

E8. Surgical techniques in breast conservation

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Despite major advances in medical oncology and radiotherapy, tumour excision remains the mainstay of breast cancer treatment, both in terms of local and distant control. In the past two decades, breast cancer surgery has evolved from an ablative, often mutilating procedure to a novel, more conservative approach, integrated into a multidisciplinary process. One of the indicators of this shift in our surgical management is the increase of the breast conservation rate: at the Institut Curie, where we treat 1200 to 1500 new breast cancer cases each year, 75% of patients are treated with breast conservation.

Reasons for the increased use of breast conservation surgery include greater public awareness and the development of mammographical screening, leading to the detection of small tumours. The volume of lesions being treated is smaller, and the rate of detection of non-palpable carcinomas (both invasive and intraductal) is increasing. In our Institute, the mean diameter of tumours decreased from 42 mm to 29 mm between 1981 and 2000. However, one has to bear in mind that, while this is the case in industrialised countries, the number of small tumours detected in developing third world countries is still negligible.

Another major factor in the expansion of the indications for conservative treatment for invasive carcinomas is the use of preoperative treatment for down-staging large breast cancers. Chemotherapy has become a standard for large tumours, and tamoxifen is an emerging option for elderly patients [1]. The lesser-known option of preoperative radiotherapy also allows tumour down-staging in women for whom preoperative chemotherapy is not feasible or produces an insufficient tumour response [2].

However, the major recent advances in breast-conserving surgery come from the development of novel surgical techniques that have been conceived and mastered in the last decade. These advances address both the extent of axillary surgery and new approaches for glandular resection and breast reshaping, integrating plastic surgery techniques at the time of the initial tumour excision, in what has been named oncoplastic surgery.

Conservative treatment of axillary nodes: SN biopsy

Since the original description of sentinel node (SN) biopsy in breast cancer treatment in 1993 [3], this procedure has generated numerous studies and controversies. The concept of the SN procedure is to avoid axillary dissection (AD) when the SN is free from metastasis. Sentinel node biopsy has proven feasible and can be achieved either by the injection of blue dye or radioisotope. The detection rate in experienced hands is approximately 95% [4]. For surgeons at the beginning of their experience, the combined technique is recommended to increase the detection rate and the reliability of the SN procedure [5]. Pathological examination of the sentinel node requires serial sectioning of the SN, and may be helped by the use of immunohistochemistry for nodes that are negative by standard examination. This reduces the false-negative (FN) rate [6], but is a source of novel information as serial sectioning and immunohistochemical staining will reveal micrometastases that would have remained undetected if a standard AD had been performed. If SN biopsy was as reliable as AD, the FN rate of SN biopsy should be insignificant. However, FN rates reported in the literature vary from 0% to 20% [7]. Achieving a FN rate as low as possible remains the key point of the SN technique, and should be a prerequisite before starting SN biopsy in clinical practice.

The FN rate is related to the experience of the surgeon, and SN implementation requires a validation period (learning curve) before starting the procedure. This is a new approach in surgery, and raises the question of quality control procedures. In our experience, introduction of such quality control procedures and strict pathology methodology has proven efficient in reducing the FN rate from an initial 11% to less than 2%, in a initial series of 400 SN biopsy backed up by control AD. However, the implementation of the SN technique as a replacement for AD is still a source of controversy. Amongst questions that will need to be answered in the near future are the standardisation of the technique (site of injection, choice of optimal tracer, necessity for lymphoscintigraphy); other key points are the management of micrometastases, and treatment of the axilla when the SN proves to be positive. Various ongoing trials in Europe and the USA may give us the final answer to these crucial

questions. Although still a source of ongoing debate over its indications and the optimal technique, we believe that SN biopsy will prove to be one of the major advances in breast cancer surgery.

Conservative treatment of the breast: extending the surgical possibilities for breast conservation

Randomised studies have demonstrated that conservative (BCT) treatment of breast cancer is a safe approach for tumours up to four [8] or five [9,10] centimetres in diameter. Some authors even suggest that there is no upper limit for breast conservation as long as BCT is technically feasible. The optimal distance from the tumour edge to the lumpectomy margin remains a matter of debate; whilst quadrantectomy has demonstrated a reduced local recurrence rate when compared with lumpectomy [11], the cosmetic results and the lack of benefit on survival of such wide excisions has led most teams to abandon quadrantectomy in favour of less extensive resections. Some studies recommend a margin of at least 10 mm, particularly for intraductal carcinoma [12], while others advocate that no tumour at the inked margin is enough [13]. By any means, breast-conserving surgery requires that the surgeon performs complete excision of the tumour, both for invasive and intraductal components, with a rim of uninvolved normal breast parenchyma around the tumour.

However, breast-conserving surgery must leave a normal breast with no deformity, and symmetry with the contralateral breast. The breast surgeon is therefore confronted with contradictory goals between the obligation to perform wide excisions and the necessity to leave undistorted breasts. Objective study of the cosmetic results of BCT show that 20 to 30% of patients have a residual deformity of the treated breast [14]. These breast deformities are difficult to follow-up, are often painful and are unsatisfactory for both the patient and surgeon. The actual trend in some teams is to integrate plastic surgery techniques during the same initial surgical procedure performed for tumour removal [15–18]. This “oncoplastic” approach has two goals: to reduce the sequelae of tumour resection, and increase the possibilities for breast preservation.

“Standard” lumpectomy

Remodelling of the breast after lumpectomy has not always been performed. In the past, some authors advocated leaving the lumpectomy cavity empty and relying on a postoperative haematoma to fill in the dead space. If this sometimes produced acceptable results on the short-term, the late follow-up of these patients show that breast retraction invariably occurs, leading to major deformities

which are further exacerbated by postoperative radiotherapy [14,19]. We strongly recommend that reshaping of the breast should be performed after any tumour excision, in order to recreate a normal breast shape. A standardisation of the lumpectomy technique is helpful in performing optimal tumour resection and remodelling of the breast. This standardisation is based on extensive undermining of the breast tissue from both the skin envelope and the pectoralis muscle, allowing glandular flap mobilisation.

In other cases, the lumpectomy is such that the defect cannot be closed by simple glandular flap mobilisation. More sophisticated techniques are then necessary, in order to allow a good cosmetic result.

Bilateral approach: mammoplasty

Breast reduction techniques performed for cosmetic surgery allow massive resections. In selected cases, when a standard lumpectomy is either not feasible or would lead to a postoperative deformity, we use these mammoplasty techniques for breast cancer treatment, to increase the possibilities of breast conservation. The main disadvantage of this technique is the necessity for contralateral surgery to achieve symmetry. To avoid secondary procedures this contralateral “symmetrisation” can be performed immediately, during the same operative session. Over the past 10 years at the Institut Curie, more than 250 patients with a unilateral breast cancer were treated by bilateral mammoplasty followed by ipsilateral radiotherapy. In a series of 101 patients (mean tumour diameter 32 mm), the median weight of the excision specimen was 220 g. The 5-year actuarial recurrence rate was 9.4%, and the 5-year overall survival and metastasis-free survival rates were 95.7% and 82.8%, respectively [15].

These techniques allow extensive surgical resections with good cosmetic results and permit conservative treatment for some patients who might otherwise have been candidates for a mastectomy. Although only limited series have been published so far, the 5-year local and distant recurrence rates suggest that these oncoplastic operations are safe and increase the possibilities of breast conservation. More data is needed even though, in some teams, follow-up of more than 10 years is available. Breast surgeons need to be trained in such techniques or should integrate plastic surgeons into their teams.

Conclusions

For many years, breast cancer surgery has relied solely on two operations: lumpectomy or mastectomy, and an AD was performed in all cases of invasive carcinoma. Sentinel node biopsy reduces the morbidity related to unnecessary ADs, and oncoplastic surgery allows a novel approach to help increase the rate of breast conservation.

By integrating plastic surgery techniques at the initial stage of the surgical treatment, extensive resections are feasible, while maintaining a normal shape and contour of the breast. These operations are compatible with post-operative radiotherapy and systemic treatment. We believe that this approach should be integrated into the arsenal of breast cancer surgery. Hence, breast surgery is moving towards a more specialised, sophisticated practice that needs specific training and teaching. Breast surgeons of the future should be able to master all aspects of these operations, to offer their patients optimal surgical techniques and minimal sequelae.

References

- [1] Gaskel DJ, Hawkins RA, De Carterets S, Chetty U, Sangsterl K, Forrest APM Indications for primary Tamoxifen therapy in elderly women with breast cancer. *Br. J. Surg.* 1992; 79: 1317–1320.
- [2] Scholl SM, Fourquet A, Asselain B, et al. Neoadjuvant versus adjuvant chemotherapy in premenopausal patients with tumours considered too large for breast conserving surgery: preliminary results of a randomised trial: S6. *Eur J Cancer* 1994; 5: 645–652.
- [3] Krag DN, Weaver DI, Alex JC, Fairbanks JT. Surgical resection and radiolocalisation of the sentinel node in breast cancer using a gammprobe. *Ann Surg Oncol*, 1993; 2: 335–339.
- [4] Giuliano AE, Jones RC, Brennan M, Statman R. Sentinel lymphadenectomy in breast cancer. *J Clin. Oncol* 1997; 15: 2345–2350.
- [5] McMasters KM, Tuttle TM, Carlson DJ, et al. Sentinel lymph node biopsy for breast cancer: a suitable alternative to routine axillary dissection in multiinstitutional practice when optimal technique is used. *J Clin Oncol* 2000; 18: 2560–2566.
- [6] K. Dowlatsahi, Ming Fan, H.C. Snider, F.H. Habib. Lymph node micrometastases from breast cancer. Reviewing the dilemma. *Cancer*, 1997; 80: 1188–1197.
- [7] Krag DN, Weaver DL, Ashikaga T, et al. The sentinel node in breast cancer. A multicenter validation study. *N Eng J Med* 1998; 339: 941–946.
- [8] Fisher B, Anderson S, Redmond CK, et al. Reanalysis and results after 12 years of follow-up in a randomized clinical trial comparing total mastectomy with lumpectomy with or without irradiation in the treatment of breast cancer. *N Engl J Med* 1995; 333: 1456–1461.
- [9] Van Dongen JA, Voogd AC, Fentiman IS, et al. Long-term results of a randomized trial comparing breast-conserving therapy with mastectomy: European Organization for Research and Treatment of Cancer 10801 trial. *J Natl Cancer Inst* 2000; 92: 1143–1150.
- [10] Jacobson JA, Danforth DN, Cowan KH, et al. Ten-year results of a comparison of conservation with mastectomy in the treatment of stage I and II breast cancer. *N Engl J Med* 1995; 332: 907–911.
- [11] Veronesi U, Volterrani F, Luini A, et al. Quadrantectomy versus lumpectomy for small size breast cancer. *Eur J Cancer* 1990; 26: 671–673.
- [12] Silverstein MJ, Giersen ED, Colburn WJ, et al. Can intraductal breast carcinoma be excised completely by local excision? Clinical and pathologic predictors. *Cancer* 1994; 73: 2985–2989.
- [13] Gage I, Schnitt S, Nixon AJ, Silver B, Recht A, Troyan S, et al. Pathologic margin involvement and the risk of recurrence in patients treated with breast-conserving therapy. *Cancer* 1996; 78: 1921–1928.
- [14] Clough KB, Cuminet J, Fitoussi A, Nos A, Mosseri V. Cosmetic sequelae after conservative treatment for breast cancer: classification and results of surgical correction. *Ann Plast Surg* 1998; 41: 471–81.
- [15] 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. In press*
- [16] Audretsch W, Rezai M, Kolotas C, et al. Tumor-specific immediate reconstruction in breast cancer patients. *Perspectives in Plastic Surgery* 1998; 11: 71–100.
- [17] Petit JY, Rietjens M, Garusi C, et al. Integration of plastic surgery in the course of breast-conserving surgery for cancer to improve cosmetic results and radicality of tumor excision. *Recent Results Cancer Res* 1998; 152: 202–211.
- [18] Rietjens M, Petit JY, and Contesso G. The role of reduction mammoplasty in oncology. *Eur J Plast Surg* 1997; 20: 246–251.
- [19] Berrino P, Campora E, and Santi P. Postquadrantectomy breast deformities: classification and techniques of surgical correction. *Plast Reconstr Surg* 1987; 79: 567–572.