Prevention of secondary lymphedema

Ann. Ital. Chir., LXXIII, 5, 2002

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Riassunto

PREVENZIONE DEL LINFEDEMA SECONDARIO

Dopo alcune premesse di ordine fisiopatologico ed anatomo-chirurgico, vengono riportate quelle che sono le principali complicanze della dissezione linfonodale ascellare realizzata per il trattamento del carcinoma mammario.
Viene sottolineato, in particolare, il ruolo della tecnica chirurgica e l'importanza della corretta cura della ferita, oltre che l'opportuna gestione del drenaggio chirurgico nell'immediata fase post-operatoria.
Viene evidenziata, infine, la necessità di una buona conoscenza del drenaggio linfatico non solo della regione mammaria, ma di tutta l'area circostante, al fine di limitare i danni e, quindi, di favorire le vie di drenaggio collaterali della linfa, in particolare per quanto concerne l'arto superiore omolaterale alla patologia mammaria.
Parole chiave: Prevenzione, linfedema, chirurgia.

Abstract

After some preliminary remarks upon pathophysiologic and anatomo-surgical aspects, the main complications of axillary lymph-nodal dissection for breast cancer treatment are reported.
The role of surgical technique is particularly underlined and also the importance of proper management of wound and surgical drainage post-operatively are pointed out.
Author describes, finally, the necessity of an adequate knowledge of lymphatic drainage not only of mammary region, but also of surrounding area, in order to prevent lesions to lymphatic pathways, particularly to those draining upper arm at the same site of breast cancer.
Key words: Prevention, lymphedema, surgery.

I - Introduction

The prevention of lymphedema has been one of the most important points of our clinical research for the last 10 years. This concept was initiated at the International Conference on Microsurgery in Roma in September, 1992. C. Campisi[1], as both a general and oncological surgeon, asked us to assess "the best possible approach" or "the least harmful approach" with respect to the lymph node pool. Since then, active prevention of lymphedema appears to be an objective of most importance for the lymphologist, especially when he is also an oncological and general surgeon.
At various meetings of the Euopean Society of Lymphology (European Group of Lymphology, GEL) or the International Society of Lymphology (ISL)[2, 3, 4], we have presented our viewpoint, which has been gradually refined and even transformed: in the definition of several criteria which shoud be of prime importance for quality of life. Evaluation of this quality of life remains a subject of high concern for the lymphologist. Therefore, we urge our different health car colleagues to strive not only to cure the patient's cancer, but to do this with the fewest sequelae possible and the smallest possible degree of impairment.

II - Plan for prevention of lymphedema

In light of developments in our thinking, prevention of lymphedema appears to have 3 stages, three stones which represent the history of concepts of prevention and their evolution[5].

A - *First Stage*

This consists of giving the right advice to a patient who has recently undergone surgery with axillary or ingui-

nofemoral lymph node dissection – lymphadenectomy – or who has undergone radiotherapy to the same areas of the body. These preventive measures are common knowledge. "Don't cut yourself, don't burn yourself, don't prick yourself, don't have an intravenous injection in the side affected by the lymphedema, and don't have your blood pressure taken on that same side. "Injuries which are particularly likely to trigger lymphedema are scratches from rose bushes (prickly throns) and cats (tiny scratches which go unnoticed).
In the minds of over 95% of health care professionals in France, those advices represent the extent to which preventive measures can be taken. These preventive measures are necessary, and it would be a mistake not to present them to the patient, and to inform him or her that some changes in his life are necessary and that a member of precautions must be taken. However, this approach, has no real efficacy with regard to the apparition of lymphedema.

B - *Second stage*

This stage is aimed at limiting the extent of lymphedema when if develops[5]. This approach is based on the following:

1) *Conservative management of lymphedema* combining several physical techniques, as described in our previous papers or by a large number of authors. However, it is usefull to remember our point of view in this context. Conservative management combines 3 basic concepts in time and space:

– *Intensive* therapy in a specialized treatment unit for lymphedema for a duration of 7 days, 2 weeks, or 3 weeks every year or every 2 years at most (this depends, of course, on the severity of the lymphedema).

– *Lifelong* out patient treatment for continuation of this therapy by a physical therapist experienced in the techniques of edema treatment and who has received training in a respected school of physical therapy. All of this is monitored by the patient's family physician and by a specialist physician. The frequency of such sessions depends on the importance of the lymphedema: one to two sessions a week if lymphedema is moderate or extensive, one session at most if it is moderate. The wearing of a compression bandage is mandatory (except at night and of course in certain exceptional circumstances) so that the patient can become accustomed to it.

– *The patient* him – or herself, who participates in therapy, accepts the preventive measures described above, and takes peculiar attention to avoide two main dangers: an obsessional approach (always wanting more) or abandonment (not accepting the "price to paid" for treatment of lymphedema). This third aspect of treatment is a basic consideration. The patient, of course, has to accept the fact that the affected limb will never be the same as it was before, but he must accept that to achieve a good result, treatment must be continued for life. This means accepting that in his daily schedule there will always be 1 hour a day which is automatically set for treatment of lymphedema. This "daily hour" consists of: physical therapy performed twice a week, travel time, time for making appointments, hospital in patient treatment, out patient consultations, etc. Every patient with a chronic condition must be prepared to sacrifice part of his time for his disorder.

2) *Antibiotic prophylaxis with Penicillin* in long-term treatment (pencillin V benzatine or penicillin G benzatine) o prevent episodes of dermato-lymphangioadenitis; such episodes are very harmful and cause a substantial loss of the body's lymphatic resources. During each episode, the patient looses part of the lymph node system, and consequently the lymphedema worsens. The patient is thus even more exposed of acute episodes of lymphangitis, and vicious circle happens.

C - Third stage

This is the only good approach and should be used in 1999. We presented it at the International Congress of Lymphology held in Madrid 5 years ago (September 1997) and in Genoa in 2001 and in this case, the medical team must keep in mind that prevention of lymphedeam starts before any treatment of the disease. This therapy may or may not be linked to the cancer, since, in a considerable number of cases, cancer is not present in the initial stage.

1) *Before surgery or radiotherapy*

It is necessary to choose the most conservative approach possible. The approach should be as atraumatic as possible, and should involve mutilating surgery only if there is an absolute need to do so and if the patient's malignancy so requires. Many cases have been observed, for example, of inguinal femoral lymph node dissection in observation of a very large and sometimes painful adenopathy, when, in fact, it was only a case of simple adenitis. The surgeon performed a wide lymphadenectomy and the patient paid the price of lifetime secondary lymphedema. The same etiological circumstances are observed in the case of hernias, which in fact are large adenopathies. The concept by Desprez-Curley must be kept in mind: we should no longer perform an imme-

diate biopsy on inguinal lymph nodes, which are the source of major concerns. The physician should follow indications for treatment precisely and avoid unjustified surgery or irradiation[6].

2) *During surgery or radiotherapy*

Here too, one should try to choose the most conservative approach possible. For example, in the case of axillary lymph node dissection, until recently it was necessary to perform surgical removal of the entire cellulo-adipose content of the axilla, which includes the entire axillary lymph node center, as described by Caplan[7] and which we have described[8]. However, it was necessary to remove only this cellulo-adipose tissue structure from the axilla and thus to stop at Berg's second level[9]. Berg's classification has prevailed in all oncology manuals, even though it was conceived some time ago and it is not based on any anatomical studies:

- Attempt to perform a very cautions hemostasis and also lymphostasis of each collecting lymphatic vessel with a clip or surgical knot.
- Optimize the Mascagni-Sappey pathway: this essential pathway of elimination, this major emunctory, this "short cut" which has been known for at least 200 years but disdainfully ignored by many. It is an essential shunt pathway for lymph in a patient deprived of the axillary lymph node center. Similarly, the posterior scapular pahtways of Caplan and Leduc or any tricipital lymph node formations must be protected.
- Insert one or two small Redon drains to prevent formation of a postoperative lymphocela.
- Encourage the protection of the Mascagni-Sappey pathway by radiotherapists who should place a lead protective cover at this level.

3) *After surgery*

Gentle and progressive physical rehabilitation of the patient's arm started very early is acceptable in itself. No lymphatic drainage, nor treatment of lymphedema, is required if there no longer is any lymph flow. Indeed, in our statistics, over half the women patients who present with postsurgical, post-radiotherapy lymphedema in the arm have in their previous medical history either the formation of a lymphocela, lymphorrhea, or a lymphatic fistula which was drained for several weeks with repeated needle punctures.

III - Materials and methods

Our Center for treatment of edema, which has been operating since 1985, had treated 930 different patients up to December 31, 2001. Eighty of them presented with an appreciable inflammatory component, and increasingly frequent episodes of lymphangitis. We attempted to determine what feature characterized this group of women patients and why some patients who were operated on by the same surgeon and were given radiotherapy by the same medical team developed lymphedema and others did not. We thus thought to examine all of the medical records to see whether the development of manifest lymphedema was really a question of chance.
The questions we asked were:
"Why does lymphedema develop?"
"Or rather, why doesn't lymphedema always develop?"
The latter appears to be the best question, because when axillary lymh nodes are removed, as has been done and is still done, and radiotherapy performed, we are sometimes surprised to see that the patient does not have lymphedema. Currently, there are still many patients who do not develop lymphedema.
In cases of sudden development of lymphedema or an acute episode of lymphangitis, it is necessary to eliminate the progressive recurrence of cancer, whether it be breast or pelvic cancer. This is done relatively simply by a clinical examination, ultrasonography, or CT scan and measurement of tumor marker levels.

IV - Results

We compile three types of observation in our 95 patients:

1 – Surgical complications very often marked the post-surgical follow-up: lymphatic fistula, lymphocela, multiple needle punctures, lymphorrhea, or infection, requiring several weeks or months of care to cicatrisation.
Healing is obtained of course at the price of formation of many axillary or inguinal femoral adhesions, which prevent proper lymphatic circulation.

2 – A finding with which we were impressed was the presence of fairly fresh or recent scars, either surgical or as the result of radiotherapy in two very well-defined areas:
– the deltopectoral region: Mascagni-Sappey delto-pectoral pathway, and Leduc and Caplan's posterior scapular pathway. The surgical incisions were made, or X rays performed, during cancer treatment by a medical team which unfortunately appeared to be uninformed of the advances made in lymphological science. Furthermore, we were offen surprised to observe just below the clavicle, at the end of the Mascagni-Sappey pathway, the existence of scars also observed a type of desperate radiotherapy with concentration of skin reference points in the subclavicular area, precisely at the end of the Mascagni-Sappey pathway, in the final part of the deltopectoral pathway. Close examination of all of these patients sometimes reveals these "criminal" 3 – skin reference points, centering with associated redness of the skin.

3 – The presence of previous scars in the above mentioned region: this is much more complex because the patient is completely unaware of what occured, and even more difficult if he or she makes little effort to remember. The patient may even become exasperated if pressed, since he/she is there for treatment of lymphedema; not to discuss minor procedures performed 20, 30, or 40 years before. However, with patience and determination, it may be possible, if not immediately, at least at the second consultation, to determine the origin of the incision. In 2 our of 3 cases, it involves a dermatological lesion, eg, nevus, sebaceous cyst, etc. In one third of cases, it often involves an ordinary traumatic cause. In any case, by misfortune, this dermatological lesion or trauma, 30 years before the development of cancer, has damaged the Mascagni-Sappey pathway. To keep things in proportion, certainly the same type of reasoning should prevail in the mind of someone who has undergone a stripping procedure for varicose veins at an earlier age, and who is confronted with the need for coronary artery bypass grafting 20 or 30 years later. In both cases the patient has lost a "spare part".

V - Summary

In answer to the question "why does lymphedema develop in one patient and not in another?", we feel that the answer lies in the intersection of two determinisms.

1 – Surgical destruction and/or radiotherapy of the axillary or inguinal femoral lymph node center, which is logical for treatment of malignancies.

2 – The presence of a wound in the major compensatory pathway for lymphatic drainage of this limb, whether the wound is recent or old (Mascagni's pathway for the upper limbs).
The first context is absolutely necessary but not sufficient for formation of lymphedema, the second one makes this assumption sufficient.
The combination of the two leads lymphedema in 100% of cases, all the more when there were post-surgical complications.

VI - Future prospects

For a little over 3 years, the promotion of less extensive lymph node dissection in certain well-circumscribed T1 or T2 types of breast cancer, removing only the external thoracic sentinel lymph nodes, makes it possible to foresee a reduction in postsurgical lymphedema. Similarly, promotion of the concept of axilloscopy, enabling liposuction of a cellular adipose formation from the armpit, leaving only lymph nodes for which a lymphadenectomy is performed, are good ideas perhaps. However, they fit in well with the lymphologist's obsession, which is active prevention before any therapy.

VII - Conclusions

The occurrence of lymphedema is not a question of luck or fate. It occurs logically, and requires the combination of two destructive approaches:
– one which can be considered positive because it is directed against malignancy,
– the other, which is negative, harmful and totally unnecessary;

It is against this latter approach that the lymphologist must seek to promote the concept of ACTIVE PREVENTION as far as possible.

References

1) Pissas A.: *The conservative treatment of lynphedema and its relationship to surgical procedures.* International Congress of European Society of Microsurgery. Rome, 26-29 september, 1992.

2) Pissas A., Dautheville E., Bitar H., et al: *Is the surgeon guilty in the apparition of lymphema?* XIXth GEL Congress, San Sebastian, October, 1994.

3) Pissas A., Dautheville E.: *Prevention of lymphedema.* XXIst GEL Congress, Rome, May, 1996, EJRLP, 6:1, 1996.

4) Pissas A.: *Prevention of secondary lymphedema.* International Congress of Phlebology, Corfù, September 1996.

5) Pissas A., Dautheville E., Robert J., et al.: *Physical treatment of lymphedema: what is the precise mission of each partner?* XVIth International Congress of Angiology, Paris, September 1992.
Abstracs in Vascular Medecine. Excerpta Medica, 469-470, Amsterdam, Elsevier, 1993.

6) Desprez-Curely J.P.: *Ne biopsiez plus d'emblée les ganglions inguinaux.* Nouv Press Med, 1391, 1997.

7) Caplan L.: *Lymphatic drainage of the mammary gland based on 300 cases.* Anat Clin, 4:329-335, 1982.

8) Pissas A., Rodriguez E., Andriason F., et al.: *A new surgical conception of clearing out the axilla.* EJLRP, 2:100-109, 1991.

9) Berg J.W.: *The significance of axillary node levels in the study of breast carcinoma.* Cancer, 8:776, 1955.

10) Caplan I., Leduc A.: *Le drainage lymphatique du membre supérieutr vers la région scapulaire postérieure.* VIIIth International Congress Lymphology, Montreal, September 1981.

11) Pissas A., Laporte S., Khatib M.O., Dubois J.B.: *Prevention of lynphedema: some paradoxal situations. (Hazard or fatality?).* Proceedings of the 16th International Congress of Lymphology, Madrid, Spain, September 22-27. Progress in Lymphology, XVl, 506-510, 1997.