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A COMPREHENSIVE STUDY ON INCIDENCE AND RISK FACTORS OF SEROMA FORMATION IN BREAST CANCER SURGERY PATIENTS

Sadam Hussain[1], Ghulam Mujtaba[2], Muhammad Burhan ulhaq[3]

[1]DHQ Hospital Lodhran, [2]THQ Hospital Kahror Pacca District Lodhran, [3]Bahawalpur Victoria Hospital.

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Abstract:

Introduction: *Breast cancer is the second leading cause of cancer death among women. The surgical treatment of choice for these patients is either modified radical mastectomy or breast preservation depending upon stage of the disease.*

Aims and objectives: *The basic aim of the study is to analyze the incidence and risk factors of seroma formation in breast cancer surgery patients.*

Methodology of the study: *This analytical study was conducted in DHQ hospital, Lodhran during December 2018 to July 2019. This study was conducted with the permission of ethical committee of hospital and by informing the patients. There were total 120 patients from the age group 40 to 50 years selected for this study. All patients undergoing surgical therapy were included in this study. Level II axillary lymph node dissection was performed for both groups. None of the patients underwent immediate reconstruction. The demographic data and clinical information were extracted from case records.*

Results: *The data was collected from 120 breast cancer patients who undergo surgery. The mean age range for this study is 46.3 years. One hundred patients (83%) underwent MRM and BP was performed in 20 (17%) patients. The axillary node involvement was significantly different between MRM and BP patients ($\chi^2 = 4.52$, $df = 1$, $P = 0.03$) indicating that those who underwent MRM had higher rate of positive axillary nodes compared to those who received BP. Thirty-one mastectomies were performed by scalpel dissection of the skin flap. Sixty-six percent of patients (66%) were node positive and the remaining 34% (34%) were node negative.*

Conclusion: *It is concluded that seroma formation after breast cancer surgery is independent of duration of drainage, compression dressing and other known prognostic factors in breast cancer patients except the type of surgery.*

Key words: *Seroma, Breast, Cancer, Patients.*

Corresponding author:

Sadam Hussain,

DHQ Hospital Lodhran

QR code

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INTRODUCTION:

Breast cancer is the second leading cause of cancer death among women. The surgical treatment of choice for these patients is either modified radical mastectomy or breast preservation depending upon stage of the disease. Seroma formation is the most frequent postoperative complication after breast cancer surgery [1]. It occurs in most patients after mastectomy and is now increasingly being considered side effect of surgery rather than a complication however, all patients are not clinically symptomatic [2]. Seroma is defined as a serous fluid collection that develops under the skin flaps during mastectomy or in the axillary dead space after axillary dissection. Incidence of seroma formation after breast surgery varies between 2.5% and 51% [3].

Carcinoma of the breast is a disease of multifactorial origin where heritage, hormonal influence on the mammary glands and lifestyle factors all contribute to the development. There are several established risk factors: early onset puberty, Hormone Replacement Therapy, alcohol and late onset menopause [4]. In 5-10% of all breast cancers, heritage is the major etiological factor where BRCA1 and BRCA2 are common risk genes. Together inherited abnormalities in BRCA1 and BRCA2 are found in 2.5 -5% of all breast cancers [5].

Seroma formation has been troubling patients and surgeons for over a century, since the first mastectomy was performed by Halsted in 1882. Seroma is defined as a subcutaneous collection of serous fluid post-mastectomy under the skin flap, in the dead space of the axilla or the breast following breast-conserving surgery [6]. Seroma is a common complication following breast cancer surgery and several surgeons consider it an 'unavoidable nuisance'. Seroma may prolong patient recovery and hospital stay, increase health care costs and possibly delay the administration of systemic treatment where required [7]. The controllable predictive factors for seroma formation remain unknown.

There are four molecular subtypes of breast cancer. They are luminal A, luminal B, HER2 and basal-like breast cancers [8]. The luminal breast cancers are characterized by a high expression of hormone receptors (ER and PR). Luminal B is then separated from luminal A by the expression of HER2 and/or Ki67. Both luminal A and B constitutes roughly 70% of invasive breast carcinomas [9].

Aims and objectives:

The basic aim of the study is to analyze the incidence and risk factors of seroma formation in breast cancer surgery patients.

METHODOLOGY OF THE STUDY:

This analytical study was conducted in DHQ hospital, Lodhran during December 2018 to July 2019. This study was conducted with the permission of ethical committee of hospital and by informing the patients. There were total 120 patients from the age group 40 to 50 years selected for this study. All patients undergoing surgical therapy were included in this study. Level II axillary lymph node dissection was performed for both groups. None of the patients underwent immediate reconstruction. The demographic data and clinical information were extracted from case records. Axillary seroma was defined as any clinically apparent fluid collection in the axilla or under the skin flaps and was treated with multiple needle aspirations. Seroma formation was studied in relation to age, type of surgery, tumor size, nodal involvement, preoperative chemotherapy, surgical instrument (electrocautery or scalpel), use of pressure garment, and duration of drainage.

Exclusion criteria:

1. All those patients who were suffering from any major medical problem other than breast cancer.
2. All those patients who done chemotherapy or radiotherapy were excluded from this study.

Statistical analysis:

To analyze data univariate odds ratio (or relative risk) was calculated using Chi-square tests or regression analysis and this was followed by the multivariate logistic regression analysis to evaluate independent risk factors related to seroma formation.

RESULTS:

The data was collected from 120 breast cancer patients who undergo surgery. The mean age range for this study is 46.3 years. One hundred patients (83%) underwent MRM and BP was performed in 20 (17%) patients. The axillary node involvement was significantly different between MRM and BP patients ($\chi^2 = 4.52$, df = 1, P = 0.03) indicating that those who underwent MRM had higher rate of positive axillary nodes compared to those who received BP. Thirty-one mastectomies were performed by scalpel dissection of the skin flap. Two closed suction drains were placed in all patients undergoing surgery. Sixty-six percent of patients (66%) were node positive and the remaining 34% (34%) were node negative.

Table 1: Characteristics of patients in seroma and no seroma groups.

	Seroma group	No seroma group	OR (95% CI)*	p value**
Age (years)				0.22
40–49	20 (36.4)	38 (36.9)	1.49 (0.63–3.49)	
>50	23 (41.8)	31 (30.1)	2.10 (0.89–4.92)	
Tumor size (cm)				0.64
<2	21 (38.2)	47 (45.6)	1.00 (ref.)	
2–5	21 (38.2)	34 (33.0)	1.42 (0.67–3.01)	
>5	13 (23.6)	22 (21.3)	1.26 (0.53–2.96)	
Nodal involvement				0.31
No	14 (26.4)	34 (36.8)	1.00 (ref.)	
Yes	39 (73.6)	65 (65.7)	1.45 (0.69–3.04)	
Surgical procedure				0.03
Breast conservation	10 (18.2)	33 (32.0)	1.00 (ref.)	

The multivariate logistic regression analysis indicated that operative time was significantly associated with the incidence of seroma postoperatively (P=0.0066, coefficient = 0.03, OR=1.03), with an increase in operative time by 10 min being associated with a 30% higher risk of seroma formation.

Table 02: Potential risk factors for breast cancer seroma formation

Characteristics	Coefficient	Standard error	OR (95% CI)	P-value
Demographics				
Age	0.00	0.05	1.00 (0.90–1.10)	0.9277
Menstrual status				
Postmenopausal	-0.07.	0.63	0.87 (0.08–10.15)	0.9116
Premenopausal	-	-	-	-
Body weight	0.03	0.06	1.03 (0.92–1.15)	0.6150
Body height	-0.20.	0.09	0.82 (0.68–0.98)	0.0272[a]
Clinical characteristics				
Serum albumin	-0.08.	0.08	0.92 (0.79–1.07)	0.2951
Hemoglobin	0.00	0.04	1.00 (0.92–1.07)	0.9054
Tumor diameter				
<2 cm	-0.10.	0.80	1.91 (0.08–46.56)	0.3700
2–5 cm	0.84	0.59	4.86 (0.35–67.87)	-
>5 cm	-	-	-	-
Axillary lymph node status				
Positive	0.11	0.51	0.80 (0.11–5.86)	0.8260
Negative	-	-	-	-
Hypertension				
Yes	0.34	0.61	1.99 (0.18–22.12)	0.5747
No	-	-	-	-
Diabetes mellitus				
Yes	0.63	0.96	3.53 (0.08–149.35)	0.5095
No	-	-	-	-
Therapeutic factors				
Operative time	0.03	0.01	1.03 (1.01–1.05)	0.0066[a]
Initial 48 h–drain output	0.00	0.00	1.01 (1.00–1.01)	0.1630
Duration of drain *in situ*	0.06	0.07	1.06 (0.93–1.20)	0.3948
Intravenous analgesia				
Yes	-1.81.	0.49	0.03 (0.00–0.18)	0.0002[a]
No	-	-	-	-

DISCUSSION:

Seroma is one of the most common complications following breast cancer surgery [10]. The precise etiology of seroma formation remains unknown and it may delay the initiation of adjuvant chemotherapy and radiotherapy, predispose to wound infection, delay wound healing and may also be associated with arm lymphoedema, which may be the cause of unnecessary tribulation and worse patient outcome [11-13]. Although seroma is considered to consist of lymphatic fluid due to lymphatic vessel damage, its pathophysiology remains poorly understood and controversial [14-15]. Breast cancer is the most common malignancy in women. Surgery is the mainstay of treatment. Modified radical mastectomy with or without reconstruction or breast preservation in addition to axillary lymph node dissection are common surgical procedures in breast cancer [16].

CONCLUSION:

It is concluded that seroma formation after breast cancer surgery is independent of duration of drainage, compression dressing and other known prognostic factors in breast cancer patients except the type of surgery. We identified no potential risk factors other than the longer operative time and the non-use of PCA, which are both controllable factors.

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