



Early Complications Following Modified Radical Mastectomy

—Among Breast Cancer Patients Admitted to AL Gomhory Teaching Hospital, Sana'a, Yemen between Jan. 2019-Jan. 2020

Yasser Abdurabbo Obadiel¹, Mohammed Noaman Al-Ba'adani², Qannaf Hayel Haidar³

¹Thammar University, Thamar, Yemen

²Surgical Department, Al-Gomhori Hospital, Sana'a, Yemen

³MBBS-Sana'a University, Sana'a, Yemen

Email: MBBS-Sana'a University, Sana'a, Yemen

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Abstract

Background: Breast cancer is the most common cancer in women worldwide. Breast cancer represents about 13% of all new cancer cases in both male and female yearly and represents about 22.8% of cancer cases among female patients in Yemen. **Objective:** To study the early complications following modified radical mastectomy among patients diagnosed with breast cancer and evaluate some risk factors and associated comorbidity. **Methods:** The present prospective and observational study was conducted in Al-Gomhori teaching hospital that described complications in 50 patients with breast cancer underwent modified radical mastectomy from Jan. 2019 to Jan. 2020. **Results:** The mean age of cases was (45.6) years with a standard deviation of (12.4) years. Only 2 male patients (4%) were diagnosed with carcinoma breast and 48 female patients (96%) out of 50 total cases. In the 50 cases, in 23 patients (46%) chief complaint was lump in breast, followed by history of pain in lump in 18 cases (36%), then breast mass with axillary swelling in 9 cases (18%). Seroma formation was the most common complication seen in 22 (44%) patients, wound infection in 14 (28%), pain at the surgical site. Seen in 14 (28%) and flap ecchymosis in 2 (4%) cases and flap necrosis in 1 case (2%) and early lymphedema seen in 1 (2%) case. **Conclusions:** It was concluded that the early complications following of modified radical mastectomy included seroma formation, surgical site infection, pain and paresthesia, skin flap ecchymosis and necrosis, and hematoma.

Subject Areas

Oncology, Surgery & Surgical Specialties

Keywords

Breast Cancer, Modified Radical Mastectomy, Post-Operative Complication, Seroma, Wound Infection

1. Introduction

Breast cancer is the most common cancer in women worldwide; in the United States, the average risk of a woman developing breast cancer in her life is about 13% (one of eight women) [1]. The breast cancer also comes second as a leading cause of women death after lung cancer as the chance that a woman will die from breast cancer is about 1 in 38 (about 2.6%) [1] [2] [3].

According to the National Oncology Center in Sana'a, Yemen, the breast cancer represents 13% of all new cancer cases in both men and women patients, and about 22.8% among women only with 700 new cases diagnosed in 2016.

The modern approach to breast cancer management is a multidisciplinary; it includes surgery, radiotherapy, hormonal therapy and chemotherapy. However; surgical management is the hallmark treatment of breast cancer. Among the surgical procedures modified radical mastectomy (MRM) is the most commonly performed procedure of treatment in breast cancer management.

Post MRM complications:

Based on different conducted surveys, a wide range of 8% - 26% has been reported as the incidence rate of the surgical site complications after the breast surgeries [4] [5] [6]. Seroma formation is the most frequent postoperative complication seen after modified radical mastectomy with an incidence of 3% to 85% [4] [7]. Incidence rates for postoperative wound infections are variable and range from 3% to 19% [4] [5] [8] [9] chronic pain in 20% - 30% of the cases [10], flap necrosis is reported between 3% and 32% [3] [5] [9] [10]. The incidence of functionally significant lymphedema after a modified radical mastectomy is <10% [4] [5] [9] [11].

According to the study conducted by Bhatti I. *et al.* in Pakistan in 2004 to study the complications after modified radical mastectomy, early complications included seroma formation was (20%), Whereas late complications included anterior chest tightness was (56%), shoulder dysfunction (36%), lymphedema with (26%) and sensory loss (22%) [12]. Shoulder dysfunction included limited range of movement in all 18 patients, and gross multiple restrictions were seen in 11 of them (61%).

Another study was done by Shah S.H. *et al.*, to identify the early complications of modified radical mastectomy. The study found that wound infection was the commonest complication occurring in (16.6%) of the patients' sample. Seroma formation occurred in (14%), while hematoma occurred in (3.5%). Marginal necrosis of flap was seen in (5.2%), whereas the extensive flap necrosis occurred only in (1.75%) of the patients' sample and only one patient developed early

lymphedema of the arm and partial limitation of the shoulder joint movements [13].

2. Methodology

Type of study:

This is a prospective and Descriptive, analytic study.

Location:

The department of general surgery at Al-Gomhori Teaching Hospital, Sana'a, Yemen.

Sampling:

Using convenience sampling method (non-random opportunistic sample), 50 patients underwent modified radical mastectomy for breast cancer between Jan. 2019-Jan. 2020. The selected patients were within our inclusion criteria.

Method of data collection and study tools

Data was collected by questionnaire and history and physical examination from the selected patients underwent modified radical mastectomy. Early post-operative complications were closely monitored in the 30 days following patients discharge at the outpatient clinic.

All the patients underwent core biopsy or open biopsy for diagnosis confirmation. All patients had staging done with ultrasound abdomen, x-ray chest, CT scan of chest.

Ethical claim

Oral consent was obtained from all participants after being fully informed of study objectives and procedures. In addition the committee of ethics in the Yemen Board of Health Specializations approved the study.

Inclusion criteria

All the patients who underwent modified radical mastectomy procedure for established breast cancer with stage I, II and stage III.

Exclusion criteria

Patients who underwent modified radical mastectomy procedure for palliative purpose (LABC with metastatic lesion)

Statistical methods

The collected data were analyzed using SPSS VERSION V.24. by applying the following statistical formulas:

- Frequencies and percentages.
- Mean.
- Variance.
- Std. deviation.
- Pearson correlation to tested hypothesis.

3. Results

- A total of 50 patients with modified radical mastectomy of breast cancer full filling the inclusion criteria were included in this study.

- Of the targeted sample only 2 male patients (4%) were diagnosed with carcinoma breast, and 48 female patients (96%) (Table 1).
- The mean age of cases was 45.6 years with a standard deviation of 12.4 years. And the age range was between 28 - 70 years. 27 of patients (54%) belonged to the age group 31 - 49 years, followed by 18 (36%) patients in the age group of 50 - 70 years, followed by 5 (10%) patient equal or less than 30 years of age (Figure 1).
- Forty one (82.0%) patients found in breast cancer stage III, while nine (18.0%) patients were found in breast cancer stage II (Table 2).
- The histopathology report was infiltrating ductal carcinoma in all the patients 50 cases (100%).
- In the 23 cases (46%) chief complaint was lump in breast, followed by lump with pain in the breast in the 18 cases (36%) followed by breast mass with axillary swelling in 9 cases (18%) as shown in (Table 3).
- Seroma formation was the most common complication 22 (44%). All our patient used negative pressure drain under skin flap and other in the axillary cavity with the length of time drain remained, according to amount of fluid drained per day it removed when its <30 ml per day (Table 4).
- Wound infection occurred in 14 (28%) patients and were treated with antibiotics and dressing (Table 4).
- 14 cases (28%) had pain at the surgical site .and paresthesia at the anterior axillary fold and along medial aspect of arm, taken history of this complaint after removed stitches and drain (Table 4).
- Ecchymosis of the flap was seen in 2 patients (4%), and flap necrosis occurs in 1 case (2%) who was treated by dressing and minor debridement (Table 4).
- Hematoma was seen in 1 case (2%) that was treated with evacuation (Table 4).

Table 1. Frequency of patient according to sex.

Gender	N	%
Male	2	4%
Female	48	96%
Total	50	100%

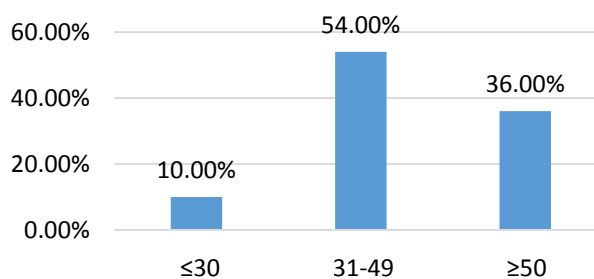


Figure 1. Frequency of modified radical mastectomy (MRM) in various age groups.

Table 2. Percentage of patients according to stage.

Stage of Tumor	N	%
I	0	0.0%
II	9	18.0%
III	41	82.0%
Total	50	100%

Table 3. The frequency of chief complaints of patient before surgery.

Chief Complaint Before Surgery	N	%
Breast mass	23	46.0%
Breast mass with pain	18	36.0%
Breast mass with Ipsilateral axillary swelling	9	18.0%
Total	50	100%

Table 4. Distribution of patients according to postoperative complication.

Complications	Percentage	
	N	%
Seroma	22	44%
Wound Infection	14	28%
Pain	14	28%
Flap Ecchymosis	2	4%
Flap necrosis	1	2%
Hematoma	1	2%
Early Lymphedema	1	2%
Muscles Paralysis	0	0%

- One patient had early lymphedema within the study period of 1 month who may be related to early active working by her hand with drain still *in situ* (**Table 4**).
- Muscles paralysis was not shown (**Table 4**).
- Comorbidity distributed as 17 patients (34%) received neoadjuvant chemotherapy as down staging because they were presented with large tumor size and some of them associated with advance axillary lymphadenopathy. 2 of them presented with fungating wound in their breasts T4 (**Table 5**).
- 8 patients (16%) were diabetic patients (**Table 5**).
- Another 8 patients (16%) were overweight with body mass index of 25 - 29.9 (**Table 5**). The used BMI categories are:
 - Underweight ≤ 18.5 .
 - Normal weight = 18.5 - 24.9.
 - Overweight = 25 - 29.9.
 - Obesity = BMI of 30 or greater.

Table 5. Distributions of comorbidities among study sample.

Comorbidity	Presence	
	N	%
Neoadjuvant Chemotherapy	17	34%
Diabetes mellitus	8	16%
Overweight	8	16%
Hypertension	7	14%
History of Cancer	1	2%
Steroids dependency	1	2%

- Hypertension patients were 7 (14%), all of them above 50 years old (**Table 5**).
- A patient (2%) has a history of breast cancer treated 7 years ago. And had a new diagnosis of breast cancer in the other breast (**Table 5**).
- Another patient with asthma treated by steroid for several years (**Table 5**).
- This study reveals that a significant correlation has been found between seroma formation after mastectomy and smoking (p-value 0.008), with Qat chewers (P-value 0.034), with hypertension (p-value 0.001), and with patients who received neoadjuvant chemotherapy (p-value 0.001). Furthermore, seroma formation give significant correlation with increasing in stage of disease *i.e.* stage 3 (p-value 0.016) (**Table 6**).
- Another significant correlation noticed between wound infection after mastectomy and smoker patient (p-value 0.009), with diabetes mellitus patients (p-value 0.001), with patients who received neoadjuvant chemotherapy (p-value 0.021), and with increasing in stage of disease *i.e.* stage 3 (p-value 0.001) (**Table 6**).
- In addition, a significant correlation come into picture between pain after mastectomy and altered sensation in chest wall with patients who received neoadjuvant chemotherapy (p-value 0.004), and with increasing in stage of disease *i.e.* stage 3 (p-value 0.034) (**Table 6**).

4. Discussion

The modern approach to the breast cancer management is multidisciplinary. The surgical treatment for the breast cancers depends upon the stage of disease at the time of initial presentation, age of patients, patient's preference and surgeon's choice. Among the approved surgical procedures, modified radical mastectomy with axillary clearance is the most commonly performed surgery [3] [4] [14] [15].

The most common complication in this study was seroma formation that was observed in (44%) of the patients (**Table 7**). This comes in line with other conducted studies were the seroma formation was the most common complication. The rate of seroma formation varies between 4.2% and 89% in un-drained axilla, and as high as 53% in drained axilla [8] [16] [17].

Table 6. Correlation between post mastectomy complications occurrence and risk factors association.

	Seroma	Pain	Wound Infection
	P-Value	P-Value	P-Value
Smoking	0.008	0.841	0.904
Qat Chewing	0.034	0.505	0.009
Shamma chewing	0.244	0.538	0.342
Diabetes Mellitus	0.625	0.056	0.001
Hypertension	0.001	0.328	0.433
Neoadjuvant Chemotherapy	0.001	0.004	0.021
Weight	0.054	0.413	0.382
Stage	0.016	0.043	0.001
Time Of Drain Removal	0.102	0.701	0.818

Table 7. Comparison of incidence of seroma in different studies.

Study	Percent %
Wedgwood KR <i>et al.</i>	25%
Dahri FJ <i>et al.</i>	33.33%
Chandrakar N <i>et al.</i>	26%
In present study	44%

The studied sample had seroma rate relatively on higher side as compared to rate quoted by other literatures. The cause behind was that most of our patients were in stage 3 and need axillary dissection till level 3 of axillary lymph nodes. Besides the correlation they had between hypertension and neoadjuvant chemotherapy with seroma formation post MRM.

The incidence of seroma has been shown to correlate with patient's age, breast size, presence of malignant nodes in the axilla, previous surgical biopsy, hypertension and use of heparin [8] [18].

According to this study, the incidence of seroma shown to correlate with smoking, Qat chewing, in patients with stage 3 breast cancer with (p value 0.016), and in patients who received neoadjuvant chemotherapy (p-value 0.001). In addition, and similarly to other studies [4] [18], the hypertension also correlated with incidence of seroma (p-value 0.001).

Seroma formation occurs in approximately 50% of patients undergoing mastectomy [10] [18] [19].

According to Soomro S.A. *et al.* study conducted in Karachi in 2006, to determine the frequency of seroma formation, and the role of hypertension, diabetes mellitus, neoadjuvant chemotherapy and nodal dissection in the development of seroma after breast surgery. The study concluded that seroma formation is a common complication of the modified radical mastectomy. The only

factor that appeared to contribute to marginally increase the risk of seroma formation in that series was hypertension and neoadjuvant chemotherapy. The study also claimed that diabetes had no role in seroma formation [16] similarly concluded by another study conducted by Chintamani *et al.* [7].

After modified radical mastectomy, the reported rates of wound infections ranged from 2.8% to 15% compared to 20% reported by other researches [10] [17]. Many factors have been proposed to increase the risk of wound infection namely open biopsy before mastectomy, increasing age, prolonged suction catheter drainage, and immune-compromised state.

In this study, wound infection developed in 28% (N= 14) of the targeted sample and the infection rate was relatively higher compared to rate quoted by other studies mentioned in (Table 8). This high rate is attributed to many factors like malnutrition and improper hygiene and sterilization, the drain and wound care, in addition most of our patients are in stage 3 and they need neoadjuvant chemotherapy. Furthermore, our study outcome that the seroma formation is a major risk factor, which came in line with the outputs of other studies [16] [20].

Nicotine and other components of cigarettes have well-known adverse effects on small vessels of the skin, resulting in a nearly fourfold increase in the risk of wound infection after breast surgery [3] [11] [22].

Pain after mastectomy frequently described as a burning, constricting, or lancing type and paresthesia at medial aspect of the arm, this was reported among 14 (28%) of our sampled patients after mastectomy. While results from another study; Chandrakar N. *et al.*, study revealed frequency of altered sensation and pain at (19.51%) [4]. Though, other study reported that 80% - 100% of patients undergoing mastectomy and axillary dissection are affected by intercostobrachial nerve damage, Axillary dissection is associated with intercostobrachial nerve damage due to stretching during retraction or frank transection [3].

Mastectomy skin flap necrosis occurred in one case with locally advanced breast cancer with bleeding, ulcerative lesion. She was treated with 4 cycles of neoadjuvant chemotherapy AC protocol, in addition to excision of skin margins and regular dressing.

Abnormal color or ecchymosis of skin flap occurred in 2 cases 4% of the targeted sample, which was related to the close use of diathermy to the skin during dissection of skin flap (Table 9).

Table 8. Comparison of incidence of post mastectomy wound infection in different studies.

Study	Percent
Compte DV <i>et al.</i>	11.9%
Chandrakar N <i>et al.</i>	37.71%
Iram Bokhari	12%
In present study	28%

Table 9. Comparison of incidence of flap necrosis in different studies.

Study	No. of patients	% of flap necrosis
Shaikh FB <i>et al.</i> 23	78	5.1%
Alam Jan W <i>et al.</i> 25	154	3.9%
Chandrakar N <i>et al.</i>	41	2.44%
In present study	50	2%

Hematoma reported in 1 case that diagnosed by clinical examination of the patient in the surgical ward, furthermore, the frank blood shown in the drain confirmed the diagnosis. Hematoma surgically evacuated with good hemostasis of source from one perforator branches of thoracoacromial artery under upper flap.

Early arm edema is said to occur in about half of the patients after axillary dissection. The majority develops some degree of edema, yet, they were unaware of it.

The higher body mass index before and after operation increases the risk of lymphedema [13] [19] [21]. However, early lymphedema occur in 1 case 2% in this study, the patient was overweight, stage 3 breast cancer and also actively worked by her hand before drain removal. Another study by Iram Bokhari found 2 cases (2%) complaint from early lymphedema associated with obesity [22].

5. Conclusions

Seroma is the most frequent and common early complication following MRM.

Wound infection represents the second most common early complication.

Pain and paresthesia in chest wall and medial aspect of ipsilateral arm represent one of the early complications.

Hematoma and skin flap necrosis and ecchymosis were observed in few cases after modified radical mastectomy.

No cases presented with muscle paralysis due to nerve injury.

Recommendations

- Complications after MRM can be minimized with thorough preoperative evaluation, meticulous technique, hemostasis, and wound closure. In addition to the standard oncologic evaluation, preoperative evaluation includes assessment of the patient's overall physiologic condition, with particular emphasis on tolerability of anesthesia, uncontrolled diabetes, hypertension, anemia, coagulopathy, or steroid dependency.
- There is a keen need for further complications assessments' studies with large sample sizes to identify approaches to decrease the frequency rate of seroma formation in patients undergoing modified radical mastectomy and decrease the rate of other complications and improve surgery outcomes.
- Well-trained surgical team with scientific and technical proficiency can de-

crease the MRM related morbidity and lessen the operations' complications.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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