CIRUGÍA ESPAÑOLA

www.elsevier.es/cirugia

Special article

Reduction mammaplasty in breast cancer surgery

Fernando Hernanz de la Fuente,[a,*] *Manuel Gómez Fleitas,*[a] *and Francisco Martínez García*[b]

[a]*Servicio de Cirugía General, Hospital Universitario Valdecilla, Santander, Spain*
[b]*Sección de Patología Mamaria, Asociación Española de Cirujanos, Madrid, Spain*

ARTICLE INFORMATION

Article history:
Received October 1, 2007
Accepted July 8, 2008
On-line March 5, 2009

Keywords:
Mammaplasty
Oncoplastic surgery
Breast cancer

Palabras clave:
Mamoplastia de reducción
Cirugía oncoplástica
Cáncer de mama

A B S T R A C T

Reduction mammaplasty techniques enable the breast cancer surgeon to provide an integral surgical treatment, thus significantly increasing and improving surgical options. These techniques are used to correct problems after the conservative treatment of type 1 breast cancer and to achieve symmetry between the breasts after mastectomy. They are also the basis of cosmetic reconstruction techniques in conservative oncoplastic surgery.
© 2007 AEC. Published by Elsevier España, S.L. All rights reserved.

Mamoplastia de reducción en la cirugía del cáncer

R E S U M E N

El conocimiento de las técnicas de mamoplastia de reducción habilita al cirujano dedicado al cáncer de mama para realizar un tratamiento quirúrgico integral, con lo que se amplían y mejoran, de un modo importante, las opciones quirúrgicas. La mamoplastia de reducción, técnica utilizada para el tratamiento de las secuelas de la cirugía conservadora del tipo I de la clasificación de Clough, completa el proceso de reconstrucción mamaria tras mastectomía con la simetrización de la mama contralateral y es la base de las técnicas de remodelación en la cirugía oncoplástica conservadora.
© 2007 AEC. Publicado por Elsevier España, S.L. Todos los derechos reservados.

Introduction

In the last few decades, surgical treatment of breast cancer has evolved decreasing the extension and radicalism of surgical resection, however, at the same time, the complexity of the surgical techniques used has increased. The variety of techniques has also increased, significantly, incorporating plastic surgery techniques that make immediate breast reconstruction surgeries and conservative oncoplastic surgeries possible.[1]

Surgeons specialized in the treatment of breast cancer should understand and work with different surgical options and offer the technique or the techniques that are most adequate for the optimal treatment of the tumour in the affected patient. At present, breast cancer surgery is an individualized surgery, a "customized" surgery.

Of the different plastic surgery techniques used in the integral treatment of breast cancer, the reduction mammaplasty (RM) is, possibly the surgery that gives us the

*Author for correspondence.
E-mail address: cgdhff@humv.es (F. Hernanz de la Fuente).
0009-739X/$ - see front matter © 2007 AEC. Published by Elsevier España, S.L. All rights reserved.

widest field of action, understanding it and knowing how to handle it will allow us to:

1. Treat the cosmetic aftereffects from conservative surgery.
2. Complete the mammaplasty reconstruction in patients with asymmetry in their other healthy breast.
3. erform conservative oncoplastic surgery by means of the therapeutic mammaplasty (TM).

In this article we will analyse these issues and present various arguments in favour of the incorporation of the RM in the list of services offered in breast units. A recent survey carried out in the United Kingdom proves that lack of experience is the main reason that surgeons do not offer partial mastectomies with immediate reconstruction to their patients.[2]

Treatment of the cosmetic aftereffects of conservative surgery

Although the majority of patients with breast cancer treated with conservative surgery are satisfied with the results of the treatment, it is important to point out that around 30% present cosmetic aftereffects, breast asymmetry being the most frequent.[3]

Clough et al[4,5] classify the aftereffects in 3 types (Table 1). This classification seems useful to us as it relates the type of aftereffect with the surgical technique to be used to repair it. The type 1 aftereffect, the most frequent (the general aspect of the breast that was operated on is maintained, there is no deformity but there is breast asymmetry of the breast that was operated on compared to the contralateral healthy breast), includes the reduction of the contralateral breast by means of an RM technique. According to our experience, some women with type 2 aftereffects (the breast that was operated on presents important deformity that can be corrected without needing to undergo a mastectomy) also selected, as a single treatment, the reduction and symmetry of the contralateral breast for 2 reasons: to avoid the complexity of the myocutaneous flap technique, that is necessary to repair the defects in the operated breast, and to consider that the asymmetry altered their quality of life more than the deformity of the operated breast.

Table 1 – Classification of secondary cosmetic aftereffects caused by conservative breast cancer surgery proposed by Clough et al[4]

Type 1. The general aspect of the breast that was operated on is maintained, there is no deformity but there is breast asymmetry, in shape and/volume, of the breast that was operated on compared to the contralateral healthy breast
Type 2. The breast that was operated on presents an important deformity that can be corrected without needing to undergo a mastectomy
Type 3. The breast deformity is so important that the breast tissue conserved cannot be preserved, the only option to re-establish the breast shape and symmetry is with mastectomy and immediate breast reconstruction

In Figure 1, 2 patients with type 1 and 2 aftereffects are shown. Figure 2 shows the treatment of the patient with type 1 aftereffect.

A special situation (Figure 3) is when a patient treated with conservative surgery presents a type 1 aftereffect and therefore wants to reduce the volume and weight of her breasts to alleviate the symptoms that cause her breast hypertrophy or gigantomastia. We must point out that the best option would have been to perform a TM given that it would avoid the poor cosmetic results which are more frequent in patients with macromastia,[6] and it also offers clear oncology benefits.[7] Faced with this situation, as an alternative, we can offer a bilateral RM, alerting the patient that the reduction of the radiated breast has a greater risk of complications.

Although the number of patients treated for aftereffects is not very high, Clough et al[5] have treated 85 patients in a period of 10 years, and it seems that the consultations for said motive are more and more frequent, as well as the number of patients that accept corrective treatments.

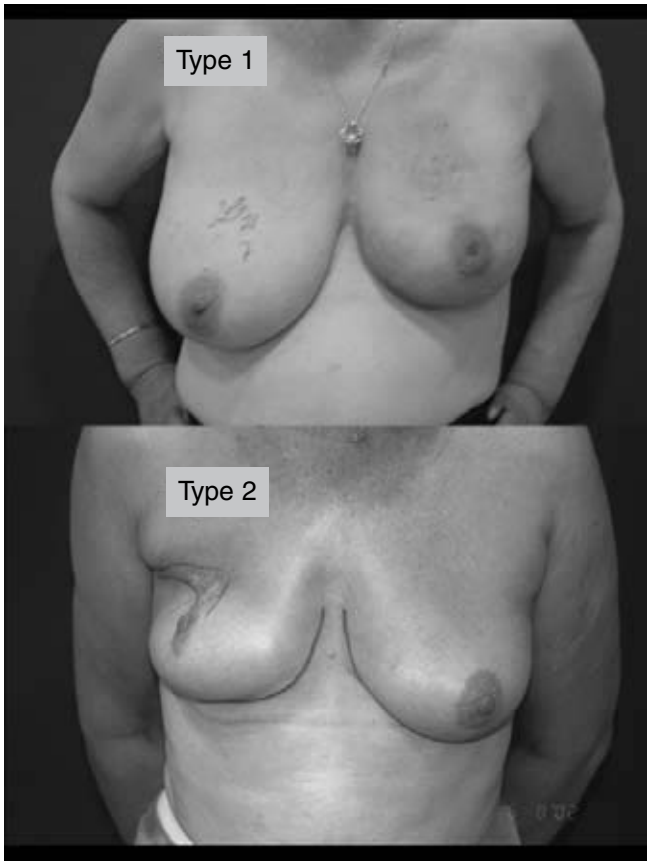

Figure 1 - Type 1 and 2 aftereffects of the conservative surgery of breast cancer according to the Clough classification.

Figure 2 - Breast asymmetry, an aftereffect of the conservative surgery of breast cancer, treated by means of the reduction of the contralateral breast.

Figure 3 - Type 1 aftereffect in a patient with hypertrophic breasts treated with a bilateral breast reduction.

Symmetrisation of the contralateral breast in breast reconstruction

There are few occasions where breast reconstruction is limited to recreating a breast imitation without modifying the healthy contralateral breast, such as, for example, the cases of reconstruction with a TRAM flap that allows us to recreate a voluptuous and ptosic breast, as well as in those where the healthy breast is small and non-ptosic, or when the patient does not want to have their healthy breast operated on.

The need to intervene in the contralateral breast is usually due to the presence of asymmetry. To correct the asymmetry in the contralateral breast, we may need to increase the projection of the breast, lift the nipple-areola complex or perform a reduction, the last one being the most frequent situation. The RM may be performed in the same surgery to treat the tumour or in a second surgery, which is more frequent.

Figure 4 - Second time differed breast reconstruction by means of the expansion-prosthesis method. Results after changing the expander to an anatomical prosthesis and reduction mammaplasty of the left breast to achieve symmetry.

In Figure 4, a breast asymmetry presented by a patient is shown, after the period of expansion is finished, and its correction in a second surgery after the reconstruction by means of expansion-prosthesis.

Therapeutic mammaplasty

The term TM was invented by McCulley et al[8-10] that apply it to the use of the RM in the oncology treatment of breast cancer; however, we believe that it should be called an onco-therapeutic mammaplasty,[7] as the breast reduction performed on a patient with a gigantomastia is therapeutic because it treats the damaging effects that said condition causes for the patient.

The first description of the treatment of breast cancer using a breast reduction technique is from Clough et al,[11] in 1992, where they treated 16 patients with localized tumours in the inferior pole of the breast. In 1993, Shestah et al[12] published the use of the breast reduction for the treatment of 4 patients with macromastia and breast cancer. Since then, publications have come out in a growing number in the last few years, which reflects the increase of its use.[13-26]

In short, we can confirm that the use of the TM has broadened the indication of conservative surgery for centrally localized tumours and for patients with gigantomastia and breast cancer; these situations, considered relative contraindications for conservative surgery, were frequently treated with a mastectomy.

The advantages of this oncoplastic surgery are not only oncological but functional and cosmetic. Regarding the treatment of tumours, the TM facilitates the performance of a broad partial mastectomy, with free and generous surgical margins, larger than those obtained by means of a simple tumourectomy. Intervention in the contralateral breast, by means of a histopathological study of the tissue removed, allows us to evaluate said breast and to discover occult lesions, aside from the possible risk reduction of the growth of a second tumour. The reduction of the volume of the breast affected by the tumour facilitates a better radio-therapeutic treatment with a decrease in the area to be treated and with a more homogenous distribution of the doses.

Regarding the functional advantages, the reduction of both breasts will improve symptoms, such as the overloading of the shoulders, cervical pain, intertrigo, etc, all related to the macromastia, in the case that they are in the moment of the diagnosis of cancer, or it will avoid its appearance, in the case that it has not yet developed.

The cosmetic results will be better by avoiding asymmetries and post-surgical deformities of the breast affected by cancer and, furthermore, the side-effects of the radio-therapeutic treatment of a hypertrophic breast.

If we compare this alternative with the mastectomy with reconstruction or conservative surgery with radiotherapy, the balance is clearly favourable, as the procedure is much simpler, safer, faster and may achieve better cosmetic results. In Figure 5, a patient is shown with a centrally-located carcinoma (retroareolar) treated by means of a central quadrantectomy and remodelling.

Discussion

Oncoplastic surgery, a term created by Audretsch et al[27] in 1998, has progressively been more and more accepted and the number of centres that perform said surgery is growing.

The oncoplastic techniques rigorously comply with the oncology surgical requirements, they enable us to perform broader anatomical breast resections with greater free surgical margins and with a lower percentage of reinterventions because of affected margins compared to those performed with conventional conservative surgery.[28-30] Rietjens et al[31] report the long-term oncology results of the oncoplastic surgery performed on 148 patients, and they demonstrate that they are the same as those from conventional conservative surgery; this study and the previous study by Clough et al[18] resolve the deficiency of data about the oncology results of said techniques.[32]

We cite Giacalone et al[30] that confirm: “one day soon the oncoplastic surgery will be the standard for conservative surgery in breast cancer”; however, for this prediction to become a reality, the surgeon responsible for the treatment of

Figure 5 - Central quadrantectomy for retroareolar infiltrating ductal cancer. Early results and results after finishing radiotherapy; although the patient has gained weight, breast symmetry is maintained.

breast cancer must be able to successfully face the challenge of oncoplastic surgery. This is done in 2 ways, by a complete surgeon, trained in both oncology and reconstruction techniques, or by a double team, created by an oncology surgeon and a reconstructive surgeon.

The complete surgeon is a more efficient and practical model, used in European centres,[7,13,18,21,25,27,30] and is the only possible option when a plastic surgeon is not available as is the case in many hospitals and even in breast units (the plastic surgeon is not a required member according to the recommended requirements of the EUSOMA[33]).

The double team, the most common model in America, where the oncoplastic surgeon has not reached the same level of acceptance as in Europe, requires good communication between both surgeons for this to be feasible. In this interdisciplinary model, the cooperation between the 2 specialists is essential, requiring more than their sequential intervention, and it is highly recommended that the oncology surgeon has had special training in plastic techniques for breasts that enable him or her to anticipate which patients may need oncoplastic techniques, to avoid poor aesthetic results, as well as a good understanding of the RM techniques to use the reduction protocol as treatment for tumours and avoids, in the ablative process, damaging the pedicles and negatively affecting remodelling.

As it is shown, in both models the oncologist surgeon must have experience in oncoplastic techniques.

In the United Kingdom, a program to teach oncoplastic techniques was created 4 years ago and at the end of 2006 some 36 surgeons had completed the program.[34] In Spain, the Spanish Surgeon Association initiated in 2002 various courses on breast reconstruction and oncoplastic techniques that are given on a bi-annual basis; also, in an informal and spontaneous manner, we have established a program to view national centres that use techniques of breast reconstruction and oncoplastic surgery.

Table 4 – Indications for a breast reduction in our department

Gigantomastias (the need to remove 1500 g or more from each breast)
Ptosis with average sternum-nipple line distance >33 cm
Trauma problems of the cervical column and scapulohumeral girdlea
Serious psychological problems[a]

[a]These require a medical report from a specialist.

We believe that the incorporation of the RM to the list of services of the breast units, or to the surgery departments in charge of the surgical treatment of breast cancer, would reinforce the educational programs and would accelerate the achievement of the goal to create “complete breast surgeons.”

The incorporation should be done with strict selection criteria where the goal to treat an illness (the damaging consequences caused by hypertrophic breasts) should take precedence over the achievement of aesthetic results. In Table 2 we show the criteria that we demand to be included in the waiting list. The breasts that we reduce are voluptuous, with an average of tissue removed per breast greater than 650 g. A specific informed consent for the procedure and extensive information are essential requirements to avoid the feared subsequent complaints.[35]

Figure 6 - Patient with breast asymmetry caused by a large-sized hamartoma (530 g) that was removed by means of a reduction mammaplasty.

The RM is the key that opens the door to a new breast cancer surgery, its incorporation in the list of services entails the improvement of the treatment of patients with breast neoplasias, although that is not its purpose, since it increases the surgical skill of the surgeon with local flaps, breast tissue, sutures, etc, and it enables him or her to confront the challenge of oncoplastic surgery and the procedures of breast reconstruction.

In addition to this, its use, as a way to treat large-sized benign neoplasies,[36-39] allows the removal of these tumours and the posterior remodelling of the breast in the same surgical act, which results in a normal and symmetric breast. In Figure 6 the treatment of a large hamartoma is shown by means of a mammaplasty technique.

In our opinion, the advantages presented are greater than the inconveniences that its incorporation entails, such as the creation of a waiting list and the consumption of surgical time that these techniques require.

REFERENCES

1. Cheung PSY. Evolution of surgery in the treatment of breast cancer. Ann Coll Surg. 2003;7:24–9.
2. Rainsbury RM, Paramanathan N. UK survey of partial mastectomy and reconstruction. Breast. 2007;16:637–45.
3. Bajaj AK, Kon PS, Oberg KC, Miles DAG. Aesthetic outcomes in patients undergoing breast conservation therapy for the treatment of localized breast cancer. Plast Reconstr Surg. 2004;114:1442–9.
4. Clough KB, Cuminet J, Fitoussi A, Nos C, Mosseri V. Cosmetic sequelae after conservative treatment of breast cancer: classification and results of surgical correction. Ann Plast Surg. 1998;41:471–81.
5. Clough KB, Thomas SS, Fitoussi AD, Couturaud B, Reyal F, Falcou MC. Reconstruction after conservative treatment for breast cancer: cosmetic sequelae classificacion revisted. Plast Reconstr Surg. 2004;114:1743–53.
6. Cardoso MJ, Cardoso J, Santos AC, et al. Factors determining esthetic outcome after breast cancer conservative treatment. Breast J. 2007;13:140–6.
7. Hernanz F, Gómez Fleitas M. Mamoplastia oncoterapéutica. Una opción adecuada en la paciente con cáncer de mama y gigantomastia. Cir Esp. 2007;82:46–9.
8. McCulley SJ, Macmillan RD. Planning and use of therapeutic mammoplasty—Nottinghan approach. Br J Plast Surg. 2005;58:889–901.
9. McCulley SJ, Macmillan RD. Therapeutic mammaplasty-analysis of 50 consecutive cases. Br J Plast Surg. 2005;58: 902–7.
10. McCulley SJ, Durani P, Macmillan RD. Therapeutic mammaplasty for centrally located breast tumors. Plast Reconstr Surg. 2006;117:366–73.
11. Clough KB, Baruch J. Plastic surgery and conservative treatment of breast cancer. Indications and results. Ann Chir Plast Esthet. 1992;37:682–92.
12. Shestah KC, Johnson RR, Greco RJ, Williams SL. Partial mastectomy and breast reduction as a valuable treatment option for patients with macromastia and carcinoma of the breast. Surg Gynecol Obstet. 1993;177:54–6.
13. Laxenaire A, Barreau-Pouhaer L, Arriagada R, Petit JY. Role of immediate reduction mammaplasty and mammapexy in the conservative treatment of breast cancers. Ann Chir Plast Esthet. 1995;40:83–9.
14. Smith ML, Evans GR, Gurlek A, Bouvet M, Singletary SE, Amez FC, et al. Reduction mammaplasty: its role in breast

conservation surgery for early-stage breast cancer. Ann Plast Surg. 1998;41:234–9.
15. Newman LA, Keurer HM, McNeese MD, Hunt KK, Gurtner GC, Vlastos GS, et al. Reduction mammoplasty improves breast conservation therapy in patients with macromastia. Am J Surg. 2001;181:215–20.
16. Stolier A, Allen R, Linares L. Breast conservation therapy with concomitant breast reduction in large-breasted women. Breast J. 2003;4:269–71.
17. Spear SL, Pelletiere CV, Wolfe AJ, Tsangaris TN, Pennanen MF. Experience with reduction mammaplasty combined with breast conservation therapy in the treatment of breast cancer. Plast Reconstr Surg. 2003;111:1102–9.
18. Clough KB, Lewis JS, Couturaud B, Fitoussi A, Nos C, Falcou MC. Oncoplastic techniques allow extensive resections for breast conserving therapy of breast carcinomas. Ann Surg. 2003;237:26–34.
19. Chang E, Johnson N, Webber B, Booth J, Rahhal D, Gannett D, et al. Bilateral reduction mammoplasty in combination with lumpectomy for the treatment of breast cancer in patients with macromastia. Am J Surg. 2004;187:647–50.
20. Goffman TE, Scheneider H, Hay K, Elkin DE, Schnarrs RA, Carman C. Cosmesis with bilateral mammoreduction for conservative breast cancer treatment. Breast J. 2005;11:195–8.
21. Acea-Nebril A, López S, Cereijo C, Bazarra, País P, Uriarte I, et al. Impacto asistencial de las técnicas oncoplásticas conservadoras en un programa quirúrgico para enfermas con cáncer de mama. Cir Esp. 2005;78:175–82.
22. Thornton BP, Stewart DH, McGrath PC, Pu LL. Breast reduction as an alterantive treatment option for early breast cancer in women with macromastia. Ann Plast Surg. 2006;56:26–30.
23. Munhoz AM, Montag E, Arruda EG, Aldrighi C, Gemperli R, Aldrighi JM, et al. Critical analysis of reduction mammaplasty techniques in combination with conservative breast surgery for early breast cancer treatment. Plast Reconstr Surg. 2006;117:1091–103.
24. Chung TL, Schnaper L, Silverman RP, Holton LHIII, Slezak S. A novel reconstructive technique following central lumpec tomy. Plast Reconstr Surg. 2006;118:23–7.
25. Huemer GM, Schrenk P, Moser F, Wagner E, Wayand W. Oncoplastic techniques allow breast-conserving treatment in centrally located breast cancers. Plast Reconstr Surg. 2007;120:390–8.
26. Losken A, Styblo TM, Carlson GW, Jones GE, Amerson BJ. Management algorithm and outcome evaluation of partial mastectomy defects treated using reduction or mastopexy techniques. Ann Plast Surg. 2007;59:235–42.
27. Audretsch W, Rezai M, Kolotas C, et al. Tumor-specific immediate reconstruction in breast cancer patients. Perpect Plast Surg. 1998;11:71.
28. Chen CY, Calhoun KE, Masetti R, Anderson BO. Oncoplastic breast conserving surgery: a renaissance of anatomically-based surgical technique. Minerva Chir. 2006;61:421–34.
29. Kaur N, Petit JY, Rietjens M, et al. Comparative study of surgical margins in oncoplastic surgery and quadrantectomy in breast cancer. Ann Surg Oncol. 2005;12:539–45.
30. Giacalone PL, Roger P, Dubon O, et al. Comparative study of the accuracy of breast resection in oncoplastic surgery and quadrantectomy in breast cancer. Ann Surg Oncol. 2007;14:605–14.
31. Rietjents M, Urban CA, Rey PC, et al. Long-term oncological results of breast conservative treatment with oncoplastic surgery. Breast. 2007;16:387–95.
32. Asgeirsson KS, Rasheed T, MC Culley SJ, Macmillan RD. Oncological and cosmetic outcomes of oncoplastic breast conserving surgery. Eur J Surg Oncol. 2005;31:817–23.
33. EUSOMA. The requirements of a specialist breast unit. Eur J Cancer. 2000;36:2288–93.
34. Audisio RA, Chagla LS. Oncoplastic fellowship: can we do better? Breast. 2007;16:11–2.
35. Acea Nebril B. El proceso informativo sobre la indicación de la cirugía oncoplástica del cáncer de mama. Cir Esp. 2007;82:204–8.
36. Beier JP, Jaeger K, Horch RE. Reduction mammaplasy for benign phyllodes tumour in an adolescent female a 13-year folow-up. Breast. 2006;15:550–3.
37. Chang DS, McGrath MH. Management of benign tumors of the adolescent breast. Plast Reconstr Surg. 2007;120:13–9.
38. Sng KW, Hong SW, Foo CL. Reduction mammaplasty in the surgical management of a giant breast hamartoma: case report. Ann Acad Med Singapore. 2001;30:639–41.
39. Hernanz F, Vega A, Palacios A, Fleitas MG. Giant hamartoma of the breast treated by the mammaplasty approach. ANZ J Surg. 2008;78:216–7.