Original Article

Role of Axillary Lymph Nodes Involvement in Some Complications of Modified Radical Mastectomy

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Abstract

Background: Modified radical mastectomy (MRM) is an excellent surgical approach for breast cancer. Some complications following mastectomy are wound infection, lymphedema, and seroma. **Objectives:** To explore lymph node involvement role in some complications of MRM. **Materials and Methods:** A prospective study enrolling 100 women with breast cancer admitted to Baghdad Teaching Hospital from January 2015 to January 2018. Data about demography, past medical history, family history, and other relevant data were taken. We did MRM with axillary lymph nodes excision level one, two, and three, depending on the lymph node involvement extent. According to the number of lymph nodes involved, patients were allocated into group one (1–3 lymph nodes), or two (4–9), or three (10 or more). Follow-up lasted 2 years after surgery to detect wound infection, lymphedema, and seroma. **Results:** Wound infection, lymphedema, and seroma occurred more in patients of group three; however, only lymphedema and seroma showed a significantly different rate among the three groups. **Conclusions:** The number and degree of lymph nodes involvement is an important factor in the occurrence of lymphedema and seroma.

Keywords: Breast cancer, lymphedema, mastectomy

Introduction

Among women in the world, the most common malignancy is breast cancer and it is the most common cause of death related to cancer.[1,2] The main treatment modalities for it at present time are surgery, radiotherapy, and chemotherapy.[2,3] Regarding surgery, modified radical mastectomy (MRM) is an excellent approach.[4]

Among complications following mastectomy are wound infection, lymphedema, and seroma.[5-7]

Lymphedema means a local swelling due to failure of lymphatic drainage causing lymphatic fluid retention in the interstitial space. Lymphedema can be primary or secondary. The primary one is caused by developmental anomalies of lymphatic vasculature; secondary one occurs due to some causes or risk factors such as trauma, systemic disease, and surgery—particularly if axillary lymph node dissection (ALND) was done, number of lymph nodes surgically removed and their status, radiotherapy, chemotherapy, the size and grade of the primary tumor, age, comorbidity, and body mass index.[8-11]

We conducted the present study to explore some complications following MRM and the role of lymph node involvement and dissection in these complications.

Materials and Methods

A prospective study that enrolled 100 women having breast cancer. Diagnoses and surgery were done from January 2015 to January 2018. Data regarding patients' demography, past medical history, family history, recent history, drug history, and systemic diseases were taken. In all women, we did MRM, with nodal excision level

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one, two, and sometimes three, depending on the lymph node involvement extent. Tumor node metastases classification[12] was used to classify lymph nodes involved by malignancy according to their number and the patients were allocated into group one (1–3 lymph nodes involved), or group two (4–9 lymph nodes), or group three (10 or more lymph nodes). Nearly all women in group one had level one and two axillary lymph nodes dissections, whereas those in groups two and three had level three dissections. The nodes were histopathologically examined after their removal. Follow-up was done in the outpatient clinic and private clinic for 2 years after surgery. Women who developed a swelling; a feeling of tightness, heaviness, or fullness; skin thickening; pain or redness in the arm or hand, were subjected to standard assessment methods of lymphedema as described by Markowski *et al.*[13] and Margaret.[14] We measured the circumferences of upper limbs on both sides and compared them at five fixed levels from the olecranon process, two levels above the process (11.5 and 21 cm) and three levels below it (7.5, 14, and 24 cm). The lymphedema was graded into mild (the difference in the circumferences was 3 cm or less); moderate (the difference between 3 and 5 cm); and severe (the difference more than 5 cm).

Data were entered into the computer and were analyzed using the software statistical package for the social sciences (IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.). The categorical variables (the groups of lymph nodes and the presence/absence of complications which are wound infection, lymphedema, and seroma) were expressed as numbers and percentages (*N* and %). Chi-square test of independence was used to find if there is an association between categorical variables. The *P* value of ≤ 0.05 (denoted as *P*) was considered significant in all statistical tests.

Ethical approval

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. It was carried out with patients' verbal and analytical approval before the sample was taken. The study protocol and the subject information and consent form were reviewed and approved by a local ethics committee according to the document number 317 (including the number and the date in November 4, 2014).

Table 1: Age distribution of the study patients

Age in years	Number of patients	%
25–35	7	7
36–45	43	43
46–55	25	25
56–65	18	18
Above 65	7	7
Total	100	100

Results

Patients' age ranged from below 25 to above 65 years. Table 1 shows that the age group 36–45 years yielded the highest number of cases.

Table 2 shows numbers and % of patients in each group of lymph nodes involvement where 66% of patients were from group two.

Fourteen patients (14%) developed wound infection postoperatively, with group three having about 22.22% of its patients affected, and no significant difference among groups was found, as shown in Table 3.

Twenty-five patients (25%) developed lymphedema; among 15 of them (60%) it was mild, as shown in Table 4.

Group three was mostly affected by lymphedema (about 66.66% of its patients) with a significant difference among groups. The variable severity levels among groups are shown in Table 5.

Table 2: Axillary lymph node involvement extent

Group	Number of lymph nodes involved	Number and % of patients
One	1–3	25 (25%)
Two	4–9	66 (66%)
Three	>9	9 (9%)
Total number		100 (100%)

Table 3: Number and percentage of wound infection among three groups

Group	Number and % of patients with wound infection in each group from the total number of patients with wound infection	% of patients with wound infection in each group from the total number of patients in each group
One (25 patients)	3 (21.42%)	12%
Two (66 patients)	9 (64.29%)	13.63%
Three (9 patients)	2 (14.29%)	22.22%
Total (100 patients)	14 (14%)	

df = 2, $P = 0.87$ (not significant)

Table 4: Number and severity of lymphedema cases among study patients

Severity level	Number and % from total number of patients with lymphedema
Mild	15 (60%)
Moderate	7 (28%)
Sever	3 (12%)
Total	25 (100%)

Table 5: Lymphedema among study patients by group and severity

Group	Number of patients with lymphedema in each group and their % from patients in the same group	Mild	Moderate	Severe
One	1 (4%)	1	0	0
Two	18 (27.27%)	14	3	1
Three	6 (66.66%)	0	4	2
Total	25		25	

df = 2, $P = 0.001$ (significant)

Table 6: Number and percentage of patients who developed a seroma

Group	Number of patients with seroma	% from total number of patients in each group
One (25 patients)	2	8%
Two (66 patients)	18	27.27%
Three (9 patients)	4	44.44%
Total (100 patients)	24	

df = 2, $P = 0.05$ (significant)

Table 7: Number of patients receiving radiotherapy postoperatively

Group	Number of patients receiving radiotherapy	% from patients in each group
One (25 patients)	0	0%
Two (66 patients)	9	13.64%
Three (9 patients)	5	55.56%
Total (100 patients)	14	

Seroma developed in 24 patients (24%), mostly in the third group (44.44% of its patients had seroma), with a significant difference among groups, as shown in Table 6.

Only 14 patients received radiotherapy: Nine from group two and 5 from group three, as shown in Table 7.

Discussion

Our study showed an overall incidence of wound infection of 14% which is within the rate of about 0.8%–26% demonstrated in variable studies.[15,16] The group-specific rate in our study was increasing with increase in lymph nodes involvement, that is, in an ascending order from group one to group three, which in turn means more tissue dissection; however, the increase was not significant which means that the number and degree of lymph nodes involvement did not play a role in the occurrence of wound infection. Lymphedema after breast surgery is a disturbing condition to the patient and it is not easy to determine its incidence due to the absence of agreed upon definition and/or limited follow-up in variable studies which lead to underestimation of its incidence. The overall incidence in our study was 25% which is within the rate of 6%–49% demonstrated in various studies,[17-19] and the group-specific rate was also increasing among groups with increase in lymph node involvement extent, and the difference among groups was significant.

The incidence of seroma in our study was 24% which is within the rate demonstrated in literature of about 2%–85%.[20-23] The group-specific rate was also increasing among groups with increase in lymph node involvement and the difference among groups was significant. The factors that play a role in the occurrence of seroma—in addition to the number of affected lymph nodes—include age, preoperative course of chemotherapy, electrocautery, intraoperative lymphatic channel ligation, wound drainage duration, pressure garment, postoperative activity of arm, and postoperative radiation.[21,24,25]

Regarding axillary dissection in groups one and two, it was mainly limited to levels one and two lymph nodes, and sometimes extended to level three, whereas for group three, the dissection involved level three, nearly in all patients. Fourteen patients in our study received radiotherapy: nine from group two and five from group three. In all the 14 patients, the radiotherapy was applied to the mastectomy bed only, whereas the axilla was sparred. This limited exposure area gave a small role for radiotherapy in the occurrence of lymphedema in our study where it is obvious that number of patients with lymphedema in each group is more than number of patients who were exposed to radiotherapy, that is, the occurrence of lymphedema here can be attributed more to other factors mentioned earlier than to radiotherapy. In summary, any increase in the number and degree of lymph nodes involvement—which implies an increase in dissection, makes the risk of lymphedema and seroma increase. These results reinforce those in the literature. Recently, sentinel node biopsy is being practiced as a less invasive approach, in which lymph nodes removed are fewer compared to ALND which implies a lower risk of lymphedema.[26-28]

Conclusion

The present study concluded that the number and degree of axillary lymph nodes involvement among women having breast cancer is an important factor in the occurrence of lymphedema and seroma.

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Conflicts of interest

There are no conflicts of interest.

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