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Original article

No increase of local recurrence rate in breast cancer patients treated with skin-sparing mastectomy followed by immediate breast reconstruction

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ABSTRACT

Background: The aim of this study was to evaluate the incidence of local recurrence after SSM with IBR and to determine whether complications lead to postponement of adjuvant therapy.
Method: Patients that underwent IBR after SSM between 2004 and 2011 were included.
Results: A total of 157 reconstruction procedures were performed in 147 patients for invasive breast cancer ($n = 117$) and ductal carcinoma in situ ($n = 40$). The median follow-up was 39 months [range 6–97]. Estimated 5-year local recurrence rate was 2.9% (95%CI 0.1–5.7). The median time to start adjuvant therapy was 27.5 days [range 19–92] in 18 patients with complications, and 23.5 days [range 8–54] in 46 patients without complications ($p = 0.025$).
Conclusion: In our single-institution cohort, IBR after SSM carried an acceptable local recurrence rate. Complications caused a delay of adjuvant treatment but this was within guidelines and therefore not clinically relevant.

Background

The surgical treatment of breast cancer has changed dramatically in the last decade. The extended radical mastectomy in the 19th century has evolved from standard mastectomy to breast conserving surgery (BCS) in the 1980s [1]. During this period, skin-sparing mastectomy (SSM) with immediate breast reconstruction (IBR) was also introduced, which clearly improved the long-term esthetic results [2]. IBR after SSM has gained popularity and has been used in an increasing proportion of patients. In addition to the gaining popularity, the number of patients with an indication for mastectomy is increasing due to improved pre-operative staging with breast MRI [3] and the introduction of risk reducing surgery in patients with hereditary breast cancer.

Breast reconstruction in combination with preservation of the whole skin envelope compared to the standard mastectomy has raised concerns about the oncological safety of the SSM in terms of local recurrence. Breast tissue will always remain when sparing skin [4]. In 2003, more than 60% of the breast surgeons reported to avoid performing SSM because of the potential risk of local recurrence [5]. Besides local recurrence, another concern is that complications of SSM with IBR might cause postponement of adjuvant chemo- and radiotherapy. Several studies have shown that the timing of receiving the first course of adjuvant chemotherapy is important for both avoiding local recurrence and improving overall survival [6,7].

Therefore, the primary aim of this study is to evaluate the incidence of local recurrence (or second primary) after SSM with

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IBR. The secondary aim of this study is to determine whether the complications due to SSM with IBR lead to postponement of adjuvant chemotherapy or radiotherapy in patients with invasive breast cancer.

Methods

Study population and data collection

Acquisition of informed consent was waived by a certified medical ethics committee. All patients that underwent a SSM with IBR for invasive breast cancer or carcinoma in situ in the period 2004–2011 were included. Patients who underwent prophylactic mastectomy were excluded from the analyses. Data concerning diagnosis, surgical procedures, histopathology, (neo-) adjuvant therapy, and follow-up were retrospectively and starting January 2010, prospectively collected.

Multidisciplinary consultation

The possibility for SSM with IBR was discussed preoperatively in a multidisciplinary consultation, attended by a surgical oncologist, medical oncologist, radiation oncologist, radiologist, and pathologist. Eligible patients were referred to the plastic surgeon for further consultation. High pre-operative risk for adjuvant radiotherapy was a relative contra-indication. The choice of reconstruction technique depended on several patient related factors including breast size, ptosis, areola size, patient preference and expectations, general health, smoking and timing of operation. Postoperatively the definitive histopathology report and (indicated) adjuvant therapy were multidisciplinary discussed.

Surgical procedure

A team of dedicated oncological and plastic surgeons performed all surgical procedures. The nipple areola complex and breast parenchyma were completely resected. Most of the SSM's with autologous reconstructions were 1-stage operations. All reconstructions with a tissue expander were 2-stage operations; SSM was performed in combination with placement of a tissue expander, which was replaced by a definitive prosthesis in a second procedure.

Pathology

Biopsies and surgical specimens were fixated in formalin. Paraffin sections were cut and stained with hematoxylin and eosin stain. The pathology report included tumor type, diameter, grade (following Bloom and Richardson for invasive tumors and the three-tier scheme for in situ tumors), lymphangio-invasion and resection margins for both carcinoma in situ and invasive breast cancer. Estrogen and progesterone status (immunohistochemistry) and HER2 (with FISH technique) were determined in case of invasive breast cancer. As part of the Dutch National Breast Cancer Guidelines, hormone receptors are not determined in DCIS tumors. Lymph node status was based on sentinel lymph node biopsy and/or (complementary) axillary lymph node dissection.

Adjuvant therapy

Radiotherapy (RT), (neo-) adjuvant chemotherapy or adjuvant hormonal treatment was indicated in accordance to Dutch guidelines [8]. The most common indication for neo-adjuvant chemotherapy was a large tumor in a relatively small breast. Radiotherapy was indicated in case of "high risk" patients, to say, more than 3 positive lymph nodes, growth into the pectoral muscle, or tumor size larger than 5 cm in combination with any of the following poor prognostic characteristics: grade III tumor, lymphangio-invasion, or age younger than 40 years. Furthermore, RT was indicated in patients with irradical resection margins. These patients were standardly treated with 50 gray and a boost of 16–26 gray.

Onset of adjuvant therapy

For the second aim of this study, only invasive breast cancer patients who received chemo- or radiotherapy were included. Complications that occurred in the post-operative period until the day of the start of adjuvant treatment were registered. Time until onset of adjuvant therapy was defined as number of days between date of the SSM and IBR and the start of the first adjuvant therapy. Complications were categorized in hematoma, wound infection, seroma, and (partial) mastectomy skin flap necrosis. Hematoma was defined as any collection of blood post-operative. Wound infection was clinically diagnosed and treated with antibiotics. Seroma was a clinical diagnosis of fluid in the surgical cavity and treated conservatively or with aspiration of the seroma. (Partial) mastectomy skin flap necrosis was defined as necrosis of the skin tissue isolated in the mastectomy skin flap. Treatment was surgically with removal of the non-viable skin.

Follow-up and local recurrence

During the first year after surgery, patients underwent physical examination every three months. The second year patients were examined twice a year, and afterward yearly. A contralateral mammography was performed yearly in patients with unilateral SSM and IBR. If the physical examination or imaging was suspicious for malignancy, a histological biopsy and breast MRI were performed. Recurrence was classified as local when located in the skin, chest wall or subcutaneous tissue overlaying the reconstructed breast. Regional lymph node metastases were classified as regional recurrence. Screening for distant metastases was performed in case of pathological proven local, regional recurrence or symptoms associated with this.

Statistics

All collected data were analyzed with Statistical Package for the Social Sciences (SPSS) version 19.0 (Chicago, Illinois, USA). Descriptive statistics, student's *t*-test, Fisher's exact test, chi-square test and Mann–Whitney *U* test were used appropriately to compare patients with and without complications. The Kaplan–Meier method was used to estimate the recurrence rate over time in patients operated on for invasive and in situ carcinoma. A p-value < 0.05 was considered statistically significant.

Results

All patient and tumor characteristics are gathered in Table 1. The median age of all included patients ($n = 147$) was 51.8 years (SD 10.0). These patients underwent a total of 157 SSM with IBR. Indications for surgery were invasive breast cancer ($n = 117$), ductal carcinoma in situ (respectively $n = 40$). Tissue expander (TE) placement, deep inferior epigastric perforators (DIEP) flap and immediate implant were the most performed reconstructive procedures (Table 2).

Pathology

The mean tumor size was 19.7 mm (SD 16.6 mm) for invasive breast cancer and 50.1 mm (SD 39.0 mm) for ductal carcinoma in