Thoracic Wall Reconstruction in Local Recurrences and Advanced Cases

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44.1 Introduction

The incidence of local recurrences after mastectomy and breast-conserving therapy ranges between 5 and 40 % depending on risk factors and primary therapy [1]. No standard therapy for local recurrences has been defined, and the current recommendation is to excise the visible tumor with subsequent radiotherapy, although in many cases irradiation or chemotherapy is the primary or only therapy [2].

Local recurrences are often misjudged as the first indication of a systemic dissemination of the disease and a curative approach is therefore abandoned [3]. Although some patients with chest wall recurrence have evidence of metastatic growth, reports have demonstrated long-term survival [2]; moreover, these patients often have disabling symptoms such as pain, bleeding, ulceration, malodorous secretion, and infection [4]. Although palliation rather than prolongation of survival is usually the main aim of chest wall resection, whether complete resection of local recurrence offers a palliative or curative approach or major prolongation of survival continues to be unclear [2, 4].

Most locoregional recurrences occur as isolated chest wall disease, and only a small proportion occur with concurrent systemic disease or following distant metastasis [5–7]. Chest wall recurrence is commoner in patients who had a mastectomy as the initial treatment for breast cancer. In this situation, locoregional recurrences are likely to penetrate the chest wall, growing around ribs and the sternum because of the previous loss of tissue. Considering that some tumors show a limited tendency for lymphatic or hematogenous spread, they may extend locally prior to becoming metastatic [5]. We argue that although the primary goal of chest wall resection is to achieve local control of the tumor, potentially leading to long-term palliation, another result may be cure in a small subset of patients with isolated chest wall recurrence of breast cancer [8, 9].

44.2 Oncologic Aspects

The overall 5-year survival after a full-thickness chest wall resection for breast cancer recurrence ranges from 18 to 45 % in older series [10–13] and recently it has been reported to be up to 71 % [14]. It has been demonstrated that patients in whom chest wall recurrence develops are a heterogeneous population [14]; hence, differences in outcome could be explained by failure to identify prognostic factors that accurately predict the breast pathological subtype, treatment response, and ultimately survival. Recently, Santillan et al. [5] demonstrated that the strongest and most independent predictor of survival is the triple-negative phenotype—estrogen receptor negative, progesterone receptor negative, human epidermal growth factor receptor 2 (HER2)/neu expression negative—in the recurrent breast tumor (Table 44.1).

In a correctly selected group of patients undergoing chest wall resection after local recurrence of breast cancer, the primary goal is to regain local control regardless of the extent of disease. Some of these patients, in fact, will present with painful, infected, ulcerated, or fungating lesions that cause a great distress to the patients [5]. Treatment with radiotherapy, systemic therapy, and surgery, alone or in combination, can help to achieve local control [15, 16].

The reported overall operative mortality rate after chest wall resection for breast cancer recurrence is fairly low, ranging from 0 % in most of the recent series [3–5] up to 2.0 % [17]; however, a higher mortality rate, ranging form 3.5 to 4.5 %, has been reported [9], and a 30-day mortality rate of 7 % has occasionally been reported [18]. In contrast, the postoperative complication rate is not negligible. Minor

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Table 44.1 Literature review

Authors	Years	Number of patients	Five-year survival (%)	Country
Miyauchi et al. [12]	1992	23	48	Japan
Dahlstrøm et al. [20]	1993	98	56	Denmark
Mora et al. [21]	1996	69	72	USA
Faneyte et al. [8]	1997	44	45	Netherlands
Downey et al. [3]	2000	38	18	USA
Henderson et al. [22]	2001	61	24	Australia
Moran et al. [23]	2002	53	55	USA
Friedel et al. [17]	2005	51	41	Germany
Veronesi et al. [4]	2007	15	19	Italy
Friedel et al. [2]	2008	63	46	Germany
Santillan et al. [5]	2008	28	18	USA

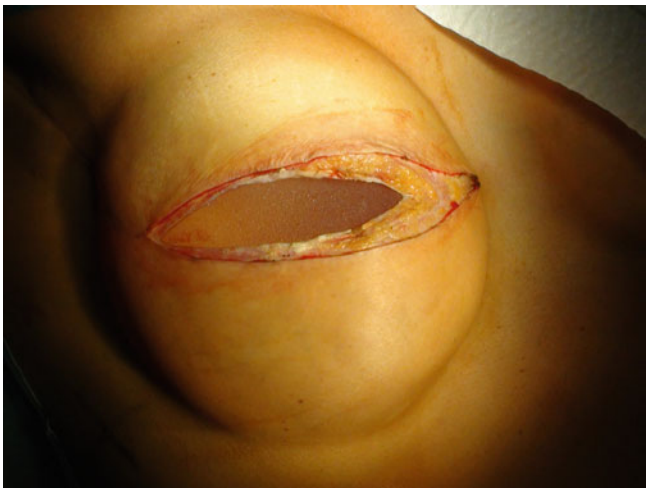

Fig. 44.1 The previously implanted breast prosthesis is removed

Fig. 44.2 The previously implanted breast prosthesis is removed

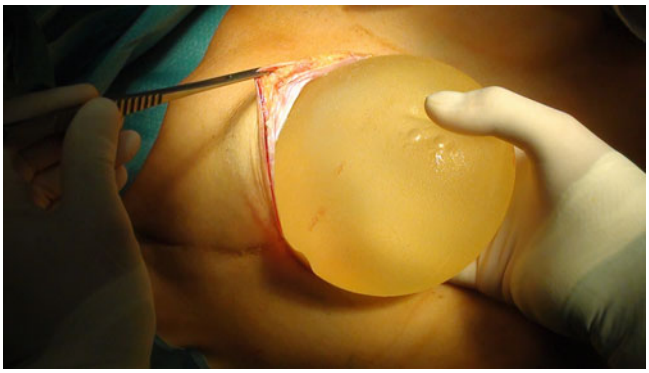

Fig. 44.3 The previously implanted breast prosthesis is removed

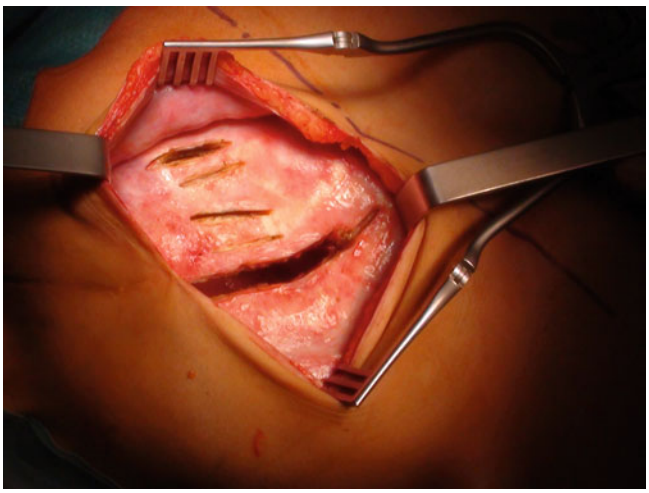

Fig. 44.4 Chest wall is exposed and every single involved rib is prepared by *scollaperiostio*

postoperative morbidity includes edge necrosis of the myocutaneous flap requiring surgical excision with the patient under local or general anesthesia, and pleural effusion requiring pleural drainage. Reported major complications are prosthesis infection, chest wall hematoma (requiring a re-do operation), massive atelectasis (requiring toilette bronchoscopy), and postoperative empyema. Morbidity has been reported to be 20–50 % in various studies, with a rate of reintervention ranging from 17 to 22 % [2].

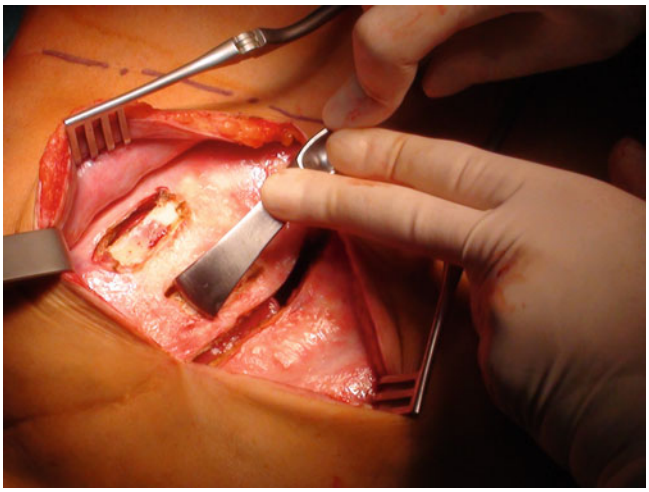

Fig. 44.5 Chest wall is exposed and every single involved rib is prepared by *scollaperiostio*

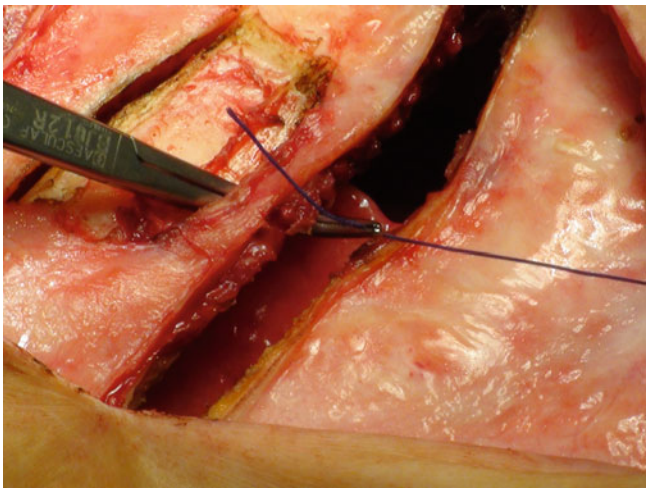

Fig. 44.7 Intercostal vein and artery are dissected and ligated to allow a safe rib resection by *costotomo*

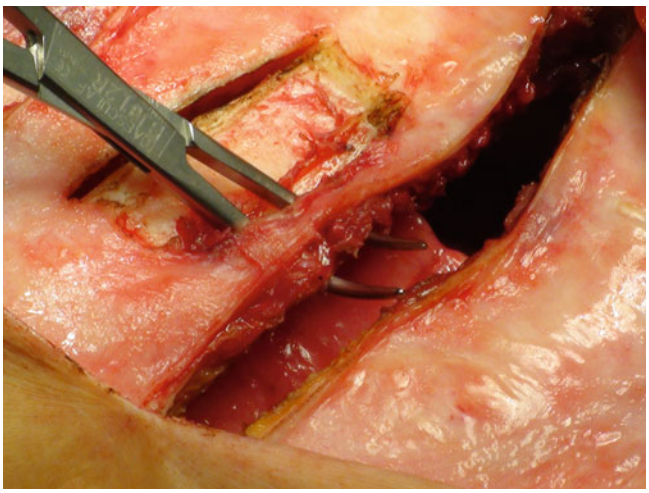

Fig. 44.6 Intercostal vein and artery are dissected and ligated to allow a safe rib resection by *costotomo*

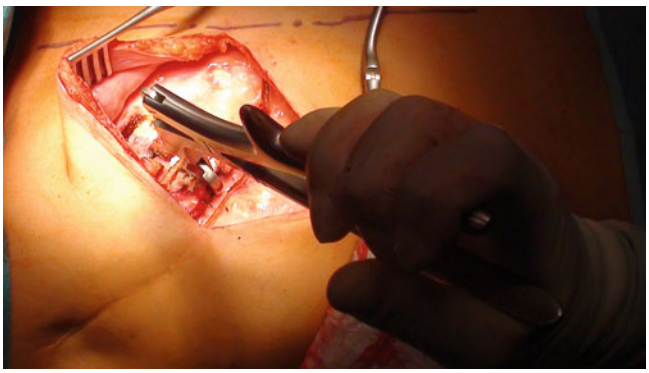

Fig. 44.8 Intercostal vein and artery are dissected and ligated to allow a safe rib resection by *costotomo*

On the basis of the existing literature, we may argue that complete resection with free margins is recommended as the first choice for treatment in recurrent breast cancer. In fact, local recurrence has to be regraded as a repeated episode of a disease with an increased risk of subsequent metastases and not vice versa. The curve of metastatic incidence might be flattened or reduced markedly by a radical resection with sufficient safety margins [2].

Risk factors affecting long-term survival are a diameter of the local recurrence greater than 1.5 cm, disease-free interval of less than 2 years, skin incision, initial tumor stage, and positive lymph nodes [19]. Age at the time of primary resection has been described as a prognostic factor, although different cutoff and prognostic values have been reported. Faneyte et al. [8] observed that patients who were younger than 35 years at

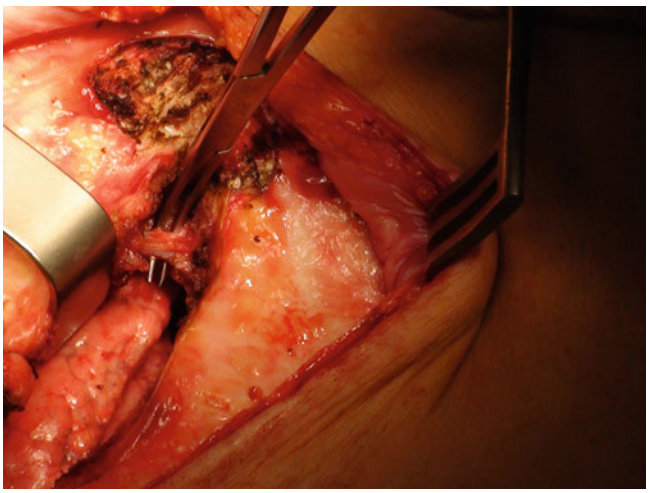

Fig. 44.9 Mammary vein and artery of the involved hemisternum are dissected, isolated and then ligated

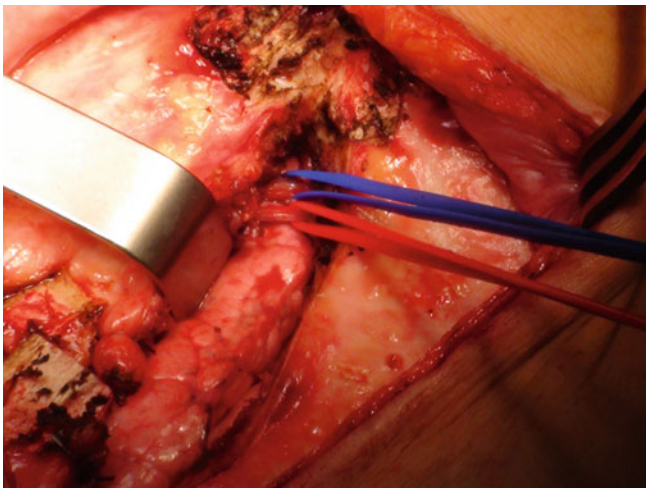

Fig. 44.10 Mammary vein and artery of the involved hemisternum are dissected, isolated and then ligated

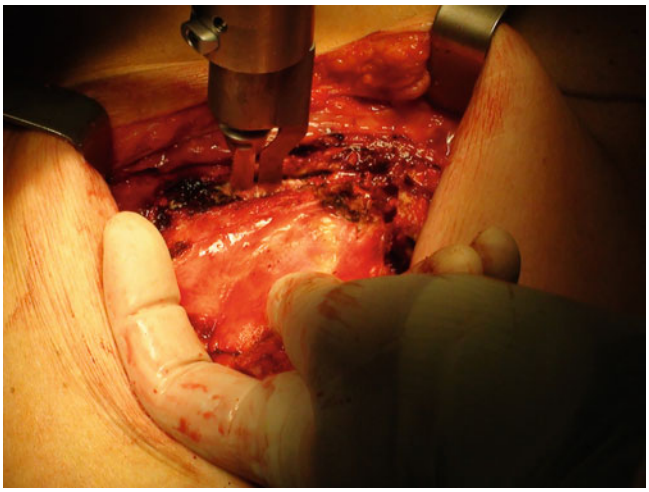

Fig. 44.12 The sternum is then transected, both horizontally and vertically by sternotomy

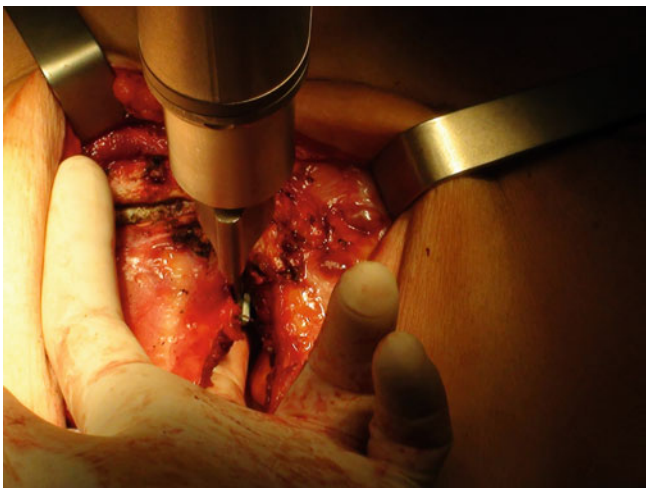

Fig. 44.11 The sternum is then transected, both horizontally and vertically by sternotomy

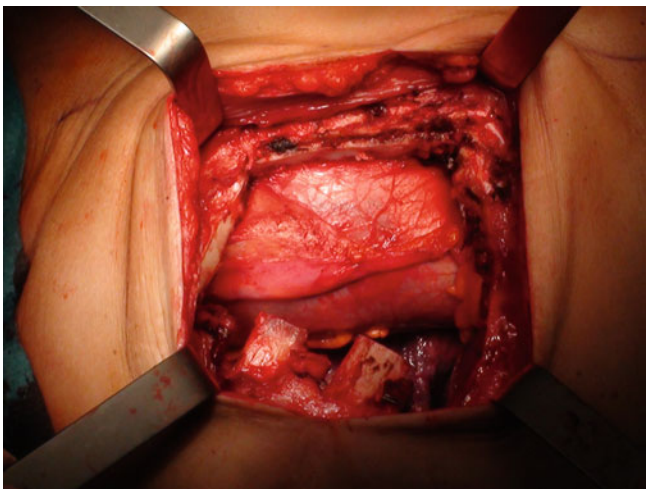

Fig. 44.13 Chest wall resection is then completed, exposing intrathoracic structures; interrupted mutliple non adsorbable stitches are roundly placed for subsequent fixing of the prosthesis

the time of primary therapy had significantly lower survival rates after the resection of a chest wall recurrence. In contrast, Friedel et al. [2] observed that the distinction between younger and older patients was determined to be 45 years, with an improved long-term survival for the younger group, who had better prognosis with surgical therapy for the local recurrence than older patients. Whether this is actually due to the therapeutic procedure or the generally decreased life expectancy of older patients has not been clarified yet.

44.3 Technical Aspects

The previously implanted breast prosthesis is removed (Figs. 44.1, 44.2, 44.3). The chest wall is exposed and every involved rib is prepared with a periosteal elevator (Figs. 44.4, 44.5). The intercostal vein and artery are dissected and ligated to allow a safe rib resection with a rib cutter (Figs. 44.6, 44.7, 44.8). The mammary vein and artery of the involved hemisternum are dissected, isolated, and then ligated (Figs. 44.9, 44.10). The sternum is then transected, both horizontally and vertically, with a sternal saw (Figs. 44.11, 44.12). The chest wall resection is then completed, exposing intrathoracic structures. Interrupted multiple nonabsorbable stitches are roundly placed for subsequent fixing of the prosthesis (Figs. 44.13, 44.14). A polypropylene prosthesis is prepared with resinous material according to the extent of parietal defect following chest wall resection (Fig. 44.15). The prosthesis is then implanted and fixed to adjacent healthy bones of the chest wall (Fig. 44.16). The latissimus dorsi muscle flap is then

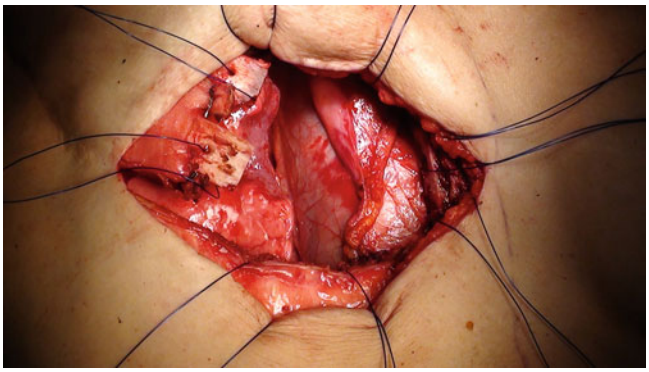

Fig. 44.14 Chest wall resection is then completed, exposing intrathoracic structures; interrupted mutliple non adsorbable stitches are roundly placed for subsequent fixing of the prosthesis

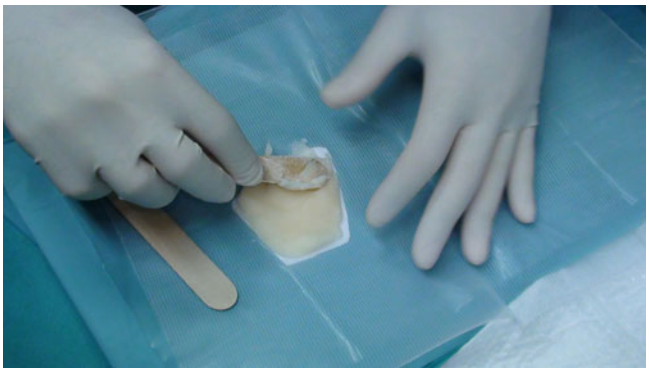

Fig. 44.15 Polypropylene prosthesis is prepared with resinous material, according to the extent ofparietal defect following chest wall resection

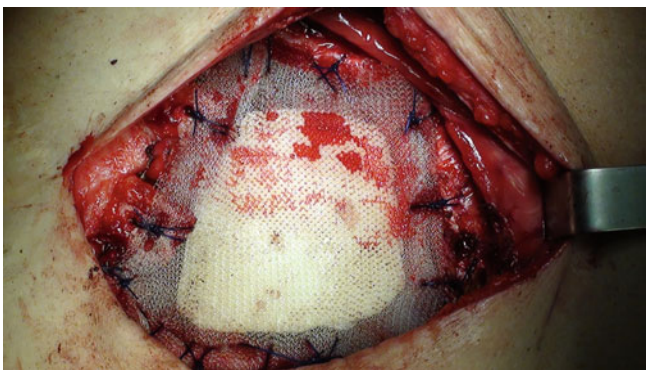

Fig. 44.16 Prosthesis is then implanted and fixed to adjacent healthy bones of the chest wall

prepared, with a cutaneous island, and then rotated to cover the prosthesis and to close the anterior tissue defect (Figs. 44.17, 44.18).

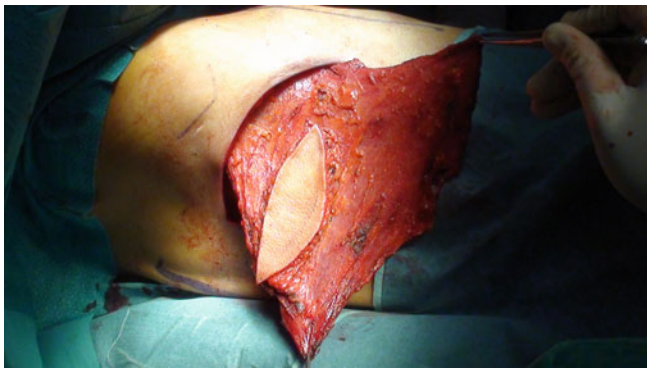

Fig. 44.17 Latissimus dorsi muscle flap is then prepared, with cutaneous island, and then rotated to cover the prosthesis and to close anterior tissue defect

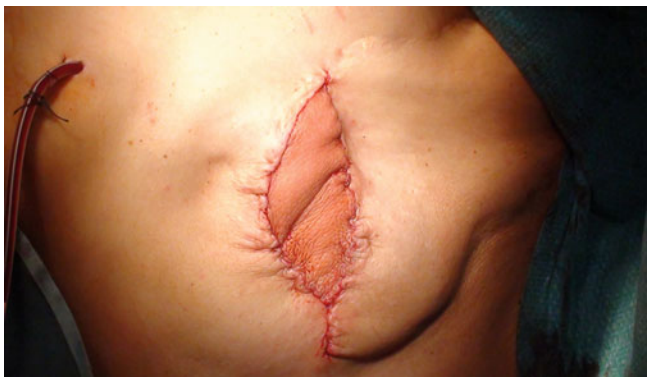

Fig. 44.18 Latissimus dorsi muscle flap is then prepared, with cutaneous island, and then rotated to cover the prosthesis and to close anterior tissue defect

44.4 Conclusion

Full-thickness resection of the chest wall can be done with acceptable morbidity and mortality, offering significant palliation in patients with locally recurrent disease. Palliative surgical resection may be taken into consideration even in the case of multiple nodules, skin ulceration, and distant metastatic disease, providing good aesthetic results along with palliation of symptoms.

In locally recurrent breast cancer, complete chest wall resection may offer radical control of the disease if it is performed with sufficient tumor-free safety margins (2–5 cm). In fact, it may offer a cure for a significant proportion of patients with isolated chest wall recurrence.

Patients with a long disease-free interval form their initial treatment and a slow clinical course may be ideal candidates for surgical treatments. Moreover, because the triple-negative phenotype is not amenable to any form of

therapy, palliation with chest wall resection may represent the only hope that can be offered.

To facilitate surgical therapy and to cover large chest wall defects, cooperation between thoracic and plastic surgeons plays a basic role.

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