ORIGINAL RESEARCH

Study the factors influencing seroma formation after modified radical mastectomy

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ABSTRACT

Background & Objectives: Seroma, is the most frequent post operative complication after breast cancer surgery/modified radical mastectomy (MRM), developing in approximately 30% of cases. The pathophysiology and mechanism of seroma formation in breast cancer surgery remains controversial and not fully understood, as little attention has been paid in the literature to etiologic factors. To prevent seroma formation, it is important to estimate individual risk of seroma formation. Aim of the study was to establish an association between various risk factors of seroma formation and to know whether the risk factors act independently or by synergism. **Methods:** Patients with breast cancer undergoing Modified Radical Mastectomy were included in the study. The proportions were compared using Chi-square test of significance and the student „t" test was used to determine the statistical difference. The data was analysed using SPSS package. **Results:** Seven out of 67 patients, accounting for 10.4 percent, developed seroma. The mean age of patients who developed seroma was 62.00+12.87 (40 – 75) years. The mean area of raw surface in seroma group was 0.18+0 (0.18 – 0.19) mm2 and the mean BMI in the seroma group was 31.57+4.58 (27.1 – 37.04), surface area and volume where statistically significant as compared to patients without seroma formation. The mean average of post op day 3 drains are151.43 ml (SD+61.76). Hence, the surface area of dissection, BMI and drain output of post op day 3 were statistically significant in comparison to the non seroma formation group. Other variables studied showed no significance with seroma formation. **Conclusion:** The factors influencing seroma formation following modified radical mastectomy for carcinoma breast were found to be area of the raw surface created on the anterior chest wall, axilla and lateral chest wall and inner surface of the resulting flaps – larger the surface area, higher the seroma rate, BMI and drain output post 72 hours resulted in higher the seroma rate.

Key Words: Modified radical mastectomy, seroma, raw surface area of dissection, Body mass index (BMI), Drain output.

INTRODUCTION

Cancer as we know is an all-consuming presence in our lives. Breast cancer is one of the most common malignancies in women and a leading cause of cancer death among women. More than a million cases of breast cancer are diagnosed worldwide each year, with an incidence rate of 25.8 per 100,000 women in India and 20% of the cancer related deaths in women. With increasing average age, lifestyle changes that increase risk for breast cancer, and improved survival from other diseases [1], the overall incidence of breast cancer is at rise from 127/100,000 at age 40-44years to 450/100,000women at age 70-74 years [2]. Breast cancer is diagnosed by cytology or histology. The choices of technique include fine-needle aspiration (FNA) for cytology, tissue core-needle biopsy (TCNB) for histology and open surgical biopsy (OSBx), either incisional or excisional, for tissue histology. Once the biopsy has been performed, further management depends on the pathology found. Recent advances in management plans for breast cancer include both surgical resection for local disease and medical therapy for systemic spread. Surgical intervention still plays a central role, but there is a gradual shift towards conservative treatment [4]. Modified radical mastectomy is a safe surgery with low morbidity and mortality, often performed as a palliative measure.

The Consensus Development Conference on the treatment of breast cancer in 1979 stated that the

modified radical mastectomy was the standard of treatment for stages I and II breast cancer.[3] Like all surgeries, ever since the Halstead performed the first mastectomy in 1882, surgeons have faced many postoperative consequences such as necrosis of skin flaps, breakdown of the wound, hematoma, seroma and infection and should be aware of the morbidity unique to mastectomy and axillary node dissection. Out of these complications, seroma, a collection of serous fluid within the surgical cavity, and is the most frequent postoperative complication seen after mastectomy and axillary surgery with an incidence of 3% to 85%.[5] Due to surgical ablation of breast tissue, the lymphatics and fatty tissue is resected en bloc, which may result in transudation of lymph and accumulation of blood in the surgical cavity.[3] The reasons for seroma formation still remain unclear and uncertain. However, excessive accumulation will stretch the skin and cause it to sag, resulting in significant morbidity, and delay in the initiation of adjuvant therapy, patient discomfort and prolongation of hospital stay. To prevent seroma formation, it is important to estimate risk factors of seroma formation i.e., the identification of those variables, single or synergistic and cautiously planning future therapies and trials in order to reduce the incidence of this common complication of mastectomy.[6] Surgical management of the patient with breast cancer is long tern endeavour, beginning with biopsy and extending through lifelong surveillance.

METHODS

This prospective study was conducted in the Department of Surgery, Ruxmanibhen Deepch and medical college and Hospital from December 2019 to September 2021. The ethical clearance was obtained from the Medical Ethical Committee of the Institute.67 consecutive patients who fulfilled the criteria were enrolled to the study after taking complete, written informed consent.

INCLUSION CRITERIA

1. All cases of breast cancer undergoing Modified Radical Mastectomy.

EXCLUSION CRITERIA

1. Cases of breast cancer who have undergone Modified Radical Mastectomy in some other hospital and referred to R.D. Gardi Medical College for further management.
2. Cases of Mastectomy and Axillary dissection for indications other than carcinoma.
3. Cases undergoing palliative mastectomies and incomplete axillary dissection.
4. Cases of breast cancer surgery in males.

The following data:

1.Age, 2.BMI, 3. History of hypertension and diabetes mellitus, 4. History of neoadjuvant chemotherapy were collected on admission to the hospital.

Each patient underwent modified radical mastectomy. Intraoperatively surface of left raw after dissection was calculated and post op day 1,2 and 3 days drain output charted.

The imprint of exposed surface of chest wall and axilla was then obtained onto the mops and calculated for surface area in following ways:

1. Each impression of the anterior chest wall and axilla with lateral chest obtained onto the mops was divided geometrically into 5 triangles.
2. The surface area of each triangle was calculated using the formula = Area = 1⁄2 *Base*Height

The surface area of all the 5 triangles were summated. The summated surface area of the chest wall and that of the axilla with lateral chest wall was multiplied by 2 to include the surface area of the inner surface of the flaps.

STATISTICAL ANALYSIS

The following methods of statistical analysis have been used in this study.

The results were averaged (mean + standard deviation) for continuous data and number and percentage for dichotomous data.

1) Proportions were compared using Chi-square test of significance

2) Student ―t‘ test

The student’ t’ test was to determine whether there was a statistical difference between the groups in the parameters measured.

RESULTS

Mean BMI and seroma

	SEROMA	N	Mean	Std. Deviation	t	p
BMI	Yes	7	31.57	4.58	2.480	.016
	No	60	26.43	5.24		

67 female patients admitted with the diagnosis of carcinoma breast, having undergone modified radical mastectomy, with consent, were included in the study. Seven out of 67 patients, accounting for 10.4 percent, developed seroma.

The mean BMI of those with seroma was 31.57+4.58 (27.1 – 37.04), the BMI for patients without seroma were 26.43+5.24 (20 – 38.40) kg/m2.

Mean drain output (ml) day 3 and seroma

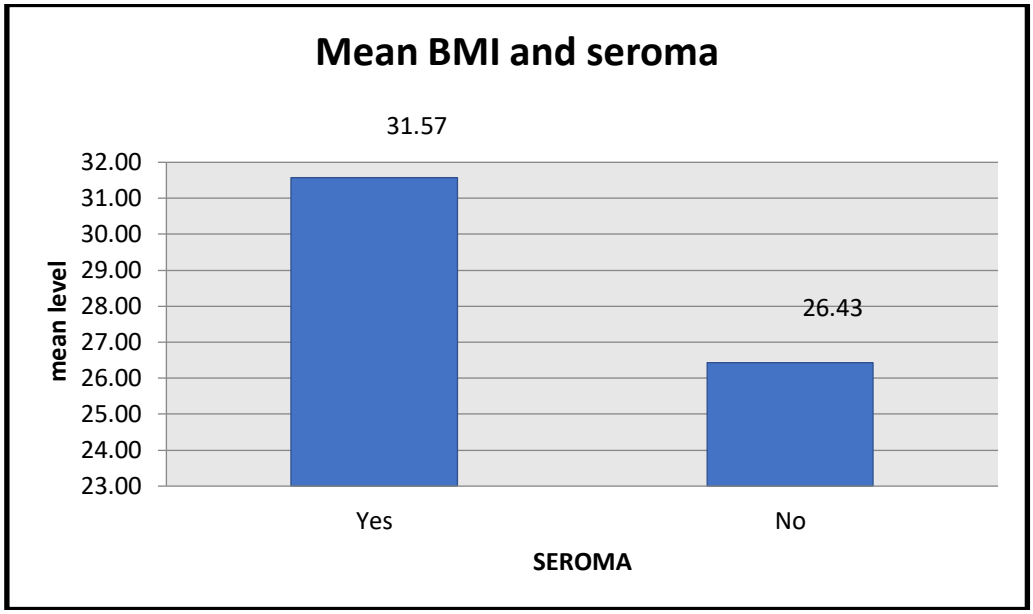
	SEROMA	N	Mean	Std. Deviation	t	p
DRAIN OUTPUT (ml) DAY3	Yes	7	151.43	61.76	6.772	0.000
	No	60	73.08	23.16		

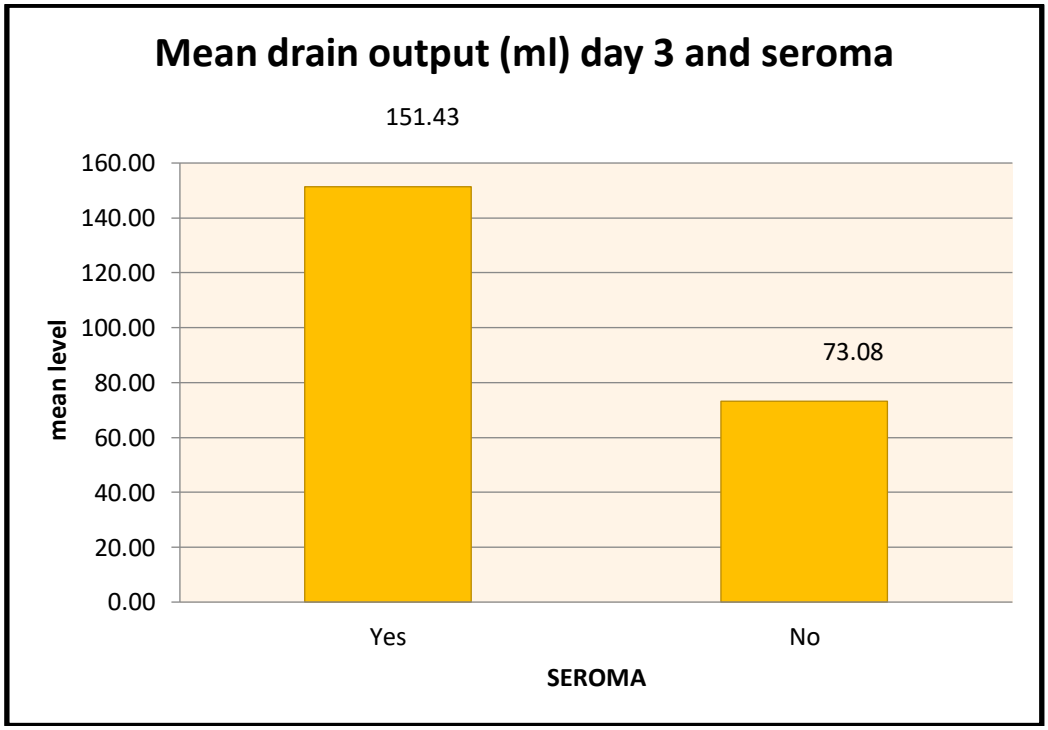
On day 3 in the seroma group 151.43+61.76 (100 – 270) and in no seroma group 73.08 + 23.16 (50 – 140) ml.

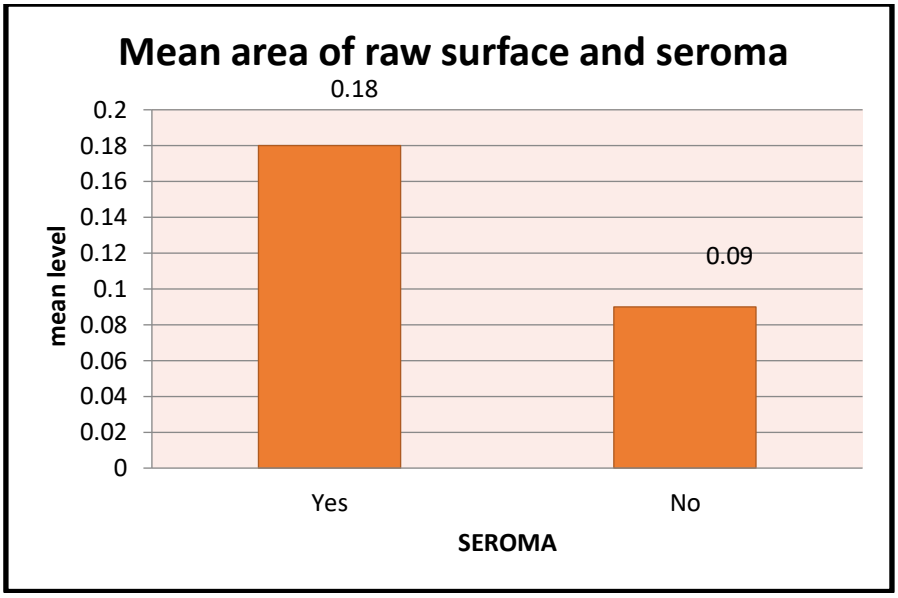
Mean area of raw surface and seroma

	SEROMA	N	Mean	Std. Deviation	t	p
AREA OF RAW SURFACE	Yes	7	0.18	0	14.17	0.00
	No	60	0.09	0.02		

The mean area of raw surface in seroma group was 0.18+0 (0.18 – 0.19), whereas, among the patients with no seroma, the mean area was 0.09+0.02 (0.07– 0.13) square metres (mm2).







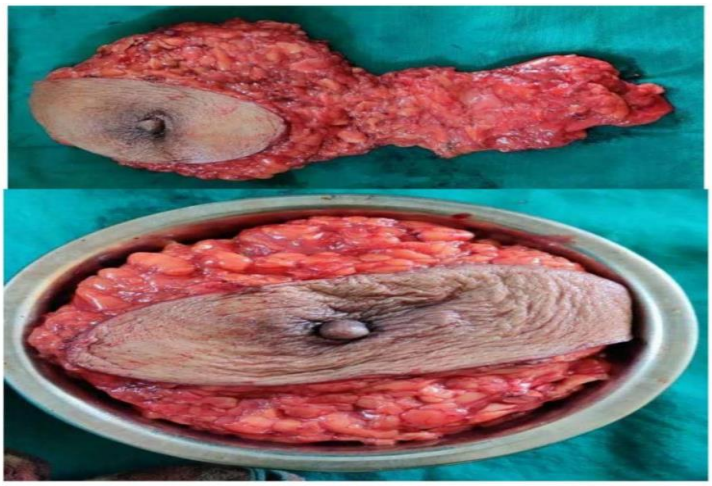


Figure 13: showing specimen of dissected breast tissue with axillary tail and overlying skin.

TABLE

Figure 14: Imprint of chest wall and axilla onto clean mop

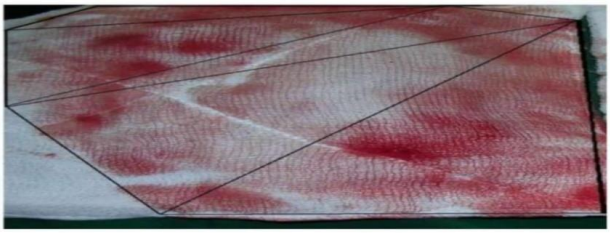


Figure 15: Imprint of axilla and chest wall divided into triangles

DISSCUSSION

Seroma, being the collection of serous fluid within a surgical cavity that is clinically evident. After mastectomy, seromas occur in the dead space beneath the elevated skin and most evidently in the area of axillary dissection. It represents the most frequent complication of mastectomy followed by wound dehiscence and flap necrosis, developing in approximately 3-85% of cases.[5] The study concluded, of 67 randomly selected patients with the diagnosis of carcinoma breast who underwent modified radical mastectomy with certain factors being standardized like pre and post-operative antibiotic and other drug coverage, use of cautery, operative side upper limb physiotherapy and number of minimum lymph nodes dissected were 10 in all cases. In this study, 10.4% of patients developed seroma. The mean BMI was 31.57 kg/mm2 (SD+4.58). In this study BMI of patients from no seroma group had a higher BMI (38.40), although the difference was not statistically significant. This study shows some correlation between BMI and seroma formation but with other contributing factors.

The mean surface area of the dissection following removal of the breast tissue and axillary fat and lymphatic tissue in the seroma group was 0.18mm2(SD+0), while that in no seroma group was 0.09mm2 (SD+0.02). The seroma group also suffered from excessive tissue handling and muscle distortion. This difference between the two groups was statistically significant, hence suggesting that seroma rate is influenced by area of the raw surface, larger the surface area, higher the seroma formation rate.

The drain output after 72 hours (postoperative day 3) was 151.43 ml (SD+61.76) in the seroma group and 73.08 ml (SD+23.16) in the no seroma group. The difference is close to statistically significant; hence we can consider the possibility of seroma formation in those patients with higher drain out-put on postoperative day three. K. Kuroi et al suggests a positive association between drainage volume during the initial 72 hours and seroma formation was significant.

CONCLUSION

1. Following factors influenced seroma formation post modified radical mastectomy and axillary dissection for carcinoma breast -

* Area of the raw surface created on the anterior chest wall, axilla and lateral chest wall and inner surface of the resulting flaps – larger the surface area, higher the seroma rate.

2. The factors - BMI, arterial hypertension along with greater surface area of dissection acts in synergy.
3. A higher drain output on postoperative day 3 is likely to predict the increased possibility of seroma formation.

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