7	2	8	1
Control	9	0	8	1	9	0	9	0	9	0	9	0	9	0
"p" value	0,5000		0,5000		1,0000		0,5000		0,5000		0,2352		0,5000	

affected limb. And Woods¹⁰ points out that, as the lymphedema increases, so does the difficulty to perform house and work chores, in addition to pain, discomfort and functional impairment of the affected extremity; the early finding of the lymphedema can spare patients delayed treatment and future complications¹⁸. Other symptoms include rigidity, numbness and decreased range of movement (ROM)^{19,20}.

Even though there is an increase of volume in the affected limb, this fact was not able to cause nervous compression capable of generating a significant sensitivity deficit in the patients from the study. But this could be due to the fact that the pressure exercised by the edema on the peripheral nerves was not enough to cause dysfunction, justified by Hargens et al²¹, who developed a device that increased the fluid pressure in the tissue inside the anterior compartment of the deep fibular nerve. The pressure exercised was around 30 to 40 mmHg and was monitored up to 3 hours after the pressure elevation. They observed that the first sign of neuromuscular deterioration was the gradual loss of sensitivity (the latter, measured through Semmes-Weinstein monofilaments), followed by other symptoms such as reduction in nervous conduction velocity, decreased action potential and motor weakness. They concluded that the pressure threshold that would cause significant dysfunction was not the same for each assessed parameter and that the magnitude of each functional deficit is not always associated to the level of compression.

The small sample size and the presence of false-negative results were limiting factors for our study. Although the Semmes-Weinstein monofilaments are frequently employed in literature to assess sensitivity, they showed to be of limited use, as they yielded false-negative results in 4 of the 7 points that were tested.

Conclusion

We conclude that it is important to assess the sensitivity in cases of lymphedema in order to provide specific advice for each patient to prevent injuries or to be able to achieve an early diagnosis. The Semmes-Weinstein monofilaments allow the quantification of the results of the sensitivity assessment; however, in future studies, it would be interesting to use other instruments for sensitivity assessment, in order to allow the comparison of data between studies. Our results showed no significant difference regarding the degree of impairment, when comparing the affected side to the control side.

Other studies must be carried out in order to identify the level of compression that a lymphedema can exert on a peripheral nerve and whether the latter is at a threshold to cause a sensitivity dysfunction. To increase the sample size, classify the grade of the lymphedema and correlate it to the alterations in sensitivity are desirable in future studies.

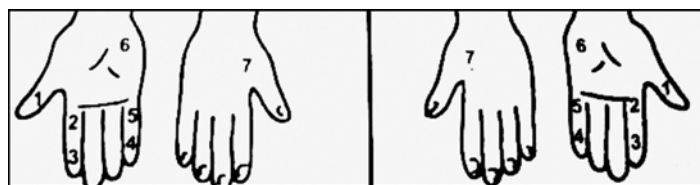


Figure 1
Tested points



Figure 2
Monofilament use

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