Current Trends in Breast Surgery

Amit Goyal

Received: 12 June 2012 / Accepted: 9 July 2012 / Published online: 3 August 2012
© Indian Association of Surgical Oncology 2012

Abstract Breast surgery has evolved significantly over the last decade. This includes developments in pre-operative assessment of patients and surgical options offered to patients. Oncoplastic breast surgery has emerged as a new approach and uses plastic surgery techniques for reconstructing the wide local excision defect.

Keywords Breast cancer · Breast surgery · Breast reconstruction · Therapeutic mastoplasmy · Lipofilling

Diagnosis and Pre-operative Assessment

All patients undergo triple assessment (clinical/radiological/pathological) for non-operative diagnosis of breast lesions. Core biopsy has replaced fine needle aspiration cytology (FNAC) for tissue diagnosis of breast lumps. In the UK Breast Screening Programme the non-operative diagnosis rate has risen from 63 % (1996/7) to 96 % (2009/10) with a corresponding increase in diagnosis by core biopsy alone from 17 % to 88 % over the same time period [1]. Needle core biopsy has decreased the need to perform open diagnostic biopsy whilst providing additional information on tumour grade, type, ER/PR status and expression of various markers, allowing thorough treatment planning. Furthermore, vacuum assisted core biopsy is increasingly used to provide more tissue to the pathologist in equivocal cases and for removing small benign lesions such as fibroadenoma in the outpatient clinic (Fig. 1).

MRI breast scan is performed to assess suitability for breast conserving surgery in patients with mammographically occult breast cancer and in those with lobular features on core biopsy.

The axilla is staged pre-operatively using ultrasound and FNAC or core biopsy of indeterminate or suspicious lymph nodes, to identify patients with nodal metastases. The node positive patients can proceed to axillary node clearance, thereby avoiding unnecessary sentinel node biopsy. Ultrasound contrast agents (microbubbles) are used by some centres to improve the sensitivity of this technique [2], however this has failed to gain widespread acceptance.

Breast Cancer Surgery

Breast Conserving Surgery

Increasing number of patients are offered breast conserving surgery, and the quality of cosmetic outcome that a woman can expect following such surgery has improved.

Neo-adjuvant treatments (hormone treatment, chemotherapy, Trastuzumab) are being increasingly used to downstage large tumours that at presentation would otherwise require a mastectomy, to facilitate breast conserving surgery.

The decision to offer breast conserving surgery is multifactorial and largely dependent on the size and position of the tumour in relation to the size of the breast. Patient choice is an important factor as a significant number of women will choose mastectomy when offered the choice.

Initial attempts at breast conserving surgery focussed on removing the cancer with an adequate margin of normal tissue and little attention was paid to the long term cosmetic outcome. This resulted in prominent unsightly scars and significant cosmetic deformity in the breast once the initial seroma absorbed from the surgical cavity.

The goal these days is to combine complete tumour removal with preserving the natural shape and appearance of the breast. Whenever possible, incision is planned to place the scar in the least visible position to improve cosmesis rather than directly over the tumour (circumareolar/inframammary/axillary incisions). Oncoplastic techniques

A. Goyal (✉)
Department of Surgery, Royal Derby Hospital,
Derby DE22 3NE UK
e-mail: amit.goyal@nhs.net

Fig. 1 Mammotome® vacuum assisted biopsy system and piecemeal removal of fibroadenoma

are used to mobilise and appose the breast parenchyma to fill the wide local excision defect, and have made a significant impact on the quality of cosmetic results (Figs. 2 and 3).

More patients can now be offered breast conserving surgery using volume displacement and volume replacement techniques. Breast reduction techniques can be modified to perform wide local excision for much larger tumours than those traditionally treated with breast conserving surgery, at the same time as carrying out breast reduction surgery. This produces a smaller breast with good shape and is a good option for patients who have large breasts and wish to be smaller. A contralateral breast reduction/mastopexy will usually be required for symmetrisation (Fig. 4). Central tumours requiring excision of the nipple areolar complex can be removed using a wise pattern incision and an inferior pedicle to fill the central defect (Fig. 5).

Volume replacement after a larger wide local excision, particularly in the upper/outer breast, can be achieved using a LICAP (lateral intercostal artery perforator flap), TDAP (thoracodorsal artery perforator flap) or latissimus dorsi muscle mini flap [3].

Axillary Surgery

Axillary nodal status remains the strongest prognostic factor for breast cancer outcome. Sentinel lymph node biopsy has become the gold standard for axillary staging for patients with clinically and radiologically node negative axilla. The

Fig. 2 Postoperative views (AP and oblique) of a patient undergoing left wide local excision of tumour in the upper outer quadrant and sentinel node biopsy using an axillary incision

recommended technique is the dual technique of blue dye/radioisotope and this is associated with high sentinel node identification rates (> 95 %). However, in centres where radioisotope is not available, blue dye guided four node sampling appears to be a reasonable alternative [4]. Sentinel node biopsy was shown to be an accurate technique for axillary node staging in the ALMANAC Trial [5] with less associated morbidity and strong health economic arguments for its use. Subsequently the UK NEW START Training Programme [6] allowed national introduction of the technique, which in turn has facilitated shorter lengths of stay for breast cancer patients. Day case breast conserving surgery and 23 h discharge of mastectomy patients not undergoing breast reconstruction surgery is the norm in many breast units.

Fig. 3 Postoperative view of a patient undergoing left wide local excision of tumour in the upper inner quadrant using a periareolar incision

Fig. 4 Preoperative and postoperative views of a patient undergoing right therapeutic mammoplasty and left breast reduction

The management of the axilla remains controversial and a rapidly changing field. The sentinel node can be assessed intra-operatively using imprint cytology, frozen section, or PCR techniques. This potentially allows intra-operative decision making and node positive patients can proceed to axillary node clearance at the same operation. However, the ACOSOG

Fig. 5 Preoperative and postoperative views of a patient undergoing right central tumour excision, inferior pedicle mammoplasty and left breast reduction

Fig. 6 Patient with right breast implant reconstruction

Z0011 trial results suggest that axillary node clearance may be over treatment and unnecessary in selected breast conservation patients with positive sentinel node. Patients randomised to completion axillary node clearance or observation only were found to have similar 5 year recurrence and survival outcomes [7], however the results are not generalisable as the trial was underpowered and has several limitations. The UK POSNOC trial (*PO*sitive *SEN*tel node: *O*bservation vs. *C*learance or radiotherapy) will clarify the role of further axillary treatment in this subgroup of patients.

Breast Reconstruction

Breast reconstruction should now be discussed as an option with all patients undergoing surgical treatment

Fig. 7 Preoperative and postoperative views of a patient with a large phyllodes tumour in the right breast, who underwent right skin sparing mastectomy, immediate dermal sling breast reconstruction along with left breast reduction for symmetrisation

Fig. 8 Patient who underwent delayed right breast reconstruction with a latissimus dorsi flap

by mastectomy. There may be good reasons why breast reconstruction is deemed inappropriate (e.g. elderly, significant co-morbidity) or why delayed rather than immediate reconstruction is recommended (if chest wall radiotherapy required post-mastectomy).

The main options continue to be implant based reconstruction, latissimus dorsi flap and abdominal flap reconstruction. However there have been significant developments in each of these areas.

Implant based reconstruction was traditionally a 2-stage procedure using a round breast implant: insertion of a tissue expander, a period of skin expansion, a second procedure to insert a silicone implant. The continued development of breast implant technology has meant that anatomically shaped tissue expanders and implants are now more widely used, leading to improved symmetry and less problems with upper pole fullness (Fig. 6).

One stage breast reconstruction using implant or one-stage tissue expander with pectoralis major muscle superiorly and a dermal sling (de-epithelialised lower mastectomy flap) [8] or an Acellular Tissue Matrix hammock inferolaterally, has recently become a popular technique for post-mastectomy reconstruction as an alternative to more complex flap procedures. These

Fig. 10 Fat injection procedure in a patient with a superiomedial contour defect of the right breast

techniques provide a complete coverage of the implant or tissue expander and create a tension-free submuscular pocket (Fig. 7). These techniques are particularly useful in patients who are unlikely to receive post-surgical adjuvant treatment e.g., women undergoing bilateral risk reducing mastectomies for genetic risk (e.g., BRCA1/2 gene carriers).

The latissimus dorsi muscle is a large flat muscle and flaps traditionally have been used to bring the required skin lost at mastectomy whilst providing a muscle protection over an underlying implant (Fig. 8). In women with smaller breast size (B and smaller C bra cup size) it is now possible in some women to harvest as much skin, muscle and subcutaneous tissue as possible from

Fig. 9 Patient who underwent an immediate right breast DIEP flap reconstruction

Fig. 11 Patient with right breast reconstruction following nipple-areolar reconstruction and tattooing

the back to provide an entirely autologous flap precluding the need for a breast implant and the complications that may arise from this if post-operative radiotherapy is required.

Abdominal flap reconstructions were traditionally pedicled flaps using the transverse rectus abdominis muscle (TRAM) on the superior epigastric pedicle. They have the advantage of being autologous tissue but there is a significant risk of abdominal wall hernias developing which can be reduced by insertion of mesh at the time of abdominal wall closure. The use of free abdominal DIEP flaps (deep inferior epigastric perforator flap) where fat and skin are transferred on perforator vessels has gained widespread popularity reducing the incidence of abdominal wall morbidity from the reconstruction (Fig. 9).

To achieve acceptable symmetrical results from breast reconstruction surgery, it is often necessary to operate on the unaffected contralateral breast. This may entail breast reduction surgery, mastopexy or breast uplift, and on occasion breast augmentation.

Lipofilling (autologous fat grafting) is a new technique gaining increased popularity for the management of soft tissue deformities after breast conserving surgery and breast reconstruction surgery. It has evolved from liposuction techniques where fat is transferred from other donor sites, usually the thigh or abdomen, to the breast (Fig. 10). Autologous fat is an ideal filler resulting in an even contour and natural consistency of breast. As this is a new technique, the long-term results and aesthetic outcomes are lacking.

The nipple is an essential aesthetic feature of the breast. Nipple reconstruction and tattooing can be easily performed following breast reconstruction. In terms of timing it is best performed at a second stage rather than

at the time of primary breast reconstruction. It is routinely performed under local anaesthetic unless the patient is undergoing additional procedures necessitating general anaesthesia (Fig. 11).

Conflicts of Interest None.

References

1. ABS Breast Screening Audit (2009–2010). <http://www.cancer-screening.nhs.uk/breastscreen/publications/baso2009-2010.pdf>. Accessibility checked on 12/06/12.
2. Sever A, Jones S, Cox K, Weeks J, Mills P, Jones P (2009) Preoperative localization of sentinel lymph nodes using intradermal microbubbles and contrast-enhanced ultrasonography in patients with breast cancer. *Br J Surg* 96(11):1295–1299
3. Tseng CY, Lipa JE (2010) Perforator flaps in breast reconstruction. *Clin Plast Surg* 37(4):641–654
4. Chetty U, Chin PK, Soon PH, Jack W, Thomas JS (2008) Combination blue dye sentinel lymph node biopsy and axillary node sampling: the Edinburgh experience. *Eur J Surg Oncol* 34(1):13–16
5. Mansel RE, Fallowfield L, Kissin M, Goyal A, Newcombe RG, Dixon JM et al (2006) Randomized multicenter trial of sentinel node biopsy versus standard axillary treatment in operable breast cancer: the ALMANAC Trial. *J Natl Cancer Inst* 98(9):599–609
6. Goyal A, MacNeill F, Newcombe RG, Townson J, Keshtgar M, Mansel RE (2009) Results of the UK NEW START sentinel node biopsy training program: a model for future surgical training. *Cancer Res* 69(24):538S
7. Giuliano AE, McCall L, Beitsch P, Whitworth PW, Blumencranz P, Leitch AM et al (2010) Locoregional recurrence after sentinel lymph node dissection with or without axillary dissection in patients with sentinel lymph node metastases: the American College of Surgeons Oncology Group Z0011 randomized trial. *Ann Surg* 252(3):426–432
8. Goyal A, Wu JM, Chandran VP, Reed MW (2011) Outcome after autologous dermal sling-assisted immediate breast reconstruction. *Br J Surg* 98:1267–1272