Lymphedema of the arm after surgery for breast cancer: new physiotherapy

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Summary

Secondary lymphedema of the upper limb is a complication which can be found in patients who have undergone surgical breast cancer treatment with an axillary dissection. Lymphedema following breast cancer treatment remains a long-term disabling complication which cannot be treated in a decisive and radical manner. The objective of the treatment is to limit complications, to try to preserve the remaining lymphatic system and to develop new anastomosis. It consists of a specific decongestive physiotherapy, which may include a specific lymphatic drainage and skin mobilization, reducing bandages including Mobiderm (Thuasne), and sub-bandage muscular exercises. However variations in the therapy have been recorded by different teams.

Our experience in treating lymphedema in Tunisia takes into consideration the epidemiological, climatic, cultural and socio-economic conditions of the country. The difference in our treatment compared to what is being advocated elsewhere essentially consists of the no muscular exercise while wearing a bandage. This is compensated for by daily domestic activities, by prolonging the first two phases of treatment (the intensive phase and the stabilization phase), and by the use of the hydro gel dressing Hydrosob (Hartmann) to prevent blisters induced by the pressure imposed by Mobiderm studs of the bandage on the skin, and also by the superimposition of two types of Mobiderm bandages (small and large blocks).

Key words: Lymphedema; Breast cancer; Tunisia; Decongestant treatment of lymphedema.

Introduction

Lymphedema is the accumulation of protein-rich lymphatic liquid in the interstitial space, particularly in subcutaneous fat, affecting the secondary lymphoid organs of the upper limb of 14 to 28% of patients who undergo surgical breast cancer treatment by axilliary dissection [1, 2].

Breast cancer is the most common cancer affecting women around the world. In African countries, standardized effects are less than 30/100,000 women [3]. In Tunisia, 17% of women with breast cancer are under the age of 35 years [3]. In this country, the diagnosis is made in most cases at an advanced stage (60% of patients are diagnosed at Stage II or III) [4], leading to invasive surgery of voluminous tumors (4 cm in diameter on average) [3, 4]. This invasive surgical treatment is associated with a large dissection and consequent additional treatments: chemotherapy and/or cobalt radiotherapy. The latter causes different skin symptoms of variable severity: erythema [5], dry dermatitis and exudative dermatitis, and dermal fibrosis which may appear and change over time. These reactions slow down or even offset new lymphatic anastomoses (indeed, they aggravate secondary lymphatic insufficiency with the appearance of post-radiation fibrosis [6]). As for chemotherapy, it is accompanied by a loss of proteins through vomiting, which may generate osmotic problems and lymph retention.

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Lymphedema is due to a combination of these factors accompanying the rupture of the lymphatic system during surgery. Furthermore, other mechanical and biochemical factors should be taken into consideration: surgical drains with protein loss at the surgery site, immobilization of the member after the surgery, lack of follow-up of post-surgery preventive instructions (especially compressive clothing), obesity [7-9], hypertension and diabetes [10].

There are two forms of lymphedema: acute and chronic. The former is often a light form which occurs a few days after the surgery. It is the result of the sectioning of the lymphatics. It can persist for six months before disappearing. The chronic form usually develops 12 months after surgery [6, 10], and is an insidious installation [6], which is not always accompanied by an erythema. Because of its physiopathology, the treatment is difficult. In both acute and chronic cases, the installation of the lymphedema occurs from the proximal to the distal. The bad position of the shoulder favors a stasis posterior of the auxiliary cavity and the shortening of the pectoral high insertion, and thus limited abduction of the shoulder [11]. Lymphedema of the arm is not isolated [12]. It generally starts at the auxiliary cavity. It can also extend to the breast during a conservative treatment, and can even reach the arm and the hand [13].

Lymphedema of the arm resulting from breast cancer treatment remains a disabling [14] chronic [15] complication which does not benefit from radical treatment and

which in the long-term can cause disability. It is then difficult to provide support for long term patients.

We present the details of our use of specific physiotherapy for this pathology.

Materials and Methods

Treatment

The main objective of the treatment is to minimize complications, to try to preserve the remaining lymphatic system and to develop new anastomoses to provide patients with more autonomy and a better quality of life. We stress the importance of hygiene [16-19], as well as specific decongestive physiotherapy. The latter includes specific lymphatic drainage, tissue mobilization, reducing bandages, and finally exercises under bandages.

The treatment should be preceded by questioning the patient about her marital status [2, 17], her living conditions (presence of animals and other possibly harmful factors), details of the history of illness and other examinations and treatments. We stress the importance of radiologic exploration in eliminating all pathologies associated with edema (such as deep thrombophlebitis, recurring metastatic and ganglion extensions) [20]. For patients with a heart deficiency, close monitoring has to be maintained by a cardiologist, since the treatment provokes a liquid surcharge in the heart. The questioning should be followed by a clinical assessment undertaken by the physiotherapist. It should include an inspection (staining loss, hairiness, transverse folds, mycosis, vesicles) [21], palpation (skin temperature, fattening, fibrosis...), assessment of mensurements (with photos); and joint, muscular, sensory and functional checks [1, 13].

In our experience, the treatment of lymphedema is normally done according to the CHARDON-BRAS protocol. It includes lymphatic drainage, tissue mobilization and exercises under bandages [1]. Specific lymphatic drainage (digital pressure with spread fingers) consists of techniques whose aim is neuro-vegetative stimulation of the lymphatic system of the superficial skin. These techniques were developed by Schiltz in 1989 [13]. Tissue mobilization performed by hand is deeper; it consists of gentle transverse and longitudinal stretching which foster slipping of the different underlying skin and muscle tissue layers designed to obtain results for fibrosis or indurate skin [1].

The method of reducing bandages entails the superposition of several types of bandages, as suggested by Leduc and Földi (1980) [1] and, evolved with Chardon toward reducing bandages which are elastic and non-elastic multilayers with Mobiderm [1]. Mobiderm by Thuasne is composed of spaced blocks between two non woven sheets. This structure creates differential pressure between the support area and surrounding area, which produces a shear effect of the underlying skin tissue.

The treatment includes three steps (Table 1). The first one consists of an intensive treatment which lasts 21 days on average. The second is a maintenance phase and stretches over a six-month period, with one session every two days. The last is a weaning phase, and its duration depends on the degree of commitment and autonomy shown by the patient. The band Biflex 16+ supports the drainage all day, even with inactive patients, but needs to be removed at night because at rest it exerts too much pressure.

The intensive treatment is as follows: specific lymphatic drainage for 40 minutes on average at the start of treatment, followed by tissue mobilization and then bandaging. We start with the anti-edema cotton bandage (Figures 2, 5), which protects and reinforces the aponeurosis. This bandage increases drainage during physical effort [1]. We then superimpose the mobilizing Mobiderm bandage, 10 cm x 3 m which comprises blocks 15 x 15 mm (Figure 3). We then superimpose one or two elastic bandages of cotton Flexideal, maintained in place by a compressive Biflex bandage. The latter ensures light compression which facilitates drainage, even in the case of inactive patients. It is important to remove the Biflex (Figure 4) bandage at night since it exerts considerable pressure, particularly with inactivity. All the bandages are placed in spiral covering (1/3, 2/3).

This protocol should be renewed on a daily basis during the intensive phase in order to establish the form of the limb and counterbalance the high pressure at vascular and tissue levels.

The main goal of the maintenance phase is to stabilize the volume reduction. It includes specifically targeted lymphatic drainage whose duration is less than that of the intensive phase. It is associated with tissue mobilization as described above. The bandages recommended by Chardon consist of an inelastic adhesive mounting or strapping [1] to stabilize volume reduction of the lymphedema.

In our practice, we proceed as follows: Since we do not have all the bandages, we use a Medica 315 cotton bandage which is carefully inserted between the fingers (Figure 2) and then wrapped around the arm in tilted circles to avoid a tourniquet effect. Prior to that, we interpose a Hydrosob (Figure 1) [22]: bandage at the elbow. It consists of a gel cushion whose composition includes 60% of water to avoid aggressive friction on the skin at the elbow. We then lay on the Mobiderm 33 cm/1 m pad, which includes small blocks (5 mm x 5 mm) (Figure 6). The Mobiderm 15 mm x 15 mm (Figure 3) is used to reinforce the effect. We finally place the Flexiedial or Biflex (Figure 6) bandage, which is left in place all day. The patient removes the Biflex bandage at night. For this phase, all bandages are in semi-spica (Figure 4 and Figure 5) to the elbow and spiral covering (1/3, 2/3) on the arm, in order to ensure their strength and to increase back pressure.

During the weaning phase, the patient needs to become more autonomous. She should learn how to perform auto-drainage and tissue mobilization from the physiotherapist. No friction should occur when laying the bandages. Chardon recommends [1] wearing a custom made Mobiderm sleeve at night. In Tunisia, since there are no Mobiderm sleeves available, the patient uses bandages which are placed at the end of the day, as in the stabilization phase. The patient should have moderate activity, and the Biflex should be removed before going to bed.

Unlike the Chardon therapy, which includes several phase I and phase II cycles, depending on the evolution of the lymphedema, the duration of the phase I therapy is increased to 21 days and the duration of phase II to six months, without repeating these two phases in recurring cycles.

Diversity of the situations encountered

Different types of situations are encountered which can generally be classified in three large groups according to the appearance of the lymphedema and its association or not with an infection (Table 2). The presentation of the lymphedema determines the therapy for the patient. It should be taken into consideration that the treatment presented above is for lymphedema installed after the end of cancer treatment. The variants of this treatment are presented in Table 2. The variants are either related to the duration of the treatment or its association with antibiotic therapy.

Postsurgery lymphedema is easier to treat since the treatment lasts one to two weeks. It is limited to the drainage and mobilization of the tissue and stretching of open channels, with the

Table 1. — *Steps of treatment*.

Phase	Duration	Frequency	Means		
Attack phase	21 Days	Every day	Lymphatic drainage:	40 mn at the beginning of the treatment	
			Tissue mobilization:	10 min	
			Bandage:	1 cotton Band	During 24h
				1 Plate Mobiderm®	
				1 or 2 Flexideal®	
				1 Band Biflex® 16⁺	
Stabilization phase	Six-month period	1 to 2 days	Lymphatic drainage:	20 mn	
			Tissue mobilization:	10 mn	
			Bandage:	1 hydro gel dressing Hydrosol®	During 24h
				1 cotton Band	
				1 Plate mobiderm®	
				1 Band Mobiderm®	
				1 or 2 Flexideal®	
				1 Band Biflex® 16⁺	
Autonomy phase	Long-term		Autodrainage lymphatic		
			Automobilization		
			Autobandage:	1 cotton Band	End of the day/during the night
				1 Band Mobiderm®	
				1 or 2 Flexideal®	
				1 Band Biflex® 16⁺	

Table 2. — *Variants of treatment according to the appearance of the lymphedema and its association or not with an infection*.

Type of lymphedema	Characteristics	Factors starting & factors of risk	Specificity of the treatment	Results
Lymphedema postoperation	< 3 or 4 cm transient evolution	Surgery Surgical drains Immobilization	Prevention Open string stretching Body's lymphatic drainage Tissue mobilization of the upper limb	Recovery of the volume of arm and mobility in 15 days
Lymphedema installed after treatment of breast cancer	Asymmetry in size and volume of the two limbs Insidious onset Slow Painless at the beginning	Lack of prevention High blood pressure Obesity slow transit/constipation Sedentarity Garments	Preventing complications of the upper limb – Manual lymphatic drainage – Tissue mobilization – Reducing Bandage	Variable recovery Slow Departure of the association of risk factors
Lymphedema following an infectious episode	Sudden increase in the pain volume + infection characteristics (blush heat)	Infection entrance through skin on lymphatic stasis	Antibiotics (6 wks min.) Rest After 6 weeks: – Manual lymphatic drainage – Tissue mobilization – Bandage	Good progress after 21 characteristics

identification of the causes of installation. We stress the need for prevention [16-23]. Lymphedema associated with an infection requires antibiotic treatment. This treatment delays the support by the physiotherapist for six weeks. However, positive results are noticeable after two months of treatment on average.

Discussion

Lymphedema of the upper limb after breast cancer treatment remains an evolving chronic illness which can, over the long term, cause disability. It is induced by the association of several mechanical and biochemical factors which may be overlooked. There are specific anatomical sites which have been found by Kubik [24]. This may explain the appearance or disappearance of different types of postoperative edemas or their delayed appearance. In both transitory and chronic lymphedema cases, the treatment is essentially preventive [16-19]. It is important to trace harmful causal factors [13] in order to adopt the most efficient treatment.

In 2003, support of the lymphedema was the subject of consensual work at the International Society of Lymphology [25]. There were specific recommendations for secondary lymphedema of the arm after breast cancer treatment. The same basic techniques for the treatment were reported by different teams: manual lymphatic drainage, multilayer bandages and muscular activity under bandage. However variations according to the teams were observed.

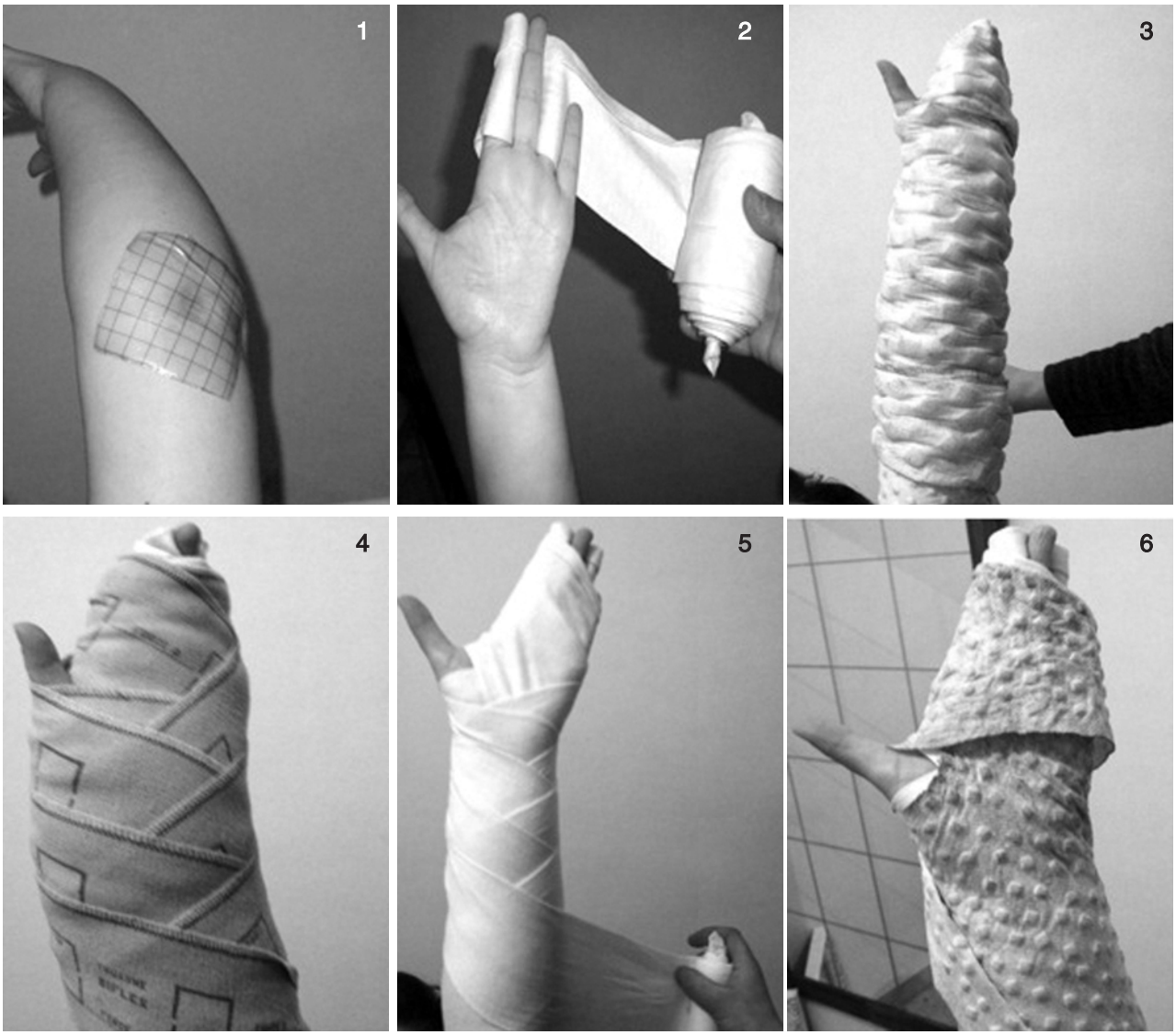

Figure 1. — Interposition of Hydrosob.
Figure 2. — Anti-edema cotton bandage (Medica 315/Gasoni-Sigvaris) application in spiral covering, protecting and reinforcing aponeurosis and increasing the drainage during physical effort (see Figure 5).
Figure 3. — Superimposition of the mobilizing Mobiderm bandage (10 cm x 3 m) with blocks of 15 x 15 mm.
Figure 4. — Superimposed elastic bandage(s) of cotton Flexideal (Thuasne), maintained in place by a compressive Biflex (Thuasne) bandage, facilitating drainage, even in the case of inactive patients.
Figure 5. — Anti-edema cotton bandage (Medica 315/Gasoni-Sigvaris) after removal of Biflex (Thuasne) bandage at night (since it exerts considerable pressure).
Figure 6. — "Final cover" with Biflex (Thuasne) bandage (left in place all day).

The objective of the support is to limit complications, particularly infection [26], to preserve the remaining lymphatic system, and eventually to develop new anastomoses to increase autonomy and the quality of life of the patient over the long term. We note a psychological effect (change of body image) [18] and physical ones (increase in the volume of the limb and a decrease of the force of movement), which result in decreased autonomy.

Specific decongestive physiotherapy elaborated by a physiotherapist is the main element in the treatment of this pathology. It is important to remember that the following treatments should not be applied on the indurated arm [17]:

– Electrotherapy due to risk of burns

– Vacuotherapy on the limb (LPG method or endermology)

– Pulley therapy for compensation and charge risks and articulatory work along a fixed axis.

– Application of all possible sources of heat (infrared, fang therapy, hot pack)

– Use of weights, pumps, resistance exercise, gymnastics.

– Massage of the indured arm which carries a risk of skin distension with a reverse effect on the lymphedema.

It is also important to remember that inadequate treatment may make the lymphedema worse.

Other factors that can reduce efficiency of the treatment: A slow transit (chronic constipation) can prevent good lymphatic drainage.

Tightly fitting clothes (bra, inadequate prosthesis, etc.) which can have a tourniquet effect on return circulation. We stress the importance of physical effort (walking, swimming) to avoid complications resulting from potential stasis in adipose tissue.

For the treatment itself, good daily hydration of the skin is necessary to limit the effects of induced irritation by the Mobiderm blocks. The treatment is only effective when there is muscular contraction. We recommend that the patient uses the arm under bandage in her daily life. Furthermore, there should be good cooperation between the physiotherapist and the patient. The acceptance of the treatment by the patient is greater if the support is personnel and adapted to each case, with rigorous monitoring of the health checks during the different phases of the therapy.

Our experience in the treatment of lymphedema in Tunisia highlights certain modifications when compared to the methods recommended by CHARDON-BRAS. These are mainly due to adaptation to local climatic, cultural and social-economic conditions. Our patients do not necessarily have domestic help and have, therefore, to perform daily domestic activities despite their bandage. This compensates for the lack of muscular exercises under bandage. The ambulatory application of the lymphedema treatment in Tunisia is reduced during the hot months (May to October). Lymphedema is further aggravated by the summer heat. The bandage treatment in these conditions often induces blisters under the Mobiderm blocks on the skin. The frequency of therapy sessions also decreases in summer, and we note an increase of the duration of the first two phases of the treatment, namely the intensive phase and the stabilization phase. In addition, a Hydrosorb bandage is included as a preventive measure.

Finally, we propose a different bandage superposition from that of CHARDON-BRAS. We superimpose two types of Mobiderm (small and large blocks) and recommend a system which is less rigid than the strapping or the sticky non elastic assembly.

In conclusion, the treatment of arm lymphedema after therapy for breast cancer is not entirely uniform and does not follow strict rules. It requires an adaptation approach by the physiotherapist and the patient.

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