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Original Research Article

Comparative study of complications using electrocautery versus conventional scissors for raising flap in modified radical mastectomy

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ABSTRACT

Background: In the current scenario of rapid advancement in the field of surgery, the intraoperative and post-operative complications have reduced drastically by the use of effective surgical techniques in the modified radical mastectomy. Previously scissors were used for raising flap, today electrocautery is used by most of the surgeons for raising flap in modified radical mastectomy. Now electrocautery and conventional scissors are the two most widely used technique for raising flaps in modified radical mastectomy.
Methods: The study was conducted on 60 patients admitted in surgical wards of Sri Guru Ram Das institute of medical sciences and research with carcinoma breast. The study will be conducted to identify the complications using electrocautery versus conventional scissors for raising flap in modified radical mastectomy. The study participants were divided into two groups.
Results: Seroma and flap necrosis consequences were comparable in both research groups; however, electrocautery surgery took less time than scalpel dissection. Seroma development after four weeks of surgery and flap infection complications were comparable.
Conclusions: Dissection in MRM by scissors took longer operative period and drain output was more and the patient had longer hospital stay.

Keywords: Electrocautery, Modified radical mastectomy, Seroma

INTRODUCTION

Breast cancer is one of the most common cancers in women worldwide. Over 1.5 million women are diagnosed with breast cancer every year throughout the world.[1] There are several types of tumors that may develop within different quadrants of the breast. The majority of breast tumours are caused by benign (non-cancerous) alterations. For instance, fibrocystic change, a non-cancerous disorder, causes women to develop lumpiness, fibrosis (the creation of scar-like connective tissue), cysts (accumulated packets of fluid), and areas of thickening, tenderness, or breast pain. Most breast tumours start in the duct-lining cells (ductal cancers).[2]

Electrocautery is the most popular surgical tool for MRM dissection and haemostasis, with the advantage of minimizing blood loss when compared to conventional scalpels and scissors. However, previous studies indicated that it may increase the risk of postoperative complications, such as seroma, wound infection, flap necrosis, hematoma, and prolonged drainage, which led to a delay of adjuvant treatments after the operation.[3]

In early breast cancer treatment, two surgical options are available: breast conservation surgery (BCS) and modified radical mastectomy (MRM).

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

An 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. An MRM used to be the main course of treatment for breast cancer in the past. In MRM postoperative complications, are not only associated morbidity, but it can also delay the adjuvant therapy and increase the risk of infection.[4]

There are two methods to raise the skin flap in MRM, one is by using electrocautery and another is by scissors/scalpel. Initial attempts for raising the skin flaps using conventional scissors/scalpel in modified radical mastectomy today surgeons, often use electrocautery. The approach of a surgeon is focused more toward making the postoperative period as comfortable as possible for the patient along with minimizing the intraoperative complications.[5]

The mastectomy surgery used today is the result of hundreds of years' worth of research, creations, and modifications to pre-existing surgical methods. The development of anesthesia and surgical instruments in medicine had a significant influence on the mastectomy and further changed the surgical field as a whole. The radical mastectomy performed by William Halsted, which is now known as the "radical mastectomy", served as the model for the majority of subsequent breast removal procedures. Currently, the most radical operations are performed.[6]

Aim and objectives of the study

To identify the complications using scissors in modified radical mastectomy in term of wound infection, flap necrosis and seroma formation. To identify the complications using electrocautery in modified radical mastectomy in term of wound infection, flap necrosis and seroma formation. To compare the complications using electrocautery versus conventional scissors for raising flap in modified radical mastectomy.

METHODS

This comparative cohort study was designed to include 60 radical mastectomies from June 2021 to May 2022, in Department of General Surgery at Sri Guru Ram Das Institute of Medical Sciences and Research, Vallah, Amritsar, after attaining approval from the hospital Ethics Committee. The participants undergoing surgery were selected randomly after taking informed written consent. Participants were assessed for inclusion into the study according to inclusion and exclusion criteria. A written informed consent was obtained from the participant or participant's next to kin. Each participant was subjected to a detailed history, clinical examination and ancillary investigations.

The patients were randomly divided into two groups. Group A: flap was raised in MRM using monopolar electrocautery dissection method which was kept on forced mode in a ratio of 80:50. Group B: flap was raised in MRM using conventional scissors.

Inclusion criteria

All breast cancer patient eligible for MRM, age ≥18 years, biopsy-proven case of early breast carcinoma requiring MRM.

Exclusion criteria

Inflammatory carcinoma of breast.

Expected outcomes were complications using scissors in modified radical mastectomy in term of infection, flap necrosis and seroma formation was less as compare to electrocautery.

A record was kept of incidence of seroma formation following drain removal up to a total of 4 weeks, incidence of flap necrosis, incidence of infection, total drain output. Day of removal of axillary drain in both groups, till drain output tapers to 30 ml/day for two consecutive days. Time taken for surgery.

Follow-up of the patient was done for a period of 4 weeks.

Different patients in the study had their total drain output measured, and the outcomes were statistically compared. Patients received thorough explanations of the entire operation and its associated risks in written form.

Statistical analysis

The data has been analysed using SPSS 24.0 software. Chi square and independent 't' test has been used to evaluate and interpret the data. p values less than 0.05 were considered statistically significant.

RESULTS

Scalpel dissection may have varying flap thickness as anesthesia levels rise. The present study was undertaken to compare dissection of flap in modified radical mastectomy with electrocautery versus scissors dissection. A total of 60 patients were included and split into two groups: group A (electrocautery dissection) contained 30 instances, whereas group B included 30 cases (scissors dissection). Perusal of observation made and discussion, the following facts come to light in our study.

Incidence of seroma formation upto 4 weeks after drain removal was higher in the electrocautery group. Out of 60 patients who underwent modified radical mastectomy, incidence of seroma formation was 13.30% in group A and 6.70 % in group B, upto 4 week after drain removal. (Table 1).

Table 1: Incidence of seroma formation upto 4 weeks after drain removal.

Incidence of seroma	Group A		Group B		Total
	N	%	N	%	
Yes	4	13.3	2	6.7	6
No	26	86.7	28	93.3	54
Total	30	100.0	30	100.0	60

Incidence of flap necrosis was more in the electrocautery group. Out of 60 patients who underwent modified radical mastectomy, the incidence of flap necrosis was 10% in group A and 3.30% in group B. This can be attributed to meticulous dissection and keeping adequate flap thickness without interfering with subcutaneous network of vessels (Table 2).

Table 2: Incidence of flap necrosis.

Flap necrosis	Group A		Group B		Total
	N	%	N	%	
Yes	3	10.0	1	3.3	4
No	27	90.0	29	96.7	56
Total	30	100.0	30	100.0	60

Between the groups using scissors and electrocautery, there is no discernible difference in the incidence of infection. Out of 60 patients who underwent modified radical mastectomy incidence of infection was 3.30% in group A and 3.30% in group B. This is attributable to strict sterile precautions intra operatively and post operatively (Table 3).

Table 3: Incidence of infection.

Infection	Group A		Group B		Total
	N	%	N	%	
Yes	1	3.3	1	3.3	2
No	29	96.7	29	96.7	58
Total	30	100.0	30	100.0	60

Table 4: Day of removal of axillary drain.

Day of removal of axillary drain	Group A		Group B		Total
	N	%	N	%	
Day 6	4	13.3	-	-	4
Day 7	7	23.3	9	30.0	16
Day 8	13	43.3	13	43.3	26
Day 9	6	20.0	8	26.7	14
Total	30	100.0	30	100.0	60

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. The analysis of day of removal of drain, show that 26.70% of patients in group B have their drain removed on 9th post-operative day which means that patient who underwent modified radical mastectomy using scissors dissection, had longer duration of hospital stay but it was not statistically significant (p value =0.209). Out of 60 patients, 6 patients had their drain removed on day 9 in electrocautery dissection group (group A). In scissors group (group B), 8 patients had drain removed on day 9 (Table 4).

Table 5: Total drain output (ml).

Group	N	Mean±SD	't' value	P value
Group A	30	380.00±53.498	1.003	0.320; NS
Group B	30	395.00±62.076		

Total drain output in electrocautery dissection was comparable to scissors dissection. The total drain output was higher in scissors dissection group but it was not statistically significant as p value >0.05 (Table 5).

Table 6: Time taken for surgery.

Group	N	Mean±SD	't' value	P value
Group A	30	137.67±9.535	8.655	<0.001**
Group B	30	162.17±12.225		

The observations were also made about total time taken for surgery. The mean in group B was 162.17 minutes which was higher than group A. This shows that the modified radical mastectomy done with scissors dissection, took longer time for completion of surgery. The p value was highly significant (<0.001) (Table 6).

We recommended tissue dissection in MRM should be carried out with the help of electrocautery as it takes shorter operative time then scissors, but seroma formation and flap necrosis were more in electrocautery group and drain output is more in scissors group. However, there is no statistically significant difference in incidence of infection and day of removal of drain.

DISCUSSION

Patients were counselled about the two surgical options for early carcinoma breast that is modified radical mastectomy and breast conservative surgery. In the presence of contraindications to breast conservative surgery modified radical mastectomy is done. On counselling patients generally opt for modified radical mastectomy as preferred choice of surgery.

Different methods of dissection are used to minimize post-operative discomfort, less hospital stay, to decrease drainage and ultimately a smaller number of seroma formation and aspirations. The choice of electrocautery or scissors dissection determines seroma production, operating room time, and postoperative problems. The most frequently noted early consequence following modified radical mastectomy is seroma development.

In this study, 30 patients from the modified radical mastectomy group who underwent electrocautery (group

A) and 30 patients from the modified radical mastectomy group who underwent scissor surgery were compared for the incidence of seroma formation (group B).

Although the study's p value (p=0.389) was not statistically significant, seroma prevalence was greater in group of electrocauteries.

According to the graph, 13.30% of patients in group A and 6.70% of patients in group B experienced seroma formation up to 4 weeks after undergoing modified radical mastectomy.

This also correlate with the study by Zim et al, total 90 patient of early breast carcinoma who had undergone modified radical mastectomy (MRM) were divided into 2 groups. Scissors were employed in group B to elevate the skin flap, whereas electrocautery and axillary dissection were used in group A. Seroma formation rates in the two groups were compared. The use of electrocautery dramatically increased the incidence of seroma. Breast surgery, as MRM does not support injudicious use of electrocautery.[7]

Day of removal of drain depends upon the daily drain output, lesser the postoperative drainage, there will be lesser number of days before removal of drain and there will be lesser complications. In modified radical mastectomy, closed suction drains are frequently employed, which helps to lower the likelihood of seroma formation. These drains are typically removed 5 to 15 days following surgery, depending on the patient, once the drain output drops to less than 25 to 30 ml/24 hours. In our analysis, the majority of the drains were eliminated by days 9-10. In this study we compared the total drain output of both the groups, 30 patients belonged to modified radical mastectomy group operated by using electrocautery (group A) and 30 patients belonged to modified radical mastectomy group operated using scissor (group B).

The study showed that although the p value was not significant but mean total drain output was higher in scissor dissection group which was 395.00 With SD 62.076 as compared to 380.00 with SD 53.498 in electrocautery group.

The patients with increased drain production as in scissor dissection group had drains in situ for a longer time period and hence a longer stay at hospital. In this study 26.70% of patients in group B have their drain removed on 9th post-operative day which means that patient who underwent modified radical mastectomy using scissors dissection, had longer duration of hospital. Out of 60 patients, 6 patients had their drain removed on day 9 in electrocautery dissection group (group A). In scissors group (group B), 8 patient had drain removed on day 9. This was compared in the two groups and found not to be statistically significant as drain with a p value of 0.209. After discharge, patients were followed up for 4 weeks to look for post-operative seroma formation. Both the group were compared and it was found that seroma aspiration was required in some patients. Careful dissection, the insertion of two drains and the administration of a crepe bandage and physiotherapy as soon as the antiseptic dressing is finished can reduce this.

This also correlates with the study conducted by Porter et al in his prospectively randomized MRM patients to flap dissection with either scalpel or electrocautery. They discovered that electrocautery was linked to less blood loss but a faster rate of seroma development. No significant difference in total days of drain duration or total drain output was observed in their study.[8]

Incidence of flap necrosis is more in electrocautery group as compared to scissors group. In this study, out of 60 patients who underwent modified radical mastectomy, the incidence of flap necrosis was 10% in group A and 3.30% in group B. Incidence of flap necrosis was compared in the two groups and found not to be statistically significant as drain with a p value of 0.301.

In this study we compared the incidence of wound infection in both the groups, 30 patients belonged to modified radical mastectomy group operated by using electrocautery (group A) and 30 patients belonged to modified radical mastectomy group operated using scissor (group B). The study showed that although the p value (p=1.000) was not significant

The incidence of infection among the 60 patients who underwent modified radical mastectomy was 3.30% in group A and 3.30% in group B. This is attributable to strict sterile precautions intra operatively and post operatively.

This result is in consonance with a study conducted by Mittal et al (p=0.526). This result can be explained by the fact that surgical site infections depend on multiple factors such as aseptic technique, wound care, and patient's comorbidity, etc.[9]

When the time required for surgery were compared among the two groups, it was found that group B with scissor dissection had longer time for dissection with a mean 162.17 minutes as compared to 137.67 in group A. The SD in group A was 9.535 and of group B was 12.225. The p value was less than 0.001 and hence statistically significant. When compared to the prospective study carried out between 2008 and 2011 at the breast. Service center IPGME and R, Kolkata, where 176 patients with early breast cancer were treated, our study's findings were comparable.[5]

The study found that while the incidence of seroma decreased with scalpel dissection, the field became more seeping, blood loss increased, operating time increased and the duration of the procedure increased.

Limitations of this study were that lymphedema and hematoma formation were not included in our study.

CONCLUSION

The present study was undertaken to compare dissection of flap in modified radical mastectomy with electrocautery versus scissors dissection. A total of 60 patients were included and split into two groups: group A (electrocautery dissection) contained 30 patients, whereas group B included 30 patients (scissors dissection).

Perusal of observation made and discussion, the following facts come to light in our study. Incidence of seroma formation upto 4 weeks after drain removal was higher in the electrocautery group. Incidence of flap necrosis was more in the electrocautery group. Between the groups using scissors and electrocautery, there is no discernible difference in the incidence of infection. Tissue dissection in modified radical mastectomy with help of scissors took longer operative time as compared to dissection with electrocautery. Total drain output in electrocautery dissection was comparable to scissors 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.

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