EUROPEAN SURGERY Volume 37 | Number 2 | April 2005

EUROPEAN SURGERY

ACA Acta Chirurgica Austriaca

Intestinal Epithelial Barrier

Body Fat Accumulation and Morbidity after Colorectal-Cancer Surgery

Atrophic Hypoganglionosis of the Colon

P.b.b. Erscheinungsort Wien, Verlagspostamt 1201 Wien, Zulassungsnummer 03Z035236

SpringerWienNewYork

22-1

Case Report

Eur Surg (2005) 37/2: 99–102
DOI 10.1007/s10353-005-0140-9

EUROPEAN SURGERY
ACA Acta Chirurgica Austriaca
Printed in Austria

Forearm fillet flap for defect closure after chest wall resection in a breast cancer patient after forequarter amputation

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Received September 21, 2004, accepted January 28, 2005
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Defektverschluss mit Unterarmlappen nach Thoraxwandresektion und interskapulothorakaler Amputation bei weit fortgeschrittenem Mammakarzinom

Zusammenfassung. *Grundlagen:* Ausgedehnte Lokalrezidive nach Brustkrebsoperationen bei Zustand nach Radio- und Chemotherapie können exulzerieren und sind nicht selten von einer Plexus-brachialis-Läsion und somit Schmerzen und Lähmung des Armes gefolgt.

Methodik: Wir berichten über eine Patientin, bei der aufgrund eines weit fortgeschrittenen Mammakarzinoms mit Infiltration der Thoraxwand und der rechten Lunge eine interskapulothorakale Amputation mit gleichzeitiger Thoraxwand- und Lungenteilresektion durchgeführt wurde. Die Indikation zu dieser mutilierenden Operation wurde aufgrund der Schmerzen im rechten Arm, dem verjauchenden Zerfall des Tumors und der Metastasenfreiheit gestellt. Aus dem amputierten Unterarm wurde ein Haut-Faszien-Lappen gewonnen, dessen Gefäße mit den Subklaviagefäßen anastomosiert wurden.

Ergebnisse: Postoperativ konnte die Patientin dadurch in die Familie sehr rasch reintegriert werden.

Schlussfolgerungen: Eine interskapulothorakale Amputation mit Thoraxwandresektion und darauf folgender Rekonstruktion kann für Patienten bei verjauchten, metastasenfreien Mammakarzinomen, wenngleich selten, so doch indiziert sein, um die Lebensqualität zu erhöhen.

Schlüsselwörter: Unterarmlappen, Mammakarzinomrezidiv, interskapulothorakale Amputation.

Summary. *Background:* Widespread local recurrence of breast cancer and extension to the chest wall and other nearby structures in patients after radio- and chemotherapy is not rare. Recurrence might be associated with ulceration and severe pain after radiation therapy. Paralysis of the arm might result from compression of the brachial plexus.

Methods: We report here on a breast cancer patient in whom chest wall resection to deal with tumor invasion was followed by reconstruction undertaken with a flap raised from the forearm of the amputated upper extremity which had been paralysed by tumor extension.

Results: The patient was reintegrated into family life, thus saving her from social isolation and psychological suffering caused by her stinking ulcer. In addition, her extreme physical suffering was ameliorated to a great degree despite accompanying mutilation.

Conclusions: Palliative forequarter amputation, chest wall resection, and subsequent chest wall reconstruction might be considered in patients without detectable metastases for improving the patient's quality of life, even though it may not be curative and chances of long-term survival may be poor. The patient, however, must find the price of severe mutilation acceptable.

Key words: forearm flap, breast cancer recurrence, forequarter amputation.

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Introduction

Treatment of extensive local recurrence after breast cancer demands a multidisciplinary approach involving oncological and thoracic surgeons, oncologists, and internists. For patients with widespread chest wall recurrence but without detectable metastatic spread, it would be desirable to include consultations with plastic reconstructive surgeons in the process of setting up a treatment plan. There are almost no technical limits to radical surgery including resection and reconstruction of the chest wall, in view of the availability of numerous reconstructive measures employing different kinds of flaps for defect closure, including microvascular techniques [1, 2]. When

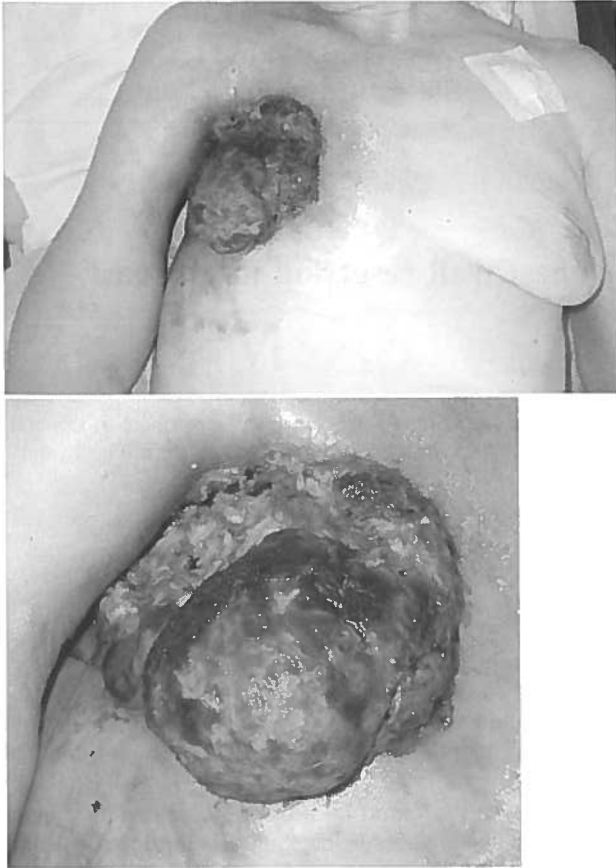

Fig. 1. 54-year-old patient with extensive breast cancer after radiation and polychemotherapy

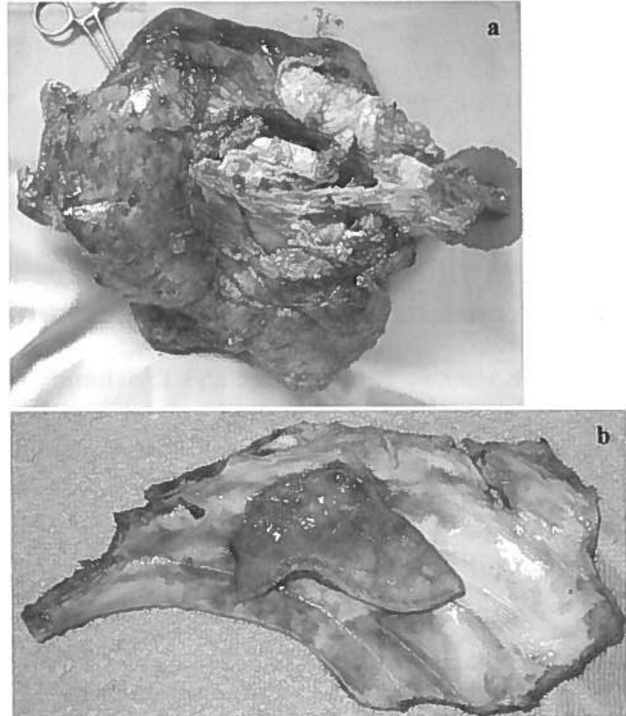

Fig. 2. a Resected ulcerated tumor mass which had extended to the chest wall. **b** Resected ribs and lung section

disease progression cannot be prevented despite therapy, the question arises in individual cases whether it is meaningful to perform surgical-oncological and reconstructive procedures, which are both costly and time-consuming.

Methods

A 54-year-old woman with local recurrence of breast cancer after polychemotherapy and irradiation was referred to us for palliative operation. During primary operation a large moderately differentiated invasive ductal carcinoma (pT4, N2, MXR1) had been resected. After resection, the patient underwent chemotherapy including 3 cycles of cyclophosphamide and epirubicin and 15 cycles of navelbine and herceptin, and radiation therapy of the right axilla (600 Gyr). Following the procedure described above, the patient underwent 6 cycles of herceptin and taxol and 2 cycles of gemzar and herceptin.

On presentation, the patient was found to have an ulcerating, bleeding, and foul-smelling tumor (15 by 15 cm) that had invaded the right anterior chest wall between the 2nd and 6th rib, pleural effusion and reduced lung function (Fig. 1). Tumor extension to the axilla and the right upper arm had caused a narrowing of the axillary vessels and complete compression of the brachial plexus resulting in almost complete plexus paresis and severe pain in the right arm. Preliminary examination included routine preoperative investigations, whole-body CT, lung function tests, MRI, and whole-body bone scan to exclude metastatic spread of the disease.

Since there was no evidence of distant spread of the disease, and the patient complained of severe pain, complete social isolation, and a total loss of quality of life, we decided to perform palliative forequarter amputation with resection of the chest wall. The aim of the operation was to enable the patient to lead a pain-free life integrated within her family, although at the cost of severe mutilation.

In order to save time, concomitantly with thorax wall resection of the four affected ribs (Fig. 2), the remnant amputated arm (Fig. 3) was prepared. The brachial artery and the cubital vein stumps were ligated. A large flap was raised comprising the skin and fascia around the whole forearm and supplied by radial and ulnar arteries, which were distally ligated at the wrist. The brachial artery was cannulated and flushed with University of Wisconsin solution till the fluid running out was clear. The flap was then packed in sterile compresses and kept cool at 4 °C.

After completion of the thorax wall reconstruction with a vicryl mesh (Fig. 4) and appropriate drainage, the forearm flap was placed in position and the vessels were anastomosed end-to-side to the stumps of the subclavian artery and vein, respectively. Entire ischemia time was 90 min. There was rapid return of normal color and good circulation to the tip of the flap. The flap was then fixed in place with interrupted sutures. It was large enough to cover most of the defect, except a defect (12 by 12 cm) on the dorsal right side of the lateral thoracic wall. This defect was covered with split-thickness skin graft. Appropriate wound dressings were applied, leaving a window on the anterior wall of the thorax wall to enable monitoring the flap's condition.

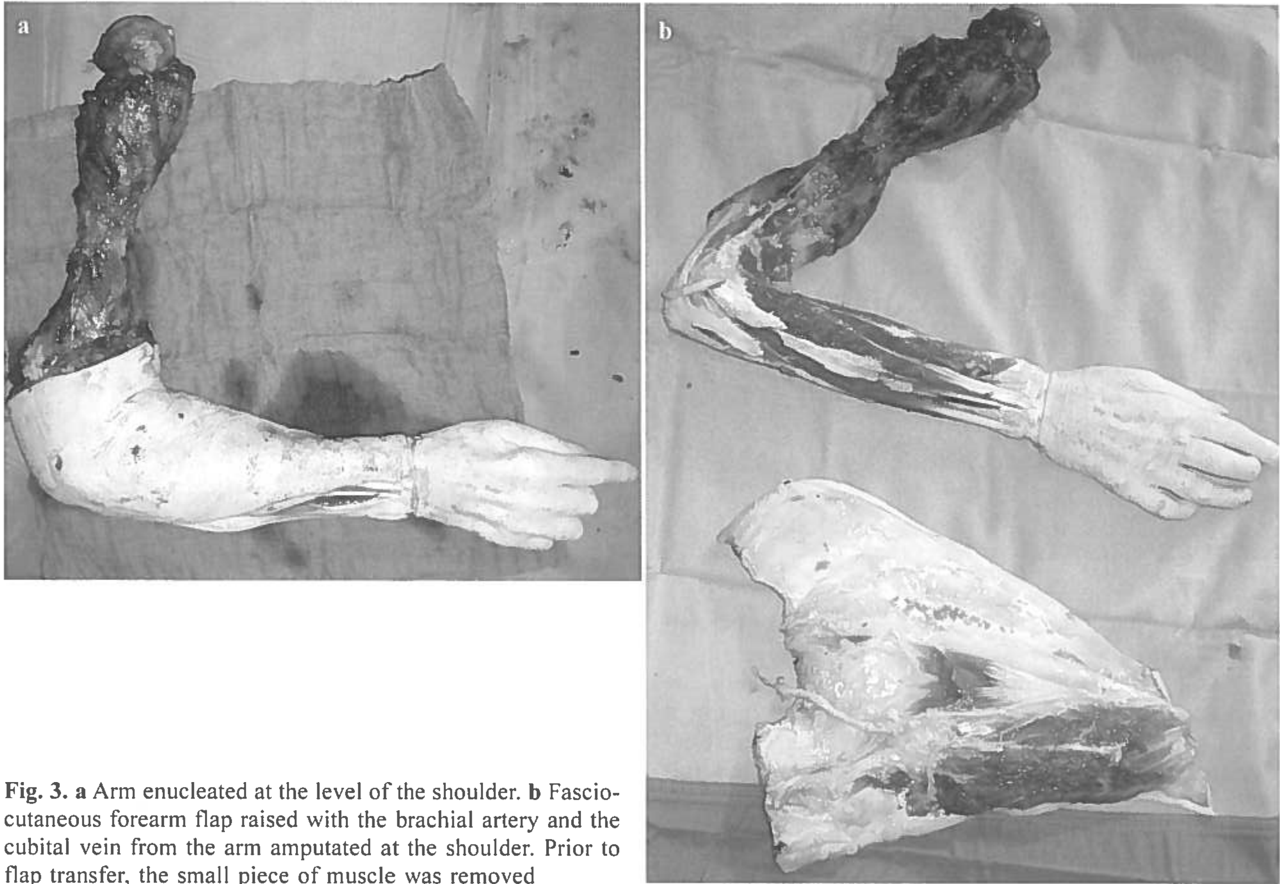

Fig. 3. a Arm enucleated at the level of the shoulder. **b** Fasciocutaneous forearm flap raised with the brachial artery and the cubital vein from the arm amputated at the shoulder. Prior to flap transfer, the small piece of muscle was removed

Results

The postoperative course was complicated by minimal necrosis of the skin graft necessitating renewed skin transplant. Three weeks post surgery, the patient was discharged after being fully mobilized (Fig. 5).

Discussion

Recurrence of breast cancer is mostly treated with additional radiation therapy and/or systemic chemotherapy depending on the initial treatment and presence of secondary changes. If the tumor infiltrates into deeper

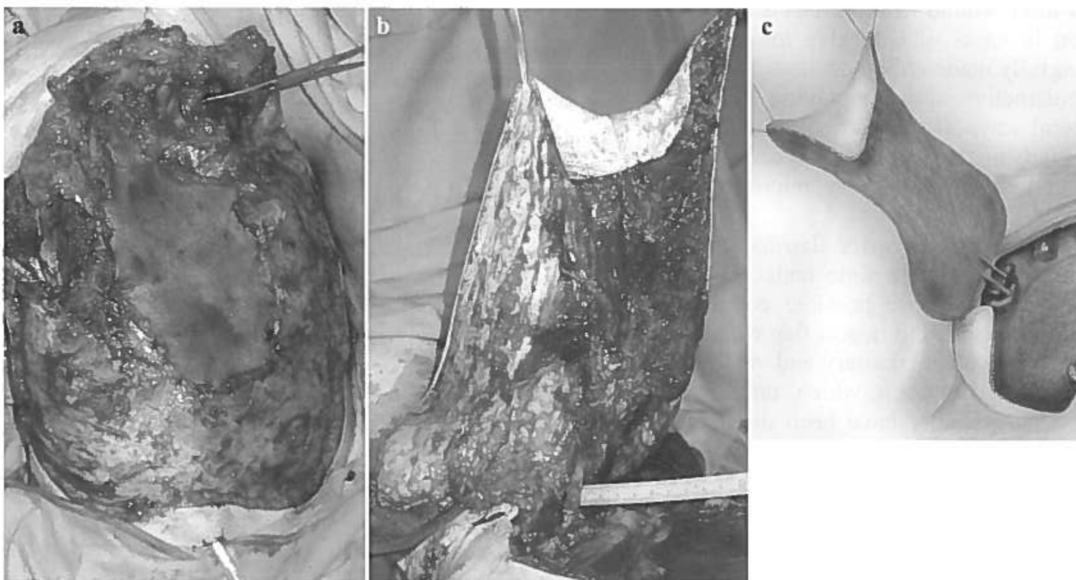

Fig. 4. a Thorax wall reconstruction with vicryl mesh. **b** Flap with vascular anastomoses in position; **c** schematic illustration

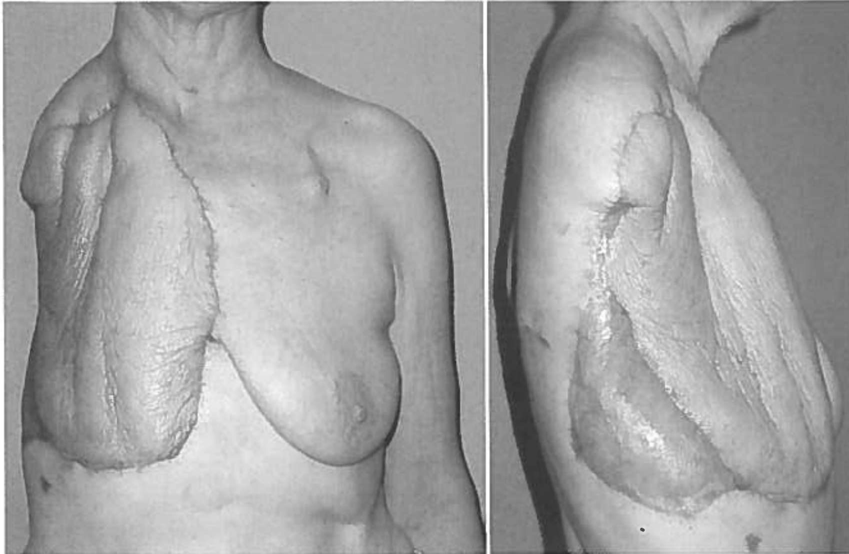

Fig. 5. 6-month postoperative results after forequarter amputation and chest wall defect closure with flap

structures or ulcerates, chest wall resection must be considered [3].

Most patients with advanced recurring tumor are considered as having exhausted available treatment options when they are referred to plastic and reconstructive surgeons. Questions then arise as to the meaningfulness of extensive surgical procedures involving chest wall and partial lung resection and possibly arm amputation in such patients because length of survival is likely to be poor and the medical and surgical costs involved are not insignificant [4]. Nonetheless, we suggest that as a palliative measure, surgery makes sense in these cases [5, 6]. Intense preoperative discussions about the tumor stage, social environment, and quality of life make it clear that these patients are willing to undergo palliative treatment if they believe that this can result in improved quality of life [5].

The pros and cons of palliative surgery must be weighed carefully. If the procedure runs an uncomplicated course, the patient can undergo chemotherapy as early as 2–3 weeks after wound healing. Decision for a surgical intervention in cases of extensive local recurrence can be meaningfully made only in an interdisciplinary team, with reconstructive surgeons playing a critical role. There are several ways of reconstructing the chest wall with different kinds of flaps, local or myocutaneous or grafts, which can be transplanted by microsurgical techniques.

It is desirable to choose an area for flap harvesting that does not prolong the operation time unnecessarily, delay wound healing, and increase possible complications. For this reason, we decided to raise a flap with skin and fascia together with the brachial artery and vein from the dysfunctional amputated forearm, which, under normal circumstances, would simply have been discarded, and use it for defect closure on the chest wall employing microvascular surgical techniques. Such a flap-raising procedure might be considered as a recycling approach in reconstructive surgery.

Nine months after this operation, the patient died after one day of hospitalization because of lung hemorrhage. During that period of time, the patient was able to live at home and thus did not suffer from social isolation. At the very end of her life, her comments were that she was happy to have undergone this surgery that prolonged her life and gave it an acceptable quality.

References

1. Tukiainen E, Popov P, Asko-Seljavaara S (2003) Microvascular reconstructions of full-thickness oncological chest wall defects. Ann Surg 238: 794–802
2. Arnold PG, Pairolero PC (1996) Chest-wall reconstruction: an account of 500 consecutive patients. Plast Reconstr Surg 98: 804–810
3. Vandeweyer E, Nogaret JM, Hertens D, Deraemaecker R (2002) Chest coverage and reconstruction after recurrence of breast cancer. Eur J Plast Surg 25: 7–10
4. Downey RJ, Rusch V, Hsu FI, Leon L, Venkatraman E, Linehan D, Bains M, van Zee K, Korst R, Ginsberg R (2000) Chest wall resection for locally recurrent breast cancer: is it worthwhile? J Thorac Cardiovasc Surg 119: 420–428
5. Piza-Katzer H, Pilz E, Hausmaninger C, Herczeg E (1995) Erfahrungen in der Behandlung weit fortgechrittener primärer Mammakarzinome, ausgedehnter Tumorrezidive und Strahlenschäden: Überlegungen zur Sinnhaftigkeit der chirurgischen Therapie. Wien Klin Wochenschr 107: 163–168
6. Sakamura R, Nohira K, Shibata M, Sugihara T (2001) Coverage of a large soft-tissue defect of the chest with a free fillet forearm and hand flap. J Reconstr Microsurg 17: 229–321