POST-MASTECTOMY SEROMA- HOW TO ANTICIPATE AND PREVENT IT?

Thekoot Vijayan Santosh¹, Sukumaran Nair Sreekumar², T. S. Sudhiraj³, Abid Iqbal⁴

¹Assistant Professor, Department of Surgery, Government Medical College, Thrissur.
²Associate Professor, Department of Surgery, Government Medical College, Thrissur.
³Assistant Professor, Department of Community Medicine, Government Medical College, Thrissur.
⁴Senior Resident, Department of Surgery, Government Medical College, Thrissur.

ABSTRACT

BACKGROUND
Seroma formation is the commonest complication of modified radical mastectomy. Exact pathophysiology and risk factors for seroma are still a matter of debate. This prospective cross-sectional study aims to detect incidence of seroma formation in patients undergoing Modified Radical Mastectomy (MRM) in carcinoma breast and to identify risk factors for seroma in MRM patients.

MATERIALS AND METHODS
All patients who underwent modified radical mastectomy for carcinoma breast over a period of 1 year were enrolled and prospectively followed up. Patients were assessed for parameters including age, BMI, diabetes, hypertension, serum haemoglobin levels, neoadjuvant chemotherapy and T-stage in preoperative period. Level of lymph node dissection and type of drainage used were also assessed. Drain volumes in each postoperative day was documented and mean volumes calculated. Clinically detectable seroma, if present, was diagnosed 14 days after removal of drain.

RESULTS
Out of the 118 patients studied, incidence of seroma was found to be in 22.88%. Incidence of seroma was found to be higher in patients with BMI >25. It was also significantly higher in patients with first day drain volume more than 150 mL. No statistically significant difference in incidence was noted with age, diabetes, hypertension, serum haemoglobin levels, neoadjuvant chemotherapy, T-stage of disease or level of lymph node dissection.

CONCLUSION
Incidence of seroma is higher in patients with BMI >25. Occurrence of seroma can be predicted even on the first postoperative day, if the drain volume is more than 150 mL.

KEYWORDS
Seroma, Breast Cancer, BMI.

in patients undergoing MRM for CA breast in our institution. The study was cleared by institutional research committee and ethical committee before commencement.

**MATERIALS AND METHODS**

This is a prospective cross-sectional study done in Department of General Surgery, Government Medical College, Thrissur, between February 1, 2012, and January 31, 2013. All female patients who underwent MRM for CA breast during this period and consented were included in a non-random sequential basis. All patients who developed postoperative wound dehiscence and wound infection were excluded from the study.

A standard level 2 axillary lymph node dissection was performed in all cases. If grossly enlarged level 2 nodes were present, level 3 nodes were also dissected. Diathermy was used in majority of cases, and in some cases, it was used in a limited fashion. The exact extent of use of diathermy could not be classified satisfactorily and hence this data could not be used for statistical evaluation. A standard 14F bellow type suction drain (Romsons Romo Vac System) was used in all patients. Two tubes were kept, one each in breast bed and axilla. A full negative suction was applied. Axillary drainage was documented from 8 a.m. to 8 a.m. next day by trained nurses and verified by the researcher. Total drainage and other derived factors were calculated using daily drainage volumes. The drains were removed when daily drainage fell below 50 mL for two consecutive days or as decided by treating consultant as the case may be. The day of drain removal with reference to day of surgery was documented.

Patients were assessed for parameters including age, BMI, diabetes, hypertension, serum haemoglobin levels, neoadjuvant chemotherapy and T-stage in preoperative period. Level of lymph node dissection and type of drainage used were also assessed.

All patients were followed up in outpatient clinic 2 weeks after discharge to assess for clinically significant seroma formation by a resident doctor and confirmed by a senior consultant. The diagnosis was confirmed by aspiration. All patients who developed seroma were managed with multiple aspirations using 18G needle.

Statistical analysis was performed using Epi Info 7 software. Sample size calculated as 109 for 20% incidence rate with 7.5% precision and confidence level of 95%. Mean and standard deviation were calculated in quantitative variables and qualitative variables summarised using frequencies. Mean differences were analysed using Student’s t-test and qualitative variables were assessed using Chi-square test. Fischer exact test was done in cases of qualitative variables with columns having zero value. Multinominal logistic regression analysis was done for factors found to be significant in univariate analysis. P value less than 0.05 was considered as significant.

**RESULTS**

Of 118 patients finally assessed, 27 (22.88%) developed clinically detectable seroma on follow up. Mean age of study population was 52.14 (SD ±9.6). Majority of patients were either in T2 (43%) or T3 (29%) stage.

On analysis, BMI and 1st day drain volumes >150 mL were significantly associated with seroma formation (Table 1). On multivariate analysis, BMI >25 and 1st day drain volume of >150 mL were found to be independent risk factors (Table 2). The development of seroma didn't correlate with any of the other factors studied.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Risk Factor</th>
<th>Seroma Yes n(%)</th>
<th>Seroma No n(%)</th>
<th>Odds Ratio (95%, CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age in Years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;45</td>
<td>5 (15.15)</td>
<td>28 (84.85)</td>
<td>0.51 (0.18-1.49)</td>
<td>0.213</td>
</tr>
<tr>
<td></td>
<td>&gt;45</td>
<td>22 (25.88)</td>
<td>63 (74.12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>BMI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;24.9</td>
<td>6 (7.23)</td>
<td>77 (92.77)</td>
<td>0.051 (0.018-0.152)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>&gt;24.9</td>
<td>21 (60)</td>
<td>14 (40%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Hypertension</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>7 (26.92)</td>
<td>19 (73.08)</td>
<td>1.33 (0.49-3.60)</td>
<td>0.578</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>20 (21.74)</td>
<td>72 (78.26)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Diabetes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>3 (18.75)</td>
<td>13 (81.25)</td>
<td>0.179 (0.197-2.853)</td>
<td>0.672</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>24 (23.53)</td>
<td>78 (76.47)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Haemoglobin</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;10 mg%</td>
<td>3 (27.27)</td>
<td>8 (72.73)</td>
<td>1.29 (0.319-5.27)</td>
<td>0.716</td>
</tr>
<tr>
<td></td>
<td>&gt;10 mg%</td>
<td>24 (24.43)</td>
<td>83 (77.57)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Neoadjuvant Chemotherapy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>6 (24)</td>
<td>19 (76)</td>
<td>1.082 (0.383-3.059)</td>
<td>0.88</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>21 (22.58)</td>
<td>72 (77.42)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Drain Volume in 1st 24 Hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≤150 mL</td>
<td>9 (12.33)</td>
<td>64 (87.67)</td>
<td>0.210 (0.0842-0.528)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>&gt;150 mL</td>
<td>18 (40)</td>
<td>27 (60)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Level of Node Dissection- Level II</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Level III</td>
<td>8 (40)</td>
<td>12 (60)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DISCUSSION

Earlier, surgeons considered seroma formation following MRM as a nuisance rather than a serious complication as the focus was on curative resection rather than on quality of life. Considering the emotional trauma and morbidity it causes, postoperative seroma is no longer considered as a necessary evil and every attempt is taken to prevent its occurrence.\(^5,6\)

Incidence of seroma in breast cancer surgeries ranges between 2.5-51%.\(^2,3,4\) Seroma formation in our study is 22.88%. This is in agreement with average incidence of 20% following breast cancer surgeries.\(^8\)

Pathogenesis of seroma formation is a matter of debate. According to traditional concept, as name indicates, seroma is a collection of serum and lymph. Montalto et al supports this view. According to him, seroma is a serum ultrafiltration of extracellular fluid in the upstream of divided lymphatics.\(^9\) This fluid is then enriched by proteins and cells collected in the drained regions. Recent studies point to the role of acute inflammation in the development of seroma. Watt-Boolsen et al concluded that seroma formation was a result of an inflammatory process determined by the cell type and proteins in seroma fluid.\(^10\) These findings have been confirmed recently by studies of McCaul et al.\(^11\)

Our study shows a strong association between BMI and seroma formation. The incidence was as high as 60% in overweight and obese patients. This was in agreement with the observation of Bonnena et al and Jack et al.\(^12,13\) Relative large area of dissection in obese patients causing more lymphatic damage maybe the reason for this observation. This is not a fully accepted conclusion, since contradicting reports are there.\(^3,14\)

Incidence of seroma was 3.24 times higher in those patients who had drain volume more than 150 mL in 1st 24 hours after surgery (Table 1). This observation will enable us to predict the chances of developing seroma in the early postoperative period. As drain volume in first postoperative day mainly depends on extent of haemostasis, this indirectly indicates that meticulous haemostasis may reduce incidence of seroma. Volume of fluid left behind after wound toilet maybe a confounding factor, but we used to mop dry the field before closure. There are studies reporting similar observations.\(^13\)

Previous studies had detected a statistically significant correlation between formation of seroma and hypertension.\(^15\) The proposed mechanism was increase in exudation from breast bed due to high arterial pressure. According to our data, hypertension is not a significant risk factor. There were studies stating that number of lymph nodes removed or extent of lymph node dissection didn't affect the seroma formation,\(^16,17\) but the sentinel lymph node biopsy is associated with fewer numbers of seroma formation.\(^18\)

A meta-analysis by Kuori et al\(^19\) examined, 51 RCTs, 7 prospective studies and 7 retrospective studies. They observed that there was no risk factor for seroma formation supported by strong evidence. There was moderate evidence to support the risk of seroma formation in individuals with heavier bodyweight undergoing extended radical mastectomy as compared with simple mastectomy and a greater initial three day drainage volume.

Different modalities have been experimented to reduce seroma formation. Of this, suture flap fixation, i.e. fixation of skin flap to the underlying chest wall have shown promising results in reducing post-mastectomy seroma. In a RCT, comparing suture flap fixation to conventional closure, incidence of seroma was significantly less in suture fixation group compared to conventional closure.\(^20\) Similar observations were made by other authors also.\(^21,22\) Other parameters like type of drains, intensity of suction, timing of drain removal, shoulder immobilisation, pressure dressings and use of fibrin glue did not have a significant impact on reducing post-mastectomy seroma.\(^19\)

**Limitations of the Study**

Since different surgeons have performed the procedure on 118 patients, technique of haemostasis and nodal dissection may not be standardised.

**CONCLUSION**

The incidence of seroma in breast cancer patients undergoing MRM in our institution is 22.88%. This was on par with international standards. Our observations point to the fact that occurrence of seroma can be predicted from BMI and drain volume >150 mL on the first postoperative day. This should prompt surgeons to anticipate seroma and to take preventive measures.

**REFERENCES**


