

CASE REPORT

Mammary myocutaneous-glandular flap for reconstruction of oncological defects of the anterior midline chest wall

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Abstract

We describe a mammary myocutaneous-glandular flap, which is a simple, convenient, reliable, and speedy reconstructive technique applicable for women that combines little or no morbidity with excellent cosmetic outcome and provides a simple solution to an extremely difficult problem.

Key Words: *Flap, chest wall reconstruction, myocutaneous-glandular flap*

Introduction

Primary or metastatic neoplasms of the chest wall tend to infiltrate the external thoracic layers and require large resections to ensure free margins. Resection of the chest wall is commonly required. It is usually indicated for palliation of pain or the unpleasant consequences of chronic ulceration for which it offers immediate relief [1,2]. For local recurrent breast cancer, in particular, it may lead to lasting control of the tumour and substantial freedom of disease with long-term survival [2]. Repair of complex defects after massive resections, however, are a challenging problem and it is difficult for the reconstructive surgeon to ensure complete, secure, and durable cover of the thoracic defect [1].

The extent of resection should not be compromised because of concern about the reconstruction of complex defects [1]. The availability of reliable methods of reconstruction of the chest wall and familiarity with these procedures have allowed more radical excision, palliation, and treatment of all types of malignant, infective, and degenerative conditions of the chest wall. In addition to soft tissue coverage, the status of the pleural cavity, and

the necessity for skeletal support must also be addressed [3].

Reconstruction of the chest wall after extensive resection has been greatly facilitated by the use of vascularised flaps and prosthetic material [3], which give satisfactory results in most patients. Consideration of which material to use involves availability of the prosthesis, ease of use, durability, adaptability, nonreactivity, resistance to infection, and translucency to radiographs. The list includes alloplastic material such as stainless steel, titanium, and fibreglass; synthetic materials such as polypropylene mesh (Prolene), polyglactin 910 (Vicryl), polytetrafluoroethylene (PFTE), nylon, silicone, acrylic, and silicone rubber. Composite synthetic materials include polypropylene (Marlex) mesh and methyl methacrylate [4]. Rigid stabilisation is necessary for sternal and parasternal defects but soft prostheses are enough in anterolateral defects to avoid paradoxical chest movements [1]. Musculo-osseous flaps such as a latissimus dorsi compound flap with the 11–12 ribs or 9–11 ribs are another reconstructive option, and seem to be “safe” in the reconstruction of full-thickness anterior chest wall defects. Ribs are also useful as bone grafts.

Regional pedicled muscular or myocutaneous flaps or free flaps are the best choice for soft-tissue coverage of full-thickness defects of the chest wall [5], and the choice depends on the size of the defect, site on the chest wall, bacterial contamination, proximity and arc of rotation of the flap, and availability of recipient vessels [1].

Case reports

Case 1

A 57-year-old woman presented in 2003 with a T2N0M0 tumour of the left breast, which was treated by partial mastectomy with lymph node dissection and adjuvant radiotherapy. She was also given six cycles of chemotherapy. A year later she presented with a mass in the middle third of her sternum that was histologically recurrent cancer. Despite three cycles of adriamycin and cyclophosphamide, the mass grew rapidly. No other distant metastases could be detected on PET scan, so the mass was judged to be resectable. Reconstruction with a right rectus abdominis muscle flap was

planned. During resection, both internal mammary vessels were sacrificed. The right pectoralis major was not suitable to cover the large defect, which extended down to the xiphoid; pectoralis major on the left showed severe radiation damage, and the medial portions had been resected en bloc with the tumour. The defect could be covered by raising the entire right breast tissue and overlying skin by making an incision in the inframammary crease with right pectoralis major based on its major blood supply (Figure 1). The composite flap was easily rotated medially and superiorly to achieve adequate and stable coverage. No skeletal stabilisation was required. The patient had an extremely smooth postoperative course with quick recovery. There were no complications (Figure 2).

Case 2

A 60-year-old woman presented in October 2003 with a stage 2 cancer of the left breast. She had a partial mastectomy with axillary node dissection followed by radiotherapy. In September 2004 she presented with pain in the left shoulder followed,

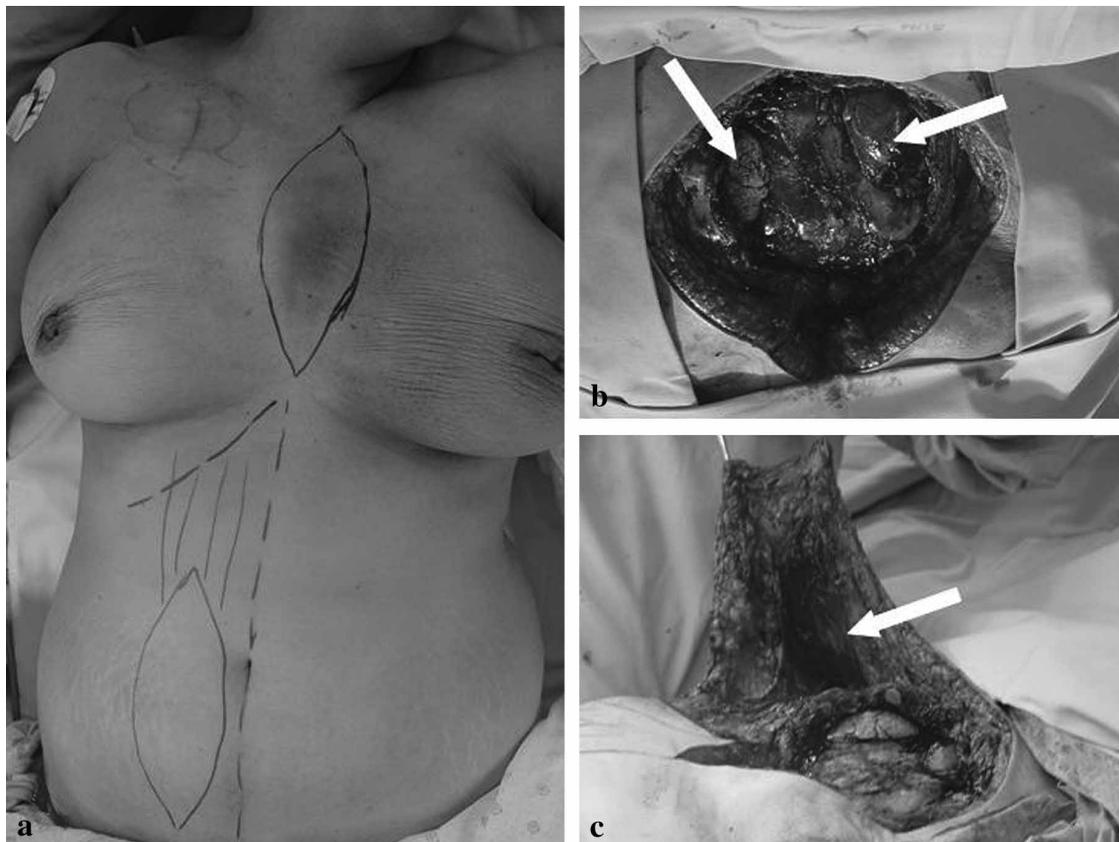


Figure 1. Case 1. (a) Planning for resection of the tumour and anticipated reconstruction with a rectus abdominis myocutaneous flap. (b) Extent of resection of the anterior chest wall exposing the lung bilaterally (arrows) and the pericardium. (c) The flap has been raised. The arrow points to pectoralis major.

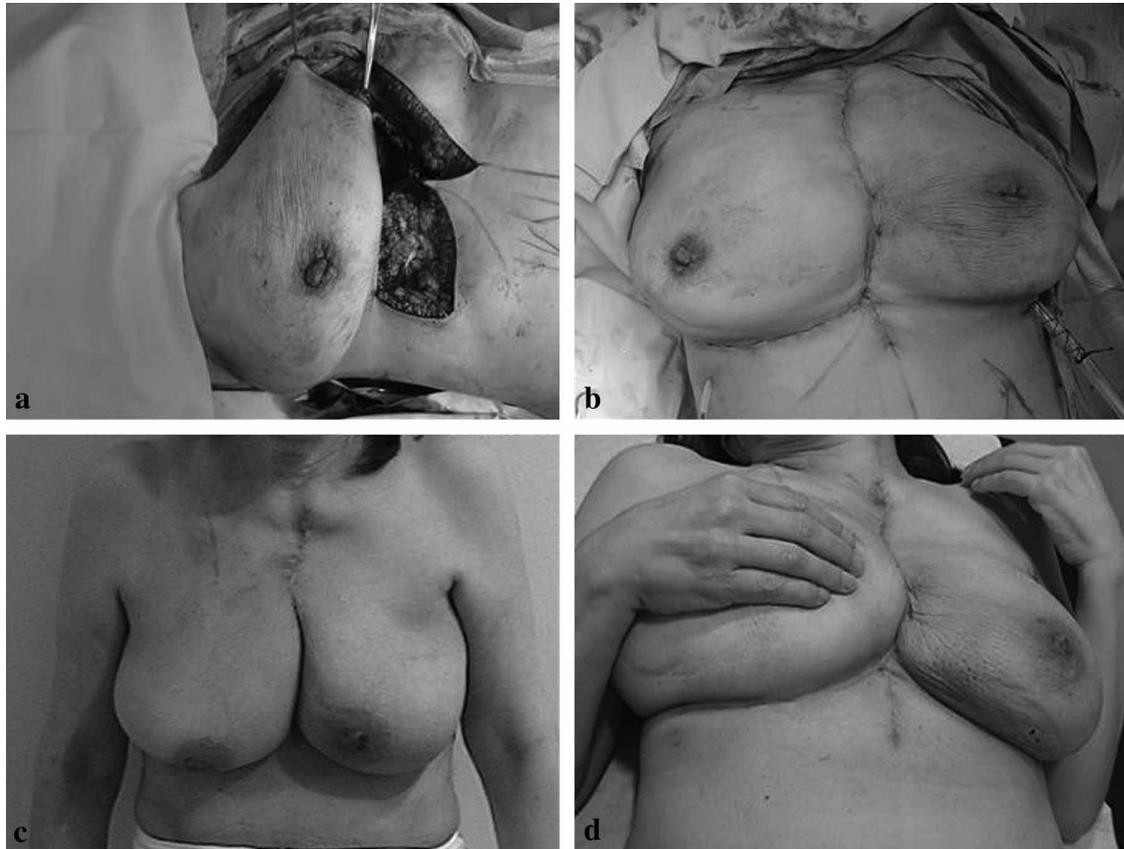


Figure 2. Case 1. (a, b) The flap has been transposed to cover the resected defect and sutured in place. The inframammary incision was easily closed primarily with minimal gathering of the skin without tension. (c, d) Result at one month with a well healed wound and inconspicuous scar in the inframammary crease.

three months later, by a mass over the manubrium that extended rapidly towards the base of the neck (Figure 3). Chemotherapy had no effect, so she was referred for operation. Reconstruction with a mammary myocutaneous-glandular flap was the first option, particularly as the defect would be high on the anterior chest wall at the limits of the reach of the rectus abdominis muscle and probably the omentum as well. The right breast was raised as a flap similar to the first patient, allowing easy and speedy reconstruction of the defect. Skeletal stabilisation was unnecessary. However, her postoperative recovery was not as smooth as that of the previous patient: she had breathing difficulties secondary to severe atelectasis and infection but did not require intubation or respiratory assistance. Raising the right breast achieved more symmetrical breasts and an improved cosmetic result (Figure 4).

Discussion

The first step in a good reconstruction is appropriate and thorough resection that leaves healthy, viable margins to which the material and tissues

may be anchored securely. A pedicled myocutaneous flap is the first choice for soft tissue coverage [5]. In some patients, however, this is not available because the flap or its blood supply may be included within the field of resection or irradiation, the flap may have been used previously, or the defect is too large or extends outside the reach of the flap. In patients with large defects that are not suited to reconstruction with pedicled myocutaneous flaps, myocutaneous free flaps may be the only option that can provide reliable single-stage soft tissue cover [5].

The omental flap, on the other hand, may sometimes seem ideal: it was a serious option in both patients described, being the only reported technique left for reconstruction, but it entailed serious morbidity particularly after wide anterior chest wall resection with bilateral exposure of the lungs. One must not underestimate the effect of prolonged operating time and the added morbidity of laparotomy or even harvesting a laparoscopic flap. The stormy recovery of the second patient was a clear indication that after such critical resections any reconstruction that limits breathing movements



Figure 3. Case 2. (a, b) Preoperative planning of excision of the tumour and reconstruction with a mammary myocutaneous-glandular flap. (c) Computed tomogram shows invasion by tumour (arrow) and stiff irradiated left breast.

should be avoided if possible. Retrospectively, skeletal stabilisation with a mesh might have speeded her recovery by limiting paradoxical movement of the upper chest.

The possibility of using the opposite breast as a donor site has been largely ignored [6], and opposite breast flaps have been considered as inferior to more technically-challenging myocutaneous or free flaps. Marshall [7] described an operation that involved the transfer of breast tissue that is normally discarded in breast reduction to the other side in a two-stage procedure; this may be useful both for reconstruction of the breast and also for repair of the chest wall after radiation damage, particularly in elderly patients. The same applies to single-stage reconstruction with an opposite split-breast perforator flap in which the excess inferior part of the opposite breast is dissected after superior-based reduction mammoplasty to its medial-supplying perforators to form a caudal lipoglandulocutaneous flap that is then rotated clockwise to the opposite side [6]. It applies also to the split-breast flap raised above pectoralis major or the deep fascia as described for single-stage repair of defects of the chest wall after secondary excision or repair of an ulcer [8]. These

single-stage split-breast flaps, however, may lead to severe postoperative swelling, venous congestion, and distal necrosis of the flap [6,8]. These complications may be prevented by additional microanastomotic venous supercharging of the thoracoepigastric vein [6], or by carrying the segment of breast tissue as a myomammary flap of pectoralis major [9]. Though these flaps may be useful, particularly for reconstruction of the opposite breast, they are different from the one stage transfer of the entire breast flap that we have described for reconstruction of the chest wall.

As confirmed by Hwang et al. [10], the breast flap associated with pectoralis major ensures reliability of the flap and minimises complications. It is easy to dissect and it is large enough to cover large defects. It is valuable when internal mammary arteries have been compromised. The mammary myocutaneous-glandular flap effectively covers complex midline defects of the anterior chest wall with exposed lung tissue and pericardium. Its arc of rotation allows adequate reconstruction of defects that extend from the base of the neck to the epigastric area and can be used to solve an extremely difficult problem.



Figure 4. Case 2. (a) Extent of resection of the chest wall with the lung exposed bilaterally and pericardium. (b) Mammary myocutaneous-glandular flap completely covering the defect. (c) Postoperative result at one week. Improved cosmetic appearance with the normal right breast raised to match the operated on and irradiated left breast.

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