

ORIGINAL RESEARCH ARTICLE

Comparative Study of Complications Following Electrocautery Dissection vs Conventional Scalpel/Scissor Dissection in Modified Radical Mastectomy

¹Rajiv Sharma, ²Neeti Rajan Singh, ³Rachhpal Singh

ABSTRACT

Background: Early breast carcinoma is amenable to modified radical mastectomy (MRM) done either with electrocautery or scalpel dissection, following which seroma and other complications can arise.

Methods: We performed a comparative study on the complications following dissection in MRM by electrocautery and scalpel dissection in a total of 70 patients in Sri Guru Ram Das Institute of Medical Sciences & Research (SGRDIMS) over a period of 2 years.

Results: The complications of seroma and flap necrosis were comparable in both the study groups, but the operative time period for electrocautery was shorter than that for scalpel dissection. Complications of seroma formation after 4 weeks of surgery as well as flap infection were comparable too.

Conclusion: MRM done with the help of electrocautery takes shorter time and the patient has a shorter hospital stay.

Keywords: Electrocautery, Modified radical mastectomy (MRM), Seroma

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INTRODUCTION

Breast cancer is the commonest cancer worldwide with a widely variable incidence. Age-standardized rates range from 6.2 to 39.5 per 100,000 Indian women. Ever since mastectomy was first carried out by Halsted in 1882,

surgeons have faced many problems, such as necrosis of skin flaps, lymphedema of arms, phantom breast pain, breakdown of wound, hematoma, seroma formation, and infection.

Early breast cancer is an invasive cancer that is present within breasts and may or may not have spread to lymph nodes in breasts or axilla.

In early breast cancer treatment, two surgical options are available:

- Breast conservation surgery (BCS).
- Modified radical mastectomy (MRM).

In cases where BCS cannot be undertaken due to some contraindications, MRM is offered to patients.

A MRM in early breast carcinoma is a procedure in which the whole breast is removed, including the ellipse of skin around the areola-nipple complex, and usually, dissection of level-II axillary lymph nodes is done. In earlier days, a MRM was the primary method of treatment for breast cancer. As the treatment for breast cancer evolved, BCS has become more widely used. However, mastectomy still remains a viable option for women with early breast cancer.

In MRM, seroma formation is the most frequent post-operative complication seen after mastectomy and axillary surgery with an incidence of 3% to 85%. It is so common that it is now believed to be a side effect of surgery rather than a complication. Associated morbidity in the form of prolonged drainage is not only troublesome to the patient, but can also significantly impact treatment by delaying adjuvant therapy and increasing the risk for infection.

Seroma after breast surgery is defined as a serous fluid collection that develops under the skin flaps or in the axillary dead space following mastectomy and/or axillary dissection. The origin of seroma remains unclear but there are several risk factors and predictors, such as age, breast size, comorbid conditions, presence, and a number of malignant nodes in the axilla. It has been hypothesized that seromas form as an exudate from an acute inflammatory reaction following surgical trauma, as it increased serous fluid collection in response to increased fibrinolytic activity in serum and lymph. Low fibrinogen levels in seromas compared with those in plasma during the postoperative period support the hypothesis that seroma most likely originates

¹Junior resident, ²Professor & Head of Department, ³Assistant Professor

¹ Department of Surgery, Sri Guru Ram Das Institute of Medical Sciences & Research, Amritsar, India

^{2,3}Department of Surgery, Sri Guru Ram Das Hospital, Amritsar, India

Corresponding Author: Rajiv Sharma, Department of Surgery, Sri Guru Ram Das Institute of Medical Science & Research, Amritsar, India, Phone: +91 9888228128, e-mail: sharmarajiv128@gmail.com

from lymph. Seroma formation is influenced by an array of surgical techniques and devices, thus, leading to varying incidence of seroma formation in different studies.

In MRM, basically, the dissection is carried out either by conventional steel scalpel/scissor or by the electrocautery method.

Diathermy is increasingly used for tissue dissection, cutting, and hemostasis, although the fear of excessive scarring and poor wound healing has curtailed its widespread use for skin incision.

High-frequency electric surgical knife is one of the common instruments in surgical operations since its inception in 1929.

The fear of deep burn with diathermy and resultant scarring continues compared with that of the scalpel, which produces clean incised wound with minimal tissue destruction.

The use of an electrode delivering a pure sinusoidal current, however, allows tissue cleavage without damage to surrounding areas.

Before the advent of nonexplosive anesthetic agents, electrosurgical units had limited application. Following the introduction of halothane, electrosurgery was used to achieve hemostasis and to a lesser extent for cutting.

The need for study was because this work has not been previously done in our institutional setting, so we wanted to compare the outcome.

MATERIALS AND METHODS

This prospective study was designed to include 70 modified radical mastectomies carried out at Sri Guru Ram Das Institute of Medical Sciences & Research, Vallah, Amritsar, after attaining approval from the Hospital Ethics Committee and taking informed written consent from the patients. The patients were randomly divided into two groups of 35 patients each.

In group A, which included 35 patients, the MRM was done using the electrocautery dissection method.

In group B, which included 35 patients, the MRM was done using conventional scalpel/scissor dissection.

The results were statistically analyzed.

The electrocautery was kept in the spray mode in a ratio of 30:40.

Inclusion Criteria

- Age \geq 18 years.
- Trucut biopsy-proven case of early breast carcinoma requiring MRM.

Exclusion Criteria

- Locally advanced breast carcinoma (down-staged patients).

- Metastatic carcinoma.

A record was kept of

- Total drain output.
- Day of removal of axillary drain in both groups, till drain output tapers to 30 mL/day for two consecutive days.
- Incidence of seroma formation following drain removal up to a total of 4 weeks.
- Incidence of flap necrosis.
- Incidence of infection.
- Time taken for surgery.

Follow-up of the patient was done for a period of 4 weeks. The total drain output was compared among various patients in the study and the results were compared statistically.

The whole procedure and risks involved were fully explained to the patients and well-informed and written consent was taken.

RESULT AND DISCUSSION

In early breast carcinoma, all patients are counseled about the two surgical options available, i.e., MRM and BCS. In the presence of contraindications to BCS, MRM is done. In our country, a majority of patients on counseling opt for MRM as the preferred choice of surgery.

The idea of using different methods of dissection is to minimize postoperative discomfort, lessen hospital stay, decrease drainage, and ultimately lessen the number of seroma formations and aspirations.

Seroma formation is the most frequently observed early complication after MRM. The use of scissor dissection or electrocautery dissection decides seroma formation, operative time, and postoperative complications.

When the postoperative drainage is lesser, there will be a lesser number of days before the removal of drain and there will be lesser complications.

The use of closed suction drainage is a common practice that has been shown to reduce the incidence of seroma drainage. These drains are generally removed once the lymph production falls to less than 25 to 30 mL/24 hours, a level generally reached between 3 and 17 days after surgery varying from patient to patient.¹ In our series, in both groups, it compares well with the study and, by the tenth day, all drains were out.

The length of postoperative axillary drainage is a major cause of morbidity after axillary dissection as the patients are usually discharged once the drains are removed. The patients with suction drains *in situ* are normally managed in the hospital (although some authors advocate discharge with the drains *in situ*).²

Migration of bacteria along these drains has also been observed to increase the risk of infection if the

drains stay *in situ* for a long time.³ Early or premature removal, however, has been found to be associated with an unacceptably high incidence of seroma formation and its continuation until the fluid discharge is acceptably low leads to a prolonged stay in the hospital, which has a bearing on the cost of surgical management of breast cancer.³⁻⁵ Shortening the hospital stay has been shown to be an effective way of reducing the costs in the case of surgery for breast cancer, but axillary drains are the main obstacles in achieving this goal.

In this study, we compared the total drain output of both the groups, 35 patients belonged to the MRM group operated by using electrocautery (group A) and 35 patients belonged to the MRM group operated using scissors (group B).

The study showed that although the *p* value was not significant, the mean total drain output was higher in the scissor dissection group which was 441.43 with SD 73.009 as compared to 421.43 with SD 73.009 in the electrocautery group.

This clearly denotes that the use of electrocautery or scissor dissection leads to comparable seroma production.

As per the study, the drains were removed when the total drain output decreased to 30 mL/day for two consecutive days. The patients with increased seroma production as in the scissor dissection group had drains *in situ* for a longer time period and, hence, a longer stay at the hospital.

This was compared in the two groups and found not to be statistically significant as drain with a *p* value of 0.303 and an SD of 0.471 in group A and a SD of 0.664 in group B.

After discharge, patients were followed up for 1 month to look for postoperative seroma formation. Both the groups were compared and it was found that no seroma aspiration was required and this was attributable to meticulous dissection and the use of double drains and application of crepe bandage immediately after the antiseptic dressing is done and early physiotherapy.

This also correlates with the study conducted by Porter et al. in his prospectively randomized MRM patients subjected to flap dissection with either scalpel or electrocautery. They found electrocautery to be associated with reduced blood loss but with an increased rate of seroma formation. No significant difference in total days of drain duration or total drain output was observed in their study.⁶

There was no incidence of flap necrosis and infection in any of the cases.

These results correlate with the studies done by Groot et al. In their studies, they did not find a significant difference in wound infection rates in thoracic incisions created by electrocautery when compared with cold scalpel.⁷

When the time required for surgery was compared among the two groups, it was found that group B with scissor dissection required longer time for dissection with a mean of 155.71 minutes as compared to that of 138.29 in group A. The SD in group A was 15.855 and in group B was 11.058. The *p* value was less than 0.001 and, hence, statistically significant.

Our study shows similar results when compared to the prospective study that was conducted between the years 2008 and 2011, at the Breast Service Center IPGME & R, Kolkata, where 176 patients with early breast cancer (stages I and II defined by the American joint committee on cancer (AJCC) 6th staging system) within the age group of 40 to 65 years were included and patients with locally advanced breast cancer (stages III and IV) were excluded from the study. MRM was a uniform initial treatment for all patients. The study concluded that with scalpel dissection, though there was a decrease in the incidence of seroma, it makes the field more oozing, blood loss is more, operating time is increased, and duration of anesthesia increases and above that, scalpel dissection may have variable flap thickness.⁸

CONCLUSION

The present study was undertaken to compare dissection of flaps in MRM with electrocautery vs scissor dissection.

A total of 70 patients were included and divided into two groups, 35 cases in group A (electrocautery dissection) and 35 cases in group B (scissor dissection).

Upon perusal of observation and discussion, the following facts have come to light in our study:

- Tissue dissection in MRM with the help of scissors took a longer operative time than that of dissection with electrocautery.
- Total drain output in electrocautery dissection was comparable to that of scissor dissection.
- Day of removal of drain, till drain output tapers to 30 mL/day for two consecutive days, has no statistically significant difference in either of the groups.
- Incidence of seroma formation up to 4 weeks after drain removal has no significant difference in either of the groups.
- There was no incidence of flap necrosis in either of the groups.
- There was no incidence of infection in either of the groups.

We recommend that in MRM, tissue dissection should be carried out with the help of electrocautery, as it takes shorter operative time than scissor dissection. However, in the case of other parameters like the total drain output, day of removal of drain, incidence of seroma formation up to 4 weeks after drain removal, incidence of flap necrosis,

and infection, there was no statistically significant difference between electrocautery dissection and scissor dissection groups.

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