

## Original Research Article

# The prevalence of seroma formation after modified radical mastectomy: an observational analysis of risk factors

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### ABSTRACT

**Background:** Seroma, a medically apparent subcutaneous accumulation of effusion fluid after breast carcinoma, growing in 30% of patients. The main hurdle in breast cancer surgery is the formation of a seroma, with an unknown root cause. The objective of this study was to determine the relation between some elements connected with, modified radical mastectomy and seroma formation before the operative period, during the operative period, and after the operative period.

**Methods:** This was an observational study including 200 female patients who were undergoing modified radical mastectomy at All India Institute of Medical Sciences, New Delhi, Delhi from January 2011 to December 2014. After the surgery, the patient was kept under observation for seroma formation. Chi square and t tests were used for the statistical analysis of this study.

**Results:** Seroma formation was more prevalent in old-age patients and overweight patients. The more the initial drain volume the more will be the seroma formation. After the operation, arm physiotherapy was started. 40 patients of older age had the formation of seroma. 30 patients developed seroma whose tumor size was more than 3 cm.

**Conclusions:** The occurrence of seroma was more prominent in older age patients and overweight patients. With prompt physiotherapy and flap fixation under muscles can reduce the occurrence of seroma formation and some interventions in the time of operation can help in decreasing seroma formation.

**Keywords:** Seroma, Breast cancer, Modified radical mastectomy, Physiotherapy

### INTRODUCTION

Breast carcinoma is the second major cause of malignant death in women. More than a billion cases are detected every year all over the world.<sup>1</sup> Breast cancer is accountable for 35% of all malignancies in women and 15-20 % of deaths due to death associated with cancer.<sup>2</sup> After that surgeons encounter many complications like necrosis of skin flaps, disintegration of wound, hematoma, and seroma. Seroma a therapeutically apparent accumulation of serous fluid under the skin, is a recurrent problem after breast surgery. The occurrence registered varies from 16-80%.<sup>3,4</sup> Even though seroma is not deadly, it can cause serious illness.

To avert seroma development, the main thing is to anticipate the sole possibility of seroma formation, which means recognition of certain variables that help in further treatment plans which decreases the prevalence of this complication of mastectomy.

The factors that are associated with breast cancer are effects on hormones present in the mamilla, inheritance, and way of living. Other factors include premature outset of pubescence, alcohol, and late cessation of the menstrual cycle. In the majority of the cases, inheritance is the main factor of breast carcinoma. Presently focus is on reducing injury by carrying out restricted operations.<sup>5</sup> This leads to

the elimination of the sentinel node, which is the lymph node where carcinoma grows.

Articulation of lymphatic vessels and blockage of dead space leads to a remarkable decrease in seroma development post-modified radical mastectomy.<sup>6</sup> Many studies evaluated that ceasing the dead space can lead to seroma development prevalence from 77% and 81% to 21%.<sup>7,8</sup> The utilization of fibrin glue is a technique tried to cease the cavity to decrease the seroma development. Conventional surgery of the breast leads to reduced development of seroma in contrast to comprehensive surgery.<sup>9-11</sup> One of the acknowledged hypotheses regarding the pathogenesis of seroma is a disturbance in the lymphatic course which causes the accumulation of liquid that is seroma. Many researchers supported this hypothesis in which liquid was examined and collated with lymph.<sup>8,9</sup>

In a study, it was evaluated that the formation of seroma is more prevalent in axillary dissection than in modified radical mastectomy.<sup>12</sup> Chemotherapy before operation in some cases, to decrease the size and level of malignancy before surgeries may be associated with seroma development.<sup>9,10</sup> The relation between the way of living like age, body mass, and sugar is comparatively insufficient. Six researches were conducted to find out the relationship between age and seroma development.<sup>8,10,12-15</sup>

Three of the studies did not observe any noteworthy relation.<sup>8,10,13</sup> The rest of the studies concluded rise in body mass relates to a rise in seroma formation.<sup>12,14,15</sup> Diabetes and smoking do not have any remarkable relation with seroma formation. Complication post-seroma formation includes the patient becoming anxious and uneasy. Wound flaps can rise due to seroma which can lead to disruption of wound healing.

The objective of this study was to determine the relation between some elements connected with Modified radical mastectomy and seroma formation before the operative period, during the operative period, and after the operative period.

**METHODS**

This was an observational study including 200 patients who were going through modified radical mastectomy at All India Institute of Medical Sciences, New Delhi, Delhi from January 2011 to December 2014.

Other details of the patients such as age, body mass index, hemoglobin before the surgery, and protein level before surgery were recorded.

**Inclusion criteria**

Women who were going through modified radical mastectomy and are above the age of 18 years and patients

who are prepared for the examination and therapy for their state.

**Exclusion criteria**

Patients who were under the age of 18 years, patients who were not prepared for the examination, patients undergoing other forms of breast surgery, and adult males who are suffering from breast cancer.

**Statistical analysis**

SPSS statistics mV2 software was used for the statistical analysis. The prevalence of seroma in the research selected was figured. The chi-square test and t-test were used to determine elements affecting the prevalence of seroma.

**RESULTS**

In Table 1, it is shown the connection of age with the formation of seroma. In the age group of 30-39 years, 10 patients had seroma formation and no seroma formation respectively. 10 and 20 patients in the age group of 40-49 years had seroma formation and had no seroma formation. Patients of age group 50-59 years, had seroma formation of 20 patients and 30 had no seroma formation. 40 and 25 patients in the age group of 60-69 years had seroma formation and no seroma formation respectively. 20 and 15 patients under the age group of 70-79 years had seroma formation and no seroma formation.

**Table 1: Correlation of age and seroma formation.**

Age (years)	Seroma	No seroma
30-39	10	10
40-49	10	20
50-59	20	30
60-69	40	25
70-79	20	15
<b>Total</b>	100	100

In Table 2, electrocautery causes seroma formation in 30 patients and no seroma formation in 50 patients. Scalpal cause's seroma formation in 25 cases and 30 had no seroma formation. In surgery where both method was used 35 patients showed seroma formation and 40 had no seroma formation.

**Table 2: Correlation between methods of dissection of the flap with seroma formation.**

Method of dissection	Seroma	No seroma
Electrocautery	30	50
Scalpal	25	30
<b>Both</b>	35	40

As shown in Table 3, the prevalence of seroma development increases with the increase in tumor size. 35

patients with less than 3 cm of tumor size had development of seroma. 95 patients with less than 3cm tumor size have not developed seroma. 30 patients developed seroma who had tumor size more than 3 cm and 40 patients had no formation of seroma with the size of tumor more than 3 cm.

**Table 3: Correlation of tumor size with seroma formation.**

Tumor size (cm)	Seroma	No seroma
<3	35	95
>3	30	40

## DISCUSSION

Seroma is the most frequent problem faced during the operation of breast cancer. The main cause of seroma development remained disputable. Seroma hinders the wound recovery process and increases the days of hospitalization. Apart from financial loss due to increased hospitalization and hampering rehab, seroma also causes mental trauma. In the current study, it was found that with the advancement of age, there is no remarkable risk of seroma formation. A study conducted by Lin et al.<sup>16</sup> It was seen that patient with higher basal metabolic rate has a higher incidence of seroma formation. It correlates with the studies conducted by Burak et al, Van Bommel et al and Anjani et al.<sup>12,17,18</sup> The pathophysiology of seroma development is controversial and presently no concrete model is there to describe seroma formation. It is suggested that the seroma development is the result of the distortion of lymphatics due to surgery or causing an inflammatory reaction in the recovery of the wound.<sup>14,16</sup> Seroma occurrence may be probably multifactorial not an individual unit. Factors considered for the incidence of seroma are huge surgical area, disunion of lymphatic courses, and highly flexible surgical field.

Due to disturbance in lymphatics, the majority of seroma development happens. Some of the seroma takes place due to the recovering process of the body or some other process causes seroma. The incidence of infection after the surgery is directly related to seroma development. That is if the patient has an infection after the surgery it may lead to seroma formation. There is no remarkable connection was seen between antibiotics and seroma formation. Methods like sentinel biopsy, a thick covering of axilla can help in decreasing seroma. Holding of drain during surgery for a long time can help aspirating developed seroma.<sup>15</sup> O'Dwyer et al described that the elimination of dead space by stitching the flaps can reduce the development of seroma.<sup>19</sup>

Drainage volume in the studies of Burak et al, Lin et al, and Anjani et al is remarkably related to seroma formation as seen in the present study.<sup>12,16,18</sup> In this study, it was evaluated that the time taken for the drainage volume reduction is not remarkably associated with seroma formation. A similar result was found in the study conducted by Anjani et al.<sup>18</sup> According to Porter et al

electrocautery decreases the loss of blood but increases the risk of seroma formation.<sup>20</sup>

Contraction covering to reduce seroma formation is commonly used in many operations. There was no remarkable relation between diabetes and seroma formation was found in this study. Smoking also does not affect seroma formation and correlates with earlier studies.<sup>14,21</sup> Simple mastectomy and seroma formation are not related notably. Although modified radical mastectomy raises the occurrence of seroma development. On the other hand, axillary dissection decreases the seroma formation. Conventional surgery leads to a reduction in seroma formation. In the current study, it was seen timely mobilization and physical therapy of the shoulder and arm can lead to a reduction in seroma rate.

## CONCLUSION

Seroma is not just an unneeded problem but a remarkable contributor to illness in breast cancer. Since mastectomy itself is psychologically and physiologically traumatic to the patients, it is crucial to recognize the possibility of seroma development and categorize the patients according to high and low risk for the early treatment of the condition. Additionally some intercession during the time of the surgery can reduce the development of seroma. According to the current study patients who are older and are overweight should be examined carefully.

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