Frequency of seroma formation after modified radical mastectomy. A comparison between electrocautery and scalpel dissection techniques.

Zain Bashir¹, Muhammad Taimur², Muhammad Imran³, Inamullah Shah⁴, Mahvish Noor⁵, Burhan Ahmad⁶


ABSTRACT... Objective: To compare the use of electrocautery and scalpel dissection while performing modified radical mastectomy in terms of frequency of seroma formation. Study Design: Randomized Clinical Trial. Setting: Department of Surgery, Fauji Foundation Hospital, Rawalpindi. Period: 19-06-2019 to 22-06-2022. Material & Methods: A total of one hundred (n=100) female patients between age 22-60 years, who underwent modified radical mastectomy for breast carcinoma were enrolled in the study and randomized into two groups. Electrocautery dissection was performed in group A while patient in group B will undergo Scalpel dissection. Outcome was measured in terms of seroma formation at 7th day postoperatively. Results: Mean age of patients in our study was 42.39 years and standard deviation 8.26. At day 7 after the surgery, mean drain volume was 39.77 ml in our patients. Seroma formation was observed in a total of 14(28%) patients in group A (electrocautery) and 8(16%) patients in group B (Scalpel). Conclusion: Frequency of seroma formation was significantly lower with scalpel dissection as compared to those with electrocautery dissection after MRM.

Key words: Carcinoma Breast, Dissection, Electrocautery, Modified Radical Mastectomy, Scalpel, Seroma.

INTRODUCTION
Both in the developed and developing countries breast carcinoma is the most common malignancy among women with addition of two million new cases in 2020.¹ For early, operable breast cancer modified radical mastectomy (MRM) is the most frequently performed surgical procedure in spite of increasing trends toward breast-conservation.² There may be complications associated with MRM like blood loss, seroma formation, flap necrosis, wound infection, hematoma and prolonged axillary drainage.³ Common modalities for dissection during MRM include sharp scalpel or scissors dissection, dissection with high frequency electrocautery and dissection with harmonic scalpel. There is moderate degree of morbidities like blood loss, hematoma formation, flap necrosis, seroma formation in conventional mastectomy, when axillary dissection is done by electrocautery.⁴ The most frequent post-operative complication followed by MRM is seroma formation which is confirmed clinically as subcutaneous fluid collection within operative area.⁵

A recent study reported that about 28% of patients developed seroma formation who underwent MRM.⁶ The mechanism of seroma formation is poorly understood but so many factors are responsible for this. However it is suggested that leakage of disrupted lymphatics and minute blood vessels for a longer time into the dead space could be one of the leading causes of postoperative seroma formation.⁷ Either the dissection done by electrocautery or scalpel in MRM the seroma formation is the most frequently observed complication.⁸ It is believed that meticulous dissection technique by scalpel, cautery or harmonic scalpel may decreases the collection of subcutaneous fluid which reduces the risk of post-operative seroma formation.⁹ Several techniques have been practiced and

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published to prevent seroma formation but there is no consensus yet. The aim of this study is to compare the frequency of seroma formation either by using electrocautery or scalpel during MRM in our set up.

**MATERIAL & METHODS**

It was a randomized clinical trial conducted in department of Surgery, Fauji Foundation Hospital, Rawalpindi from 19-06-2019 to 22-06-2022. Sample size of study was 100 patients and sampling were done by non-probability consecutive sampling. Patients undergoing modified radical mastectomy included in study were between 22-60 years of age either female or male and fall in ASA grade I & II. Patients with inoperable advanced breast malignancies, coagulation, previous history of breast surgery and receiving neoadjuvant chemotherapy were excluded from study. After getting approval of ethical committee (659/RC/FFH/RWP) patients were explained about the whole procedure and a written well-informed consent was obtained. Brief history and clinical examination with investigations was recorded on a Proforma. MRM was performed under general anesthesia by surgeons having more than 5 years clinical experience post fellowship in surgery. Patients were randomly distributed in two groups A and B by lottery method. Electrocautery dissection was performed in group A while patient in group B will undergo Scalpel dissection. Outcome was measured in terms of seroma formation at 7th day postoperatively. All the data was recorded on proforma.

**DATA ANALYSIS**

Statistical Package for Social Sciences (SPSS) version 26 was used for data analysis. For quantitative data like age and volume of drain at 7th day postoperative day mean was calculated. For qualitative data like gender and seroma formation frequency was recorded. Where required Chi square test was applied.

**RESULTS**

A total of one hundred (n=100) patients were included. Mean age of patients in was 42.39 years and standard deviation 8.26 (Table-I). All patients were of female gender. At day 7 after the surgery, mean drain volume was 39.77 ml in our patients (Table-II). Seroma formation was observed in a total of 14(28%) patients in whom electrocautery was used while 8(16%) patients in which Scalpel dissection done (Table-III).

<table>
<thead>
<tr>
<th>Age of patients in years</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100</td>
<td>22</td>
<td>60</td>
<td>42.39</td>
<td>8.267</td>
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</table>

**Table-I. Age of patients in years (n=100)**

<table>
<thead>
<tr>
<th>Volume of Drain on 7th post op day in ml</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100</td>
<td>20.00</td>
<td>100.00</td>
<td>39.77</td>
<td>14.99216</td>
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</table>

**Table-II. Volume of drain on 7th post operative day in ml (n=100)**

<table>
<thead>
<tr>
<th>Type of Dissection in MRM</th>
<th>Total</th>
<th>Value</th>
<th>Df</th>
<th>Asymptotic Significance (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>with Electrocautery</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with Scalpel</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>22</td>
<td>2.098a</td>
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<td>.148</td>
</tr>
<tr>
<td>no</td>
<td>78</td>
<td></td>
<td></td>
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</table>

**Table-III. Seroma formation in both groups (n=100)**
DISCUSSION
After modified radical mastectomy (MRM) for carcinoma of breast seroma formation is a common post operative complication. Seroma formation leads increased time of recovery of patients, increased risk of wound infection and wound dehiscence. Patient have to visit outpatient department frequently and leads to delay in start of adjuvant chemotherapy and radiotherapy. Dissection during surgery leads to formation of acute inflammatory exudates and damage of lymphatics resulting in lymph leakage are leading causes of seroma formation. Several dissection techniques are applied to reduce seroma formation but there is no consensus on a single method. Meticulous dissection during MRM to minimize the leakage from blood vessels and lymphatics may reduce the incidence of seroma formation. In Pakistan there is not much published evidence available about comparison of use of electrocautery and scalpel dissection surgical techniques in MRM. In our study we compared the frequency of seroma formation in modified radical mastectomy when the dissection is done either by electrocautery or scalpel.

In this study 100 patients who underwent MRM were divided in two groups. In 50 patients dissection was done by electrocautery and in rest of 50 patients dissection was done by scalpel. Mean age of patients was 42.39 years with SD 8.26 which is comparable to study done by Mansour Mohamad Kabbash et.al (mean age 49.6 years SD 8.46). In our study all the patients were of female gender while in study done by Umm-e-Rabab Sandano et.al 217 female patients were included. In our study mean drain volume at 7th post operative day was 39.77 ml wit SD 14.99 ml. Shiraz Sheikh et.al in their study showed mean drain volume of 230ml while Ramadanus in his study found 149 ml post MRM drain volume. In our study seroma formation was observed in 14(28%) patients in electrocautery dissection and 8(16%) patients in scalpel dissection.

Rahul Kumar N Chavan et.al in their study found 23.8% patients developing seroma in electrocautery group and 7.4% patients in scalpel group after MRM. Rajiv Sharma et.al study concludes that the use of electrocautery or scissor dissection leads to comparable seroma production. Abrar Zahid et.al in their study compared harmonic scalpel and electrocautery dissection in MRM. They concluded that seroma formation occurred in harmonic scalpel group in 16.7% patients whereas in electrocautery group it is in 36.7% patients. M. Farooq Shahid et.al in their study found seroma formation in 12.5% patients in harmonic scalpel group while 25% patients in electrocautery group developed seroma. Many factors are involved in seroma formation. Lee KT et al suggested that dead space created during dissection and postoperative leakage from disrupted lymphatics and blood vessels into this dead space are leading mechanisms of postoperative seroma formation. We observed in our study that use of electrocautery during MRM reduced the blood loss but the rate of seroma formation was increased, so electrocautery use should be kept minimal. Several techniques have been practiced and published to prevent it but there is little consensus as of yet.

The results of our study and several other studies in the literature demonstrated an increased incidence of seroma formation with electrocautery when compared with scalpel dissection. We recommend further randomized controlled clinical trials comparing both the techniques in larger number of patients.

CONCLUSION
Frequency of seroma formation was significantly lower with scalpel dissection as compared to those with electrocautery dissection after MRM.

REFERENCES


<table>
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<tr>
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<td>1</td>
<td>Zain Bashir</td>
<td>Conceived idea, Literature search.</td>
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<td>2</td>
<td>Muhammad Taimur</td>
<td>Data interpretation, Statistical analysis and manuscript writing.</td>
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<td>3</td>
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<td>5</td>
<td>Mahvish Noor</td>
<td>Designed Research, Methodology.</td>
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<td>6</td>
<td>Burhan Ahmad</td>
<td>Data collection and compilation.</td>
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