COMPLICATIONS AFTER SURGERY FOR INVASIVE BREAST CANCER: COHORT STUDY

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ABSTRACT

Background

Mastectomy or wide local excision, and axillary clearance remain standard management option for majority of patients with breast cancer.

Objectives

The aim of this study is to evaluate the frequency and pattern of complications following breast cancer surgery in our practice with comparison to results of international publications

Materials and Methods

This retrospective descriptive study included 90 patients who underwent Modified Radical Mastectomy (MRM), Wide Local Excision (WLE), or Sentinel Lymph Node biopsy (SLN) at Sulaimani city by the author, which were eligible according to inclusion criteria. The interviews were conducted to collect data and record the information on the structured proforma questionnaire. Some information was extracted from patients' medical records in the hospitals

Results

Out of 90 patients, 63 (70%) of patients had seroma formation, 21 (23.2%) of them had lymphoedema, 16 (17.8%) of them were suffered from early or delayed upper arm pain, and in 4 (4.4%) of them wound infection was noticed.

Conclusion

Seroma is the most common complication of surgery for breast cancer whereas, lymphoedema is the second most common, followed by upper arm pain, and then wound infection

Keywords: *Breast cancer, Breast surgery, Complications.*

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INTRODUCTION

Breast cancer is the most common cancer in women and it is the second most common cause of death from the cancer among females [1]. Axillary lymph nodes are the most common site of tumor metastasis from breast cancer [2] and the presence of axillary lymph node metastasis is the single most important prognostic factor in patients with breast cancer [3, 4]. Mastectomy, axillary clearance, and wide local excision remain the most commonly performed surgical procedures for breast cancer [5-8]. Axillary dissection has a role in the management of early breast cancer as a major prognostic indicator, as a guide to the need for adjuvant treatments [9], therapeutic value in reducing the risk of axillary recurrence and staging information provided by excised lymph nodes [10].

The complications of breast and axillary surgery for breast cancer include, seroma formation [11, 12], lymphoedema [13-15], upper arm pain or numbness [16], wound infection [17, 18] , restriction of shoulder movement [19], and axillary web syndrome [20]. Seroma formation is an abnormal collection of serous fluid [21] in the dead space of post mastectomy skin flaps, axilla, or breast conserving surgery [12] and it is known for being the most common complication following breast cancer surgery [21] with incidence rate varying from 3% to 85% [11]. Although, the exact pathogenesis not yet fully understood, some precipitating factors have been linked to seroma formation including; first, extensive dissection in mastectomy and axillary lymphadenectomy damage several blood vessels and lymphatics, which can result in oozing of blood and lymphatic fluid from a large raw surface area [22]. Second, the dead space created by dissected tissue is filled with serous fluid [21]. Third, using diathermy for dissection of the skin flaps, may increase the risk of seroma [23]. Many methods have been used to prevent seroma formation including; suction drain insertion, suture obliteration of the axillary space, topical tetracycline sclerotherapy, fibrin glue application, and external compression dressing [24]. Suction drainage following axillary lymph node dissection is generally accepted as a routine measure for reducing seroma formation [25].

Lymphoedema, is a swelling of variable degrees affecting hand, forearm, and upper arm [26] and its estimated risk is 8-28% in patients undergoing axillary node clearance [15] due to excess accumulation of protein-rich fluid in body tissues [13] as a result of lymphatic channels disruption during surgery [27].

Upper arm pain, and sensory deficit at the internal part of the arm and posterior part of the axilla have been related to the sectioning of the intercostal-brachial nerve [16]. Wound infection is a minor surgical sequel of breast and axillary surgery for breast cancer, its incidence is ranging from 6% to 19% [17]. The incidence of wound infection will increase in more extensive dissection and involvement of larger number of lymph node [18].

The aim of this study is to identify the frequency and pattern of complications following breast and axillary surgery for established cases of breast cancer in our set up compared to results of international publications.

MATERIALS AND METHODS

This prospective descriptive study was conducted at three hospitals in Sulaimani city including; Teaching, Zhian, and Soma hospital; it was included 90 patients with confirmed diagnosis of breast cancer during 2010-2013. After approval was obtained from the Ethics Committee of the Sulaimani medical school for this study, all eligible patients who underwent breast and axillary surgery with follow up by the author for 2 years after surgery were invited to participate in this study. The inclusion criteria of this study was female patients presented with breast symptoms who were diagnosed as breast cancer by histopathology and they underwent either, Modified Radical Mastectomy (MRM), breast conserving surgery, or Sentinel lymph node biopsy. An oral informed consent was taken from every patient during interview or through contact by phone; a detail history of each patient was taken.

A structured proforma questionnaire was designed; the data on socio-demographic characteristics of patients such as, age, residency, and occupation were registered. Also the data were collected regarding the type and time of complications through reviewing patients' medical records in the above hospitals. Following the data collection, a standard Excel sheet was conducted and analysis of variables was performed from using an (SPSS version 22) statistical package. Descriptive statistics was used to describe the study sample, which was determined by using statistical software (Epinfor version 4.3.1) based on the 80% power at 5% significance level which was equal to 90 patients. Qualitative data were expressed as number and percentage, while quantitative data were expressed as mean ± Standard Deviation (SD).

RESULTS

Ninety patients were allocated to the study according to the inclusion criteria and after exclusion of patients with no sufficient information to be of value because of follow up loss and who were refused participation. The age was ranging from 22 to 81 years, with the mean age of (52.37 ± 12.06) years. The mean ± SD of their hospital stay was (0.97 ± 0.551) day. Out of 90 patients, 56(62.2%) of them were from Urban area, while 34(37.8%) of them were from rural areas. Seventy (80%) patients had performed MRM, while 18 (20%) of them had performed WLE of primary tumor in the breast and 9 (10%) of them underwent SLN.

Figure 1 shows the distribution of the patients undergoing the different type of the procedures including, SLN, Level II, and Level III axillary clearance.

In Figure 2, we have observed that the most of patients had stage II, and III breast cancer at the time of diagnosis, this phenomenon may affect the treatment strategy, hence, may alter the frequency of complications related to surgical methods. Seroma formation was the most common complication that occurred in 63(70%) of patients, and the second most common complication was lymphoedema which was noticed in 21(23.2%) of patients, followed by upper arm pain and then wound infection. Frozen shoulder and axillary web were not reported. Detailed of complications are presented in Table 1. Regarding the complications related to the type of the procedures, no complication was reported in patients with SLN. Among patients who underwent level II axillary clearance, 39(75%) of patients were suffered from seroma formation, and 10(19.23%) of them had arm lymphoedema whereas, the incidence rate of seroma and lymphoedema was higher in patients with history of level III axillary dissection. Table 2

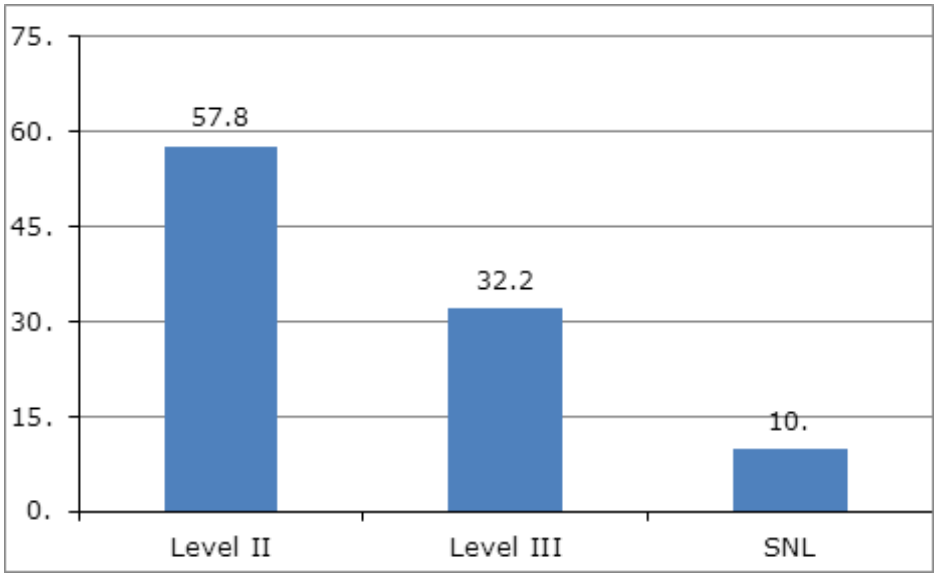

Figure 1. Distribution of patients undergoing the different type of procedure.

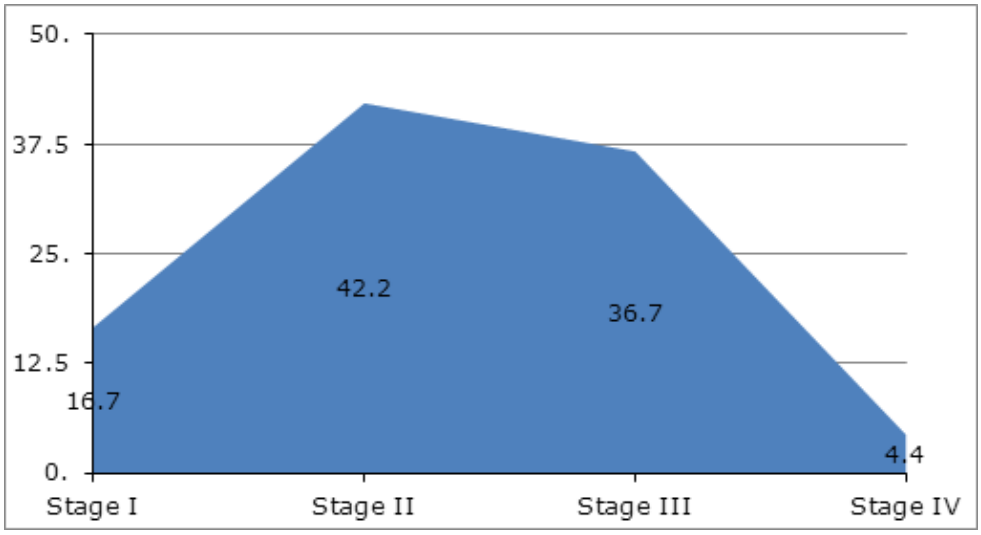

Figure 2. Patients' stages of breast cancer at the time of diagnosis.

Table 1. Breast surgery complications and their time of incidence during follow up for 2 years.

	Duration of follow up							
Complications	**After 1 wk No.(%)**	**After 2 wks No.(%)**	**After 3 wks No.(%)**	**After 4 wks No.(%)**	**After 12 wks No.(%)**	**After 24 wks No.(%)**	**After 48 wks No.(%)**	**Total No.(%)**
Seroma	18 (20)	21 (23.3)	14 (15.6)	10 (11.1)				63 (70)
Lymphoedema	3 (3.3)	2 (2.2)			9 (10.0)	3 (3.3)	4 (4.4)	21 (23.2)
Arm pain	3 (3.3)				4 (4.4)	6 (6.8)	3 (3.3)	16 (17.8)
Infection		2 (2.2)	1 (1.1)	1 (1.1)				4 (4.4)
Frozen shoulder								
Axillary web Syndrome								

Table 2. Distribution of complications related to the type of procedure.

Procedures	No. of Cases	Seroma	Lymphoedema	Arm Pain	Wound infection
SLN	9	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Level II A.C	52	39 (75.0)	10 (19.2)	7 (13.5)	2 (3.8)
Level III A.C	29	24 (82.8)	11 (37.9)	9 (31.0)	2 (6.9)

DISCUSSION

In our study, we reported the mean age of (52.37 ± 12.06) years and the mean of hospital stay was (0.97 ± 0.551) day. More than half of the patients were from Urban area whereas, (37.8%) of them were from the outside the city of Sulaimani. These results were in accordance with results of international publications, in which the incidence rate of breast cancer was higher in Urban than the rural areas [28-30].

This study demonstrated that 80% of patients had performed MRM whereas, 20% of them underwent WLE, irrespective to SLN. This result is differ from the studies were conducted in developed countries in which breast conserving surgery was the preferred approach [23-24]. This difference could be explained by the fact that the majority of patients in our region are diagnosed at more advanced stage due to lack of proper screening program, which are not good candidate for breast conserving surgery. In addition, during planning for surgery, we discussed the details of the types of procedures with the patients, and their potential risks about recurrence rate in breast conserving surgery. Most of patients who were good candidate for wide local excision, they were refused this procedure because of their fear from recurrence. It is well known that the local recurrence rate in wide local excision is higher than Modified Radical Mastectomy.

In this study, the vast majority of our patients underwent axillary clearance in the form of level II, and level III according the treatment strategy. Figure 1 This result is consistent with international publications [3, 7, 31]. Axillary lymph node clearance is the established operative management for disease control in patients with invasive breast cancer [6]. On the other hand, 78.9% of our patients had stage II, and III breast cancer at the time of diagnosis as shown in Figure 2. From this point of view, in more than two-third of patients, axillary clearance were necessary to provide a curative value, optimal local axillary control, meticulous staging by histopathology, and prognostic information, which influence postoperative adjuvant therapy.

In our patients, the most common complication was seroma, which was account (70%) of patients, with a higher prevalence in patients with level III axillary clearance than level II. Table 1, Table 2. This result is accord with international studies [11, 12]. The incidence of seroma formation after breast surgery varies from 3% to 85% [32]. Our incidence rate of seroma may be higher than some studies [33], which may partially, explained by that we were used bipolar electrocautery for dissection to create the upper and lower skin flaps for minimizing blood loss, which may increase the risk of seroma formation. Because of lack of harmonic scalpel in our hospitals as safe and effective methods for hemostasis, we have been obligated to use electrocautery. Electrocautery increases seroma formation because of either, the thermal effect of the tissues or leakage from incomplete obliteration of the lymphatic ducts, while harmonic scalpels have been used to reduce seroma formation [8]. Lack of other modalities to reduce seroma, such as fibrin glue might be another reason for this high incidence of seroma. Although, we were employed closed suction drainage for each patient to reduce seroma, but it couldn't prevent it, because after the drain removal continued fluid production can lead to seroma formation. The use of suction drainage postoperatively has been shown to reduce, but not prevent, seromas [34].

In this study, we have observed that the lymphoedema was the second most common complication of breast and axillary surgery. This complication was observed in (23.2%) of our patients with a higher prevalence in level III axillary clearance caste than level II, which is comparable with international proportions. Lymphoedema has been reported to develop in 8-28%

of patients who had history of breast cancer surgery [13-15, 26, 27]. Really, it is not possible to predict who is likely to develop lymphoedema, but some risk factors have been linked to this complication such as, extent of surgery, obesity, postoperative infection, presence of preoperative lymphoedema, and adjuvant radiotherapy to axilla. Nowadays, it has recently been suggested that axillary reverse mapping can identify and spare the lymphatics from the arm and thus reduce the incidence of lymphoedema [14].

In our study, 17.8% of patients had upper arm pain early postoperatively or delayed after months, which may due to sacrifice of intercostals-brachial nerve, chronic incisional pain, psychosomatic, or neuropathic. The exact etiology of this syndrome remains obscure, although it commonly assumed to be neuropathic in nature [35].

In the present study, the rate of wound infection was 4.4%, which is acceptable rate, and the proportion was higher in level III axillary clearance than level II Table 1, Table 2 despite using aseptic technique and administration of prophylactic antibiotics 1 hour before surgery in the form of either, Penicillin or Cephalosporin group. Wound infection in breast and axillary surgery is ranging from 6 to 19% [17]. In our patients, frozen shoulder and axillary web were not reported.

In our practice, seroma formation is the most common complication of surgery for breast cancer, while the second most common complication is lymphoedema, followed by upper arm pain, and then wound infection.

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