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ORIGINAL ARTICLE

Comparison between electrocautry and ligasure in terms of preoperative blood loss in modified radical mastectomy in carcinoma breast.

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ABSTRACT… Objective: To compare mean intra operative blood loss using ligasure and electrocautery in modified radical mastectomy in patients of breast malignancy. **Study Design:** Randomized Control Trial. **Setting:** Department of Surgery, Allied Hospital, Faisalabad. **Period:** June 2020 to December 2020. **Material & Methods:** After fulling inclusion criteria, 60 Patients from surgical OPD of Allied Hospital Faisalabad were enrolled for the study. Informed consent was taken. Two groups of patients were made on random basis. Group A patients underwent modified radical mastectomy using ligasure while in Group B electrocautery was used to secure bleeding. In both groups, surgery was performed by senior consultant surgeon. Intra operative blood loss was measured. **Results:** In this research, mean intra operative blood loss was 17.63+1.22 ml in Group-A while 21.76+1.41 ml in Group-B, p value was 0.001. **Conclusion:** Mean intra operative blood loss using LigaSure is significantly lower when compared with electrocautery in modified radical mastectomy in patients of breast cancer.

Key words: Breast Malignancy, Electrocautery, Intraoperative Blood Loss, LigaSure, Modified Radical Mastectomy.

INTRODUCTION

Breast malignancy is the major factor of malignancy-related mortality among women internationally[1], with an occurrence of about 90 cases per 100,000 women. The incidence of breast malignancy, with more concern to developing world, continues to grow with time. The surgical procedure of breast malignancy has got significant modifications over the last few years.[2] With time, there has been a strong trend towards minimal invasive procedure in the treatment of patients with breast malignancy.[3]

Carcinoma breast treatment has undergone transformation from the radical mastectomy to contemporary fashion of breast conservation.[4] Despite the evolution of breast preservation surgery, modified radical mastectomy (MRM) remains the most frequently done surgery for malignant tumors of breast.[5]

The operations for breast tumors can be done by using fine knife and scissors or electrocautery. Occasionally, radiofrequency ablation and laser had been used in few cases. Ultrascission dissection (harmonic scalpel) and tissue response generation (ligaSure) are just beginning to be used in dissection of tumor surgery.[6] Electrocautery has been generally utilized for dissection in breast surgery, as it markedly decreases blood deficit in comparison to formal knife utilization. During operation there is increase chance of seroma formation with electrocautery usage, as it creates more thermic destruction in the skin folds, inflammation in surrounding structures, subdermal vascular plexus disruption, and impaired lymphatic and vascular occlusion; thus leading to more incidence of seroma morbidity rate.[7]

The LigaSure Small Jaw is the newest bipolar vessel sealing system (BVSS) in the LigaSure

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family, launched in 2010. This instrument has compact undulated jaw, low-temperature portray, less thermal outspread, and multiple uses.[3] Here bleeding is secured by producing a seal using pressure and electrothermal energy to modify the integrity of the vessel walls and localized structures.[8]

The recommended surgical procedure for malignant tumors of breast is Mastectomy and axillary dissection. There are chances of significant hemorrhage while performing this operation. [9]

Mean intra operative blood loss by using LigaSure was 74.6±15.05 ml[10] and with electrocautery it was 182±92 ml.[11] Another study shows no considerable significance between LigaSure and electrocautery in terms of mean intra operative blood loss (18.2 ± 31.1 vs. 20.6 ± 26.3 mL; *P* value = 0.663).[3]

There is no local data available on comparison of these two modalities to secure hemostasis and there is also controversy in literature. Purpose of this study was to assess the better hemostatic method for breast cancer surgery to reduce the morbidity of the surgical procedure.

MATERIAL & METHODS

This study, a randomized control trial, was conducted in department of surgery, Allied hospital, Faisalabad, Pakistan. Duration of study was six months from June 2020 to December 2020.

By using WHO sample size calculator of two mean, Sample size was 60 (30 in each group) by using nonprobability consecutive sampling technique.

Female patients between the ages of 20-70 years having stage (IIB / III) breast tumor undergoing modified radical mastectomy were included in study. While patients with locally advanced tumors, taken neoadjuvant therapy, Inframammary fold tumors and bleeding diathesis or any medical contraindication to major surgery was excluded from study.

After consent from hospital ethical council (R.No.880), patients who fulfilled the inclusion criteria were admitted through OPD and enrolled for the study. Informed consent was taken. Two groups of patients were made on random basis. Group A patients underwent modified radical mastectomy using ligasure while in Group B electrocautery was used to secure bleeding. In both groups, surgery was performed by senior consultant surgeon. Blood loss during operation was calculated by weighing the dry sponges before operation and subtracting the weight from the weight of sponges after operation (using a digital weighing scale with each gram taken as equal to one milliliter of blood). The amount of blood loss was calculated as mL.

All the data was added and calculated on SPSS Version 26. Mean ± Standard Deviation was estimated for age, BMI and intra operative blood loss. Frequency and percentages were estimated for ASA status and stage of breast cancer. Independent sample t-test was put to analyze blood loss during operation between two groups. Effect modifiers like age, BMI, ASA status and stage of breast cancer were stratified and post-stratification independent sample t-test was applied. A p-value ≤ 0.05 was considered significant.

RESULTS

A sum of 60 cases (30 in each group) completing the inclusion points were put to compare mean blood loss during surgery using LigaSure with electrocautery in modified radical mastectomy in patients of breast malignancy.

Age distribution showed that 63.33% (n=19) in first group and 66.67% (n=20) in second were 20-50 years, while 51-70 years were between 36.67% (n=11) in first and 33.33% (n=10) in second. Mean+SD was estimated as 47.57+7.96 years in first and 46.3+8.84 years in second group. Mean BMI of the patients was calculated as 29.97+2.74 in Group-A and 30.17+2.88 in Group-B. Stage of cancer elicited that 46.67% (n=14) in first and 56.67% (n=17) in second group had Stage-I while 53.33% (n=16) in Group-A and 43.33%

(n=13) in Group-B had stage-II. Comparison of mean intra operative blood loss using LigaSure (apart from raising flaps used in mastectomy and axillary dissection) with electrocautery in patients of breast tumor showed that 17.63+1.22 ml in Group-A and 21.76+1.41 ml in Group-B, p value was 0.001. (Table-I). Effect modifiers like age, BMI and stage of breast cancer were stratified and post-stratification independent sample t-test was applied. A p-value ≤0.05 was considered significant.

Intra Operative Blood Loss (in ml)	Group-A (n=30)		Group-B (n=30)	
	Mean	SD	Mean	SD
	17.63	1.22	21.76	1.41

Table-I. Comparison of mean intra operative blood loss using ligasure with electrocautery in modified radical mastectomy in patients of breast cancer (n=60) P value=0.001

DISCUSSION

Breast malignancy is the second most commonly recognized malignancy internationally, including developing countries. Mastectomy remains an important surgical choice for breast tumor patients.

Electrocautery has been generally utilized for dissection in breast surgery, as it markedly decreases blood deficit in comparison to formal knife utilization. During operation there is increase chance of seroma formation with electrocautery usage, as it creates more thermic destruction in the skin folds, inflammation in surrounding structures, subdermal vascular plexus disruption, and impaired lymphatic and vascular occlusion; thus leading to more incidence of seroma morbidity rate.[7]

The LigaSure Small Jaw is the newest bipolar vessel sealing system (BVSS) in the LigaSure family, launched in 2010. This instrument has compact undulated jaw, low-temperature portray, less thermal outspread, and multiple uses.[3] Here bleeding is secured by producing a seal using pressure and electrothermal energy to modify the integrity of the vessel walls and localized structures.[8]

There is no local data available on comparison of these two modilities and there is also controversy in literature. We wanted to conduct this study to evaluate the better procedure for malignancy breast to improve the choice of treatment.

In our study, Comparison of mean intra operative blood loss using Ligasure with electrocautery in patients of breast malignancy shows that 17.63+1.22 ml in Group-A and 21.76+1.41 ml in Group-B, p value was 0.001.

The results of this research are in line by Study conducted by ER Erain. In that study, mean intra operative blood loss by using ligasure was 74.6±15.05 ml[10] and with electrocautery, it was 182±92 ml.[11] Another study shows no remarkable disparity between ligasure and electrocautery in comparison to mean intra operative blood loss (18.2 ± 31.1 vs. 20.6 ± 26.3 mL; *P* value = 0.663).[3] Findings of our study are in agreement with the above study regarding lower intraoperative blood loss in ligasure group.

Ali Sabry Ali Helal and others did the comparison in terms of use of monopolar electrocautery and LigaSure™ Small Jaw in malignant breast tumor patients who underwent modified radical mastectomy. They concluded that application of LigaSure™ Small Jaw in operation of breast tumor decreases time of operation and less blood loss showing that it is useful for reducing the operative time as well.[13]

The rate of flap mortification is less when energy devices such as LigaSure™ or Harmonic® scalpel is used in modified radical mastectomy.[14] Mortification of flap is more with sideways heat transmission from the instrument application in surgery of breast tumor. Sutton et al. showed that electrocautery had the maximal core temperature with highest sideways heat transmission.[15] However, this variable did not cover in our study due to limitations of the trial.

However, further trials covering other variables such as operative time and flap necrosis are also required to be evaluated.

CONCLUSION

We concluded that mean intra operative blood loss using LigaSure is significantly lower when compared with electrocautery in modified radical mastectomy in patients of breast cancer.

LIMITATIONS

The major limitation we faced while conducting this study was the availability of the ligasure and the cost of the procedure, but it was resolved by the hospital administration in the vital interest of the patients. The study was conducted in single center. If the same study is conducted in multiple centers then more elaborate and better results can be achieved.

CONFLICT OF INTEREST/ DISCLOSURE

The authors have no conflict of interest and no disclosure regarding the trial with anyone.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
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2	Nabeel Akthar	Concept, Design and Analysism Data collection and composing.	
3	Sultan Mahmood Khan	Proof reading and final approval for version.	
4	Asif Rashid Alamgir	Literature search.	
5	Shaheer Sultan	Data collection.	
6	Hasnain Ejaz	Literature search.