

## E13. Reconstruction/augmentation in breast cancer surgery

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The subjects of reconstruction and augmentation in the sense of increasing the value and the effectiveness of breast cancer surgery and to make up the final result are becoming leading factors in the upfront planning and surgical approach. Tumour-specific reconstructive techniques [1] augment breast cancer surgery.

The uncompromising operative procedure both in organ conservation i.e. partial mastectomy (BCT) or organ-sacrificing surgery i.e. modified radical mastectomy (MRM) of the mammary carcinoma with reconstruction is defined by a conflict of aims concerning the resection volume with free margins and the supply of tissue for coverage of the defect and reconstruction.

Oncological and anatomical criteria can form the basis of this conflict in BCT and MRM operability. Here there are transitions from partial to total mastectomy operability i.e. skin-sparing techniques (SSM) with immediate reconstruction of the breast mound.

Oncological criteria are multicentricity, inflammatory carcinomas, lymphangiosis carcinomatosa or an extended ductal carcinoma *in situ*. Anatomical criteria are unfavourable relative size or unfavourable location of the tumour.

There is direct and indirect evidence for the need of coupled oncological and reconstructive surgery [2,3] with regard to an augmentation of the final result.

The studies Milan I, II and III and the National Surgical adjuvant breast and bowel Project (NSABP)-B6 Study determined the margin for an appropriate local radicality in combination with radiotherapy [4]. The aesthetic results after quadrantectomy need revision in 20% of cases and are limited in 90%, particularly for small breasts [5]. Therefore, the factors of unfavourable relative size and unfavourable site belong to the relative contraindications for BCT.

The results of the European Organization for Research and treatment of Cancer (EORTC)-10801 Study show that there is basically no oncological contraindication for BCT because of tumour size or involvement of the lymph nodes alone. The EORTC Study 22881 has made clear the significance of free margins for prognosis, especially in young patients below the age of 35 years. The NSABP-B18 Study was able to prove the equal value of a preoperative and adjuvant chemotherapy, as well as the increased rate of BCT after preoperative

chemotherapy. Amongst other factors, the EORTC regards the unfavourable tumour location as an indication for a preoperative chemotherapy.

In studies of our own, we have investigated the influence of biological and anatomical factors on local recurrence and the influence on prognosis in 2875 patients. Both histological-anatomical characteristics and tumour biological factors influence the local risk to an equal degree. It is striking that an early local recurrence leads to an extremely bad prognosis. This is especially the case following BCT. In the analysis of multiple variance, the histological and anatomical factor margin is highly significant as an independent predictor ( $P = 0.0002$ ) for loco-regional early recurrence. This is followed by the biological factor ( $P = 0.0039$ ) progesterone receptor and a second anatomical characteristic of tumour size ( $P = 0.0382$ ). Looked at from this point of view, the creation of free margins in connection with a cosmetic result is a decisive factor in BCT and in cases of mastectomy reconstruction. Oncological and reconstructive operative procedures for the solution of this conflict of aims can be summarised under the term oncoplastic surgery or coupled operations for partial and total mastectomies. This kind of tumour-specific immediate reconstruction couples the access to the tumour site and the axilla, the excision pattern and the resection volume to the reconstruction of the defect. Unlike usual immediate reconstruction procedures, a decoupling is only possible with restrictions. Due to the implicit oncological point of excision, oncoplastic surgery requires consideration of the treatment sequence for chemotherapy and radiotherapy. Autologous local tissue or transferred tissue can be used to cover the defect. Local tissue is used, for example, in cases of defect shrinking achieved through different "surgical target"-volume reduction techniques [6] in BCT i.e. reduction mammoplasty, and mastopexy techniques involving different tumour-adapted skin patterns such as the standard key-hole pattern, the modified "B" technique developed by Regnault and applied to central and inner-lower pole tumours, the oblique pattern, the "purse-string" pattern, the inverted "T"-pattern for low-pole lesions, and the inverted Rubin pattern preferred for other kinds of tumour location in large or pendulous breasts. A thoraco-epigastric flap (TEF) or thoraco-dorsal flap (TDF) may be recommended for reconfiguring the infero-medial and infero-lateral as-

pect of the breast. Local autologous tissue is taken from the area adjacent to the tumour bed or the chest wall and should be radiated after surgery in cases of BCT.

Distant and transferred autologous tissue is used in BCT or mastectomy reconstruction for a coupled myocutaneous latissimus dorsi flap (LAT) for lesions in the unfavourable borderline of the breast and for relative size problems or together with an implant. This kind of tissue is reliable as long as the thoraco-dorsal pedicle and/or the serratus branch remains intact. Because of its twofold (either simultaneous or successive) availability and its paired occurrence, in which it resembles the breast, the most important and best suited distant "autologous tool" for the coupled surgical approach as well as for volume (i.e. "mini-flap") and skin replacement is the myocutaneous latissimus dorsi island flap. The evolution of the LAT from the safest tool in delayed post radiation repair surgery or deformities to the mainstay in cases of reconstruction after partial or total mastectomy with regard to new treatment protocols represents a breakthrough and augmentation in the field of breast cancer surgery. The decision between partial and total mastectomy operability is brought about solely by the distribution of the tumour in the breast [7]. The myocutaneous rectus flap (TRAM) has become the "state of the art" in total mastectomy reconstruction. Looked at from this point of view, coupled reconstructive surgery is able to facilitate mastectomy operability as well.

Transferred tissue is generally considered healthy and free from tumour cells. Generally, radiotherapy is not indicated from an oncological point of view and therefore can be applied prior to surgery. In individual cases, radiotherapy can also take place after latissimus quadrantectomy reconstruction, but is not recommended after TRAM-flap reconstruction. A simpler reconfiguration can follow by means of a mirror biopsy. The preference of bilateral surgery for quadrantectomy and of the recentralisation of the nipple areola complex was based on the aim of restoring symmetry after quadrantectomy or, in cases of asymmetry, of favouring the non-affected breast.

In most of the cases, the basis of the breast is narrowed. This results in a decentralisation and, most frequently, in a lateralisation of the nipple areola complex. Consequently, recentralisation should be performed by means of a peri-areolar concentric mastopexy, i.e. the "purse string" technique.

A response-dependent indication for larger plastic intervention with the aim of creating a tumour cell-free operative zone is desirable. These principles are the basis of one of our current randomised studies. In the framework of a pilot study of IIA–IIIA mammary carcinoma with conversion for BCT in 101 patients, no true, early local recurrences were observed after 18 months. The conversion rate was 54% BCT. For cases of non-irradiated LAT, the cosmetic long-term result after 30–73

months was good to very good in 86% and satisfactory in 14%. The resection weights from oncoplastic surgery for partial mastectomies were between 90 and 650 g i.e. 10 times more than for a standard partial mastectomy. The functional long-term results showed no reduction in the self-confidence or any greater discomfort in the patients. As a direct comparison to the untreated breast, in 50% there was no limitation of sensitivity in the psycho-sexual sphere. As far as the unanswered question of resection volume after preoperative treatment is concerned, we were able to determine in a pilot study on 232 patients after preoperative chemotherapy alone and clinical nodal-positive tumours in 16%, ypT0/ypN0 histological complete responders (pCR). After preoperative chemotherapy and radiotherapy in nodal-positive tumours, we found in 26%: ypT0 u. ypN0 pCR ( $P=0.03$ ).

Results from a worldwide overview (Richard Peto, NIH Consensus, November 2000) suggest that a quarter of isolated local recurrences will result in death from breast cancer, deaths that would not otherwise have happened. Avoiding 20 local recurrences will lead to the avoidance of 5 breast cancer deaths in 15 years. From our own results and the data from the literature, it would seem that tumour location adapted wider excision supported by autologous tissue reconstruction is oncologically more sound as far as local control of the mammary carcinoma is concerned.

The topographical-anatomical problems are: location and relative size of the tumour. Coupled onco-plastic procedures promote the implementation of reconstruction after partial mastectomies and local radical oncological criteria, independent of topographical and/or anatomical problems to augment the value and effectiveness of breast cancer surgery.

## Conclusion

In view of the fact that adjuvant to oncological surgery, radiotherapy, and chemotherapy, plastic and reconstructive surgery have become increasingly integrated into the comprehensive management of breast cancer, it goes without saying that this coupled procedure requires an even more sophisticated and detailed pre-treatment planning and sequencing. Moreover, onco-plastic surgery, together with the use of autologous tissue, may reduce resource costs and help to save money because it is a one-step procedure, has fewer re-excision problems, represents a non-delayed reconstruction without secondary surgery, contributes to the avoidance of epi-prosthesis during mastectomy, and involves few contralateral procedures as in most cases it is a natural breast that is reconstructed.

Of all the new treatment protocols, the principles and methods of tumour-specific immediate reconstruction

with autologous tissue are particularly suited to meet the requirements of pre- or post-radiation reconstruction of the partial and total mastectomy defect and of concepts expected to guarantee satisfactory and reliable surgical (i.e. oncological and aesthetic) results. In view of the combination of breast cancer treatment and reconstruction of the defect, coupled reconstructive surgery can be called the fourth modality in addition to chemotherapy, radiotherapy, and surgical oncology in a comprehensive approach towards an augmentation of breast cancer treatment.

## References

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