Pectoral fascia preservation during modified radical mastectomy: why and when

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Context
The surgical treatment of breast cancer has changed significantly over time, but modified radical mastectomy (MRM) is still performed in about 20–30% of patients undergoing surgeries. Many articles that have studied the breast lymphatic system claim that the deep fascia is very poor in lymphatic vessels.
Aim
The aim of our study was to detect the benefits and oncological safety of pectoral fascia preservation in patients undergoing MRM.
Materials and methods
Totally, 73 patients with early breast cancer underwent MRM. The patients were randomized between removal (n=37) and preservation (n=36) of pectoral fascia.
Results
The amount of blood loss, operative time and drain output was significantly reduced in a case of pectoral fascia preservation (P>0.00001); in addition, seroma was significantly reduced (P=0.025). No chest wall recurrence had occurred in both groups.
Conclusion
Pectoral fascia preservation is safe and has many advantages as regards operative time, blood loss, seroma formation and cosmetic appearance of the flaps. It is oncologically safe compared with pectoral fascia resection, provided that good selection of the patient was done.

Keywords:
breast cancer, pectoral fascia, pectoral fascia preservation

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Introduction

Breast cancer is the most prevalent malignancy among women [1]. The surgical treatment of breast cancer has evolved from the radical mastectomy of Halsted to more limited surgery, which was introduced by Patey. In both techniques, pectoral fascia was resected to ensure radicality. Although breast conservation is considered the standard surgical approach for the treatment of early breast cancer patients, modified radical mastectomy (MRM) is still performed in about 30% of breast cancer patients [2–4].

Many articles that study the breast lymphatic system claim that the deep fascia is very poor in lymphatic vessels [5,6].

Dalberg *et al.* [7] published the only study that compared pectoral fascia preservation and excision and concluded that there was no significant increase in local recurrence in the preservation group.

Da Silva *et al.* [8] studied the specimens from 30 cases of MRM in order to determine clinical and pathological factors that were associated with invasion of pectoral fascia and demonstrate that tumor–pectoral fascia distance was the only significant independent variable to predict pectoral fascia invasion.

The aim of our study was to detect the benefits and oncological safety of pectoral fascia preservation in patients undergoing MRM.

Materials and methods

This prospective randomized control clinical trial was conducted at General Surgery Department, Zagazig University, between February 2013 and March 2014. Approved by local ethical committee of our faculty.

Totally, 96 patients were diagnosed with early breast cancer by complete history taking, clinical evaluation and full investigations and the diagnosis was proved histopathologically.

Informed consent was obtained from all patients.

Inclusion criteria

Female patients with early breast cancer and candidates for MRM were included in this study.

Exclusion criteria

The exclusion criteria were as follows:

(1) Stages III and IV breast cancer.
(2) Inflammatory breast cancer.
(3) Tumor very close to, or invading, the pectoral fascia.

Totally, 23 patients were excluded from the study, 14 refused participation, and nine had a deeply seated tumor. Seventy-three patients were included in the study and randomized into two groups: group I comprised patients (n=37) in whom the pectoral fascia was resected and group II comprised patients (n=36) in whom the pectoral fascia was preserved.

All patients underwent MRM with level II axillary dissection and closed with suction drain, which was removed when the amount of drain was between 20 and 30 ml/day.

Our patient received adjuvant chemotherapy protocols according to estrogen receptors (ER), progesterone receptors (PR), human epidermal growth factor receptor (HER2) and proliferation index (KI67).

All patients were followed up early postoperatively for drain output, seroma formation and cosmetic appearance of the flaps and late for recurrence.

All patients were followed up until January 2017 (34–48 months), with a mean follow-up period of 41 months.

Results

Totally, 73 patients were included in this study; the mean age of the patients was 55.9 years in group I and 57.4 years in group II. Tumor and patient features of our study are given in Table 1.

Intraoperative

The mean of intraoperative blood loss in group I was 300 ml, whereas it decreased significantly in group II to 198 ml (P=0.00001). As regards the operative time, it was about 80 min (mean) in group I and decreased significantly in group II to 59 min (P=0.00001), as shown in Table 2.

Early postoperative

The volume of initial 7-day drain output was decreased significantly in group II, 501 ml, whereas in group I it was 791 ml (P=0.00001). As regards the duration of drains, in group I it was 15.3 days, whereas it decreased significantly in group II to 8.7 days (P=0.00001). Seroma occurred in nine patients in group I, whereas it occurred in only two patients in group II (P=0.025), as shown in Table 2.

Pathological examination of excised pectoral fascia

Histopathological examination of pectoral fascia in group I (excised group) revealed negative deep

Table 1 Demographic, clinical, and pathological features of patients in the study

	Group I: excised pectoral fascia (n=37)	Group II: preserved pectoral fascia (n=36)	Tests	P-value
Age (mean) year	55.9	57.4	t=0.737	0.231
Tumor stage				
T1	7	9	χ^2=0.643	0.724
T2	28	26		
T3	2	1		
Stage				
I	5	7	χ^2=0.467	0.494
II	32	29		
Number of excised LN	18	19		
ER				
Positive	22	19	χ^2=0.331	0.565
Negative	15	17		
PR				
Positive	22	20	χ^2=0.113	0.735
Negative	15	16		
HER2				
Positive	19	15	χ^2=0.687	0.406
Negative	18	21		

HER2, human epidermal growth factor receptor; ER, estrogen receptor; LN, lymph node; PR, progesterone receptors.

Table 2 Intra-operative and post-operative characteristics of patients in the study

	Group I: excised pectoral fascia (n=37)	Group II: preserved pectoral fascia (n=36)	Tests	P-value
Intraoperative blood loss (mean) (ml)	300	198	t=10.571	>0.00001
Operative time (mean) (min)	80	59	t=11.405	>0.00001
Volume of initial 7-day drain output	791	501	t=44.404	>0.00001
Duration of drain (mean) (days)	15.3	8.7	t=25.233	>0.00001
No of patients with seroma	9	2	χ^2=5.022	0.025
Recurrence	No	No		1

pectoralis margin in all cases and tumor–pectoral fascia distance varied from 48 mm to 5 mm.

Long-term follow-up

The follow-up period of our patients was 34–48 months, with a mean follow-up period of 41 months. Our patients were followed up for chest wall recurrence by clinical examination and CA15-3. Breast ultrasonography, chest radiography and chest computed tomography were performed if there is suspected induration. No local recurrence occurred in both groups during this period, as shown in Table 2.

Discussion

Fisher stated that breast cancer is a systemic disease from the start and any change in local surgical management will have no effect on overall survival, and breast conservation is considered standard treatment for malignant breast diseases [9,10].

Dalberg *et al.* [7] has published the only comparative study between preservation and resection of pectoral fascia. Therefore, we tried to focus on the benefit of pectoral fascia preservation and oncological safety.

In our study, many benefits for pectoral fascia preservation were observed as regards operative time, blood loss, drain output, seroma formation and cosmetic appearance of the flaps.

Subfascial plane also can be used for immediate reconstruction by breast implant and pectoral fascia provides more soft-tissue coverage [11].

All those benefits encourage preservation of pectoral fascia, but oncological safety is the most important point. Dalberg *et al.* [7] concluded that chest wall recurrence and overall survival are not significantly affected by preservation of pectoral fascia with long-term follow-up, but there is an increased risk for local recurrence of 1.8 among patients with fascia preservation.The most important risk factors for chest wall recurrence after MRM are deeply located tumor and excessive nodal spread [12–14]. Postoperative irradiation plays an important and significant role in controlling and decreasing the incidence of chest wall recurrence [15]. In our study, we excluded all patients with deeply seated tumor near the pectoral fascia, and this is may be the cause of absence of recurrence through the period of follow-up.

Pectoral fascia preservation is not mandatory in all cases, and choice of the patient is the most important factor; a tumor that is away from the pectoral fascia is less liable for local recurrence.

Conclusion

Pectoral fascia preservation is safe and has many advantages as regards operative time, blood loss, seroma formation and cosmetic appearance of the skin flaps. It is oncologically safe as compared with pectoral fascia resection, provided that good selection of the patient was done.

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Conflicts of interest

There are no conflicts of interest.

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