Oncoplastic Principles in Breast Surgery

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The aim of local breast cancer treatment is to achieve long-term local disease control with a minimum of local morbidity. The majority of women presenting symptomatically to breast clinics or who are diagnosed with breast cancer through screening programmes have small breast cancers, which are suitable for breast-conserving surgery [1, 2]. A meta-analysis of 9 randomised controlled trials that compared breast conservation treatment with mastectomy found no significant difference in the risk of death over 10 years. There was also no difference in the rates of local recurrence in 6 randomised controlled trials involving 3,006 women where data were available [3].

Originally it was thought that local therapy had little influence on overall survival but it is becoming clear that local therapy is responsible, at least in part, for some patients developing metastatic disease. In his meta-analysis about the effects of radiotherapy and differences in the extent of surgery on local recurrence and 15-year survival, Sir Richard Peto demonstrated that avoidance of a local recurrence in the conserved breast after breast-conserving surgery is of relevance to 15-year breast cancer mortality. Differences in local treatment that substantially affect local recurrence rates would avoid about 1 breast cancer death over the next 15 years for every 4 local recurrences avoided, and should reduce 15-year overall mortality [4]. While complete excision of the tumour with clear margins is mandatory, there is still debate about the optimal amount of normal tissue that should be removed with the tumour [5]. The most important surgical-related factor for reducing the risk for local recurrence is completeness of excision. Current practice is to aim for at least microscopically disease-free margins. There should be a clear rim of normal tissue (>1 mm) around the carcinoma in all directions [6]. Almost all studies have reported an increased rate of local recurrence in patients with positive margins [7–9]. Few studies have investigated whether wider margins are associated with significantly better

rates of local control. One of the early studies of breast-conserving treatment randomised patients to lumpectomy or quadrantectomy (Milan II trial). A significantly greater number of patients who had lumpectomy had incomplete local excisions. Not surprisingly therefore local recurrence was greater after lumpectomy than after the more extensive quadrantectomy [9]. Few studies have investigated whether wider margins are associated with significantly better rates of local control. One study of 509 patients demonstrated that at 6 years patients with positive margins had a relative rate of local recurrence 3.83 times that of patients with a margin of normal tissue of greater than 5 mm. Within the range of clear margins from 0 to 5 mm there was no suggestion that patients with narrow margins (<2 mm) had a significantly worse rate of local recurrence than those with wider margins (2–5 mm) [7]. Because of these inconsistent data concerning the optimal tumour-free resection margin we tried to reach ≥ 1 mm clear margins for pT1-tumours, ≥ 5 mm for pT2-tumours, and ≥ 1 cm for in-situ breast cancer measured in the longitudinal axis of the segmentally resected breast sector.

Cancers have differing anatomical distributions in the breast. By comparison of preoperative MRI studies with postoperative histopathological findings, Amano and colleagues classified the distribution of breast cancer into 3 patterns of histological spread: localised (55%), segmentally extended (35%), and irregularly extended (10%) [10]. This classification defines an important framework for oncological breast surgeons to use when thinking about breast cancer distribution. In cases of a segmental tumour distribution (in ductal carcinoma in situ (DCIS) and invasive cancer + DCIS) segmentectomy is mandatory compared to lumpectomy. In our hands segmentectomy is the general procedure in breast-conserving surgery because of oncological and reconstructive aspects.

It is the balance between tumour size as assessed by imaging and breast volume that determines whether a patient is suit-

able for breast-conserving surgery. Options for breast-conserving treatment for patients with tumours considered too large in relation to the size of the breast include neoadjuvant systemic therapy to shrink the tumour, an oncoplastic procedure involving transfer of tissue into the breast, or surgery to the opposite breast to obtain symmetry [11–13].

Oncoplastic resections allow the removal of large breast tumours with improved cosmetic outcome and widened surgical margins, which are associated with objective indicators measuring patients' quality of life [14]. The crucial issue is actually margin clearance, which is established by the ratio of tumour-to-breast size rather than absolute tumour dimensions. Oncoplastic breast-conserving surgery has the following aims and should reach defined quality indicators: a) local control with recurrence rates < 15% in 10 years, b) good long-term outer cosmesis with reconstruction of size, shape and symmetry, c) good inner cosmesis for imaging during follow-up, d) low functional morbidity in terms of scars and the choice of the oncoplastic procedure. Oncoplastic approaches also need to be closely associated with breast imaging, so that the location of disease can be found and marked as accurately as possible in preparation for operative intervention, either by use of needle localisation wires placed before surgery or by adequate skin marking. Oncological breast surgeons benefit from a solid understanding of the strengths and limitations of imaging studies. Similarly, breast radiologists benefit from understanding the surgical goals in resection to best communicate the location and distribution of malignant tissues within the breast.

There is a wide spectrum of sometimes artistic techniques

published as oncoplastic technique for tumour resection and partial mastectomy reconstruction. The oncoplastic breast surgeon has to keep in mind that not the personal preference of the surgeon for one special technique should decide about the oncoplastic procedure [15]. The aim of oncoplastic breast surgery on the contrary is the realization of the mentioned aims and quality indicators of oncoplastic surgery, especially the low functional morbidity of the patient [11, 12, 16, 17].

The oncoplastic techniques and principles can be structured in two classes: a) volume displacement techniques and b) volume replacement techniques. Volume displacement techniques can be subdivided in four principles: a) glandular rotation, b) dermoglandular rotation – tumour-adapted mastopexy, c) tumour-adapted reduction mammoplasty, d) lateral thoracic wall advancement. Volume replacement techniques can be subdivided in two clinically relevant principles: a) latissimus-dorsi flap and b) thoracoepigastric flap. Partial mastectomy reconstruction using microsurgical perforator flaps is not a standard procedure.

In order to bridge the gap between oncological and reconstructive aspects in breast-conserving surgery it will be necessary to improve education and training of general breast surgeons to become oncoplastic breast surgeons [18–21]. This training should be related to European considerations published by the EUSOMA [22]. In our view in Germany especially the gynaecologists with insights, competence and training in the field of senology focused on tumour biology, general breast surgery, senological oncology, breast sonography and imaging are predestined for training and education to become oncoplastic breast surgeons.

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