https://doi.org/10.29309/TPMJ/2023.30.08.7524

The Professional Medical Journal
www.theprofesional.com
2023, Volume, 30 Issue, 08

ORIGINAL ARTICLE

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

Zain Bashir[1], Muhammad Taimur[2], Muhammad Imran[3], Inamullah Shah[4], Mahvish Noor[5], Burhan Ahmad[6]

Article Citation: Bashir Z, Taimur M, Imran M, Shah I, Noor M, Ahmad B. Frequency of seroma formation after modified radical mastectomy. A comparison between electrocautery and scalpel dissection techniques. Professional Med J 2023; 30(08):966-970. https://doi.org/10.29309/TPMJ/2023.30.08.7524

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. **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

1. MBBS, FCPS, Surgical Specialist, DHQ Hospital Kotli.
2. MBBS, FCPS, Assistant Professor Surgery, Fauji Foundation Hospital, Rawalpindi.
3. MBBS, FCPS, Associate Professor Surgery, Fauji Foundation Hospital, Rawalpindi.
4. MBBS, FCPS, Professor Surgery, Foundation University Medical College Islamabad.
5. MBBS, FCPS, Senior Registrar, Fauji Foundation Hospital, Rawalpindi.
6. BS (Hons), Dietitian, Fauji Foundation Hospital, Rawalpindi.

Correspondence Address:
Dr. Muhammad Taimur
Department of Surgical Unit-1,
Fauji Foundation Hospital, Rawalpindi.
drmtaimur@yahoo.com

Article received on: 17/03/2023
Accepted for publication: 19/05/2023

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.

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, Dated: 09th January 2023) 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).

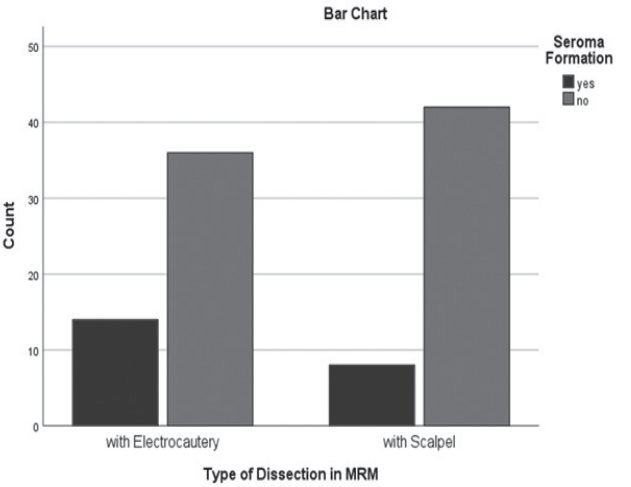

Figure-1. Seroma formation in both groups (n=100)

	N	Minimum	Maximum	Mean	Std. Deviation
Age of pateints in years	100	22	60	42.39	8.267

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

	N	Minimum	Maximum	Mean	Std. Deviation
Volume of Drain on 7th post op day in ml	100	20.00	100.00	39.7700	14.99216

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

		Type of Dissection in MRM		Total			
		with Electrocautery	with Scalpel		Value	Df	Asymptotic Significance (2-sided)
Seroma Formation	Yes	14	8	22	2.098[a]	1	.148
	no	36	42	78			
Total		50	50	100			

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.[10] Dissection during surgery leads to formation of acute inflammatory exudates and damage of lymphatics resulting in lymph leakage are leading causes of seroma formation.[11] 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[12] (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[13] 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[14] while Ramadanus in his study found 149 ml post MRM drain volume.[15] 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.[8] Rajiv Sharma et.al study concludes that the use of electrocautery or scissor dissection leads to comparable seroma production.[16] 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 electro cautery group it is in 36.7% patients.[17] 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.[18] 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.[19] 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.[20] 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

1. Lukasiewicz S, Czeczelewski M, Forma A, Baj J, Sitarz R, Stanislawek A. **Breast cancer—epidemiology, risk factors, classification, prognostic markers, and current treatment strategies—An Updated Review.** Cancers. 2021; 13:4287. https://doi.org/10.3390/cancers13174287

2. Wang X, Ji C, Chi H, Wang H. **How many ELNs are optimal for breast cancer patients with more than three PLNs who underwent MRM? A large population-based study.** Onco Targets Ther. 2018; 11:1005-1011. https://doi.org/10.2147/OTT.S152936

3. Alptekin H, Yılmaz H, Ozturk B, Ece I, Kafali ME, Acar F. **Comparison of electrocautery and plasma blade on ischemia and seroma formation after modified radical mastectomy for locally advanced breast cancer.** Surg Tech Dev. 2017; 7:7011-7014.

4. Memon F, Ahmed A, Parveen S, Iqbal S, Anwar A, Hashmi AA. **Outcomes of harmonic scalpel and electrocautery in patients who underwent modified radical mastectomy.** Cureus. 2020; 12(12):e12311. doi:10.7759/cureus.12311.

5. Jabir MA, Taha A, Shehata MR, Sayed MM, Yehia A. **Post-mastectomy seroma: Does dead space obliteration have a protective effect?** Breast Can Curr Res. 2017;3:1-6.

6. Chaudhary A, Gautam S. **A prospective study of factors affecting seroma formation after modified radical mastectomy in patients of carcinoma of breast.** International Surgery Journal. 2020; 7(9):2919-2924. doi: http://dx.doi.org/10.18203/2349-2902.isj20203768.

7. Garzali IU, El-Yakub AI. **Factors affecting seroma formation after mastectomy among West African patients: A single center experience in North West Nigeria.** PAMJ - Clinical Medicine. 2020; 3:174. doi: 10.11604/pamj-cm.2020.3.174.24567.

8. Chavan RN, Chikkala B, Mondal P, Sarkar DK. **Comparison study between scalpel and electrocautery, in causation of seroma after modified radical mastectomy.** Indian J Surg. 2017; 79(5):423-6.

9. Faisal M, Fathy H, Shaban H, Abuelela ST, Marie A, Khaled I. **A novel technique of harmonic tissue dissection reduces seroma formation after modified radical mastectomy compared to conventional electrocautery: A single-blind randomized controlled trial.** Patient Safety in Surgery. 2018; 12:8. https://doi.org/10.1186/s13037-018-0155-3.

10. Adrien, C., Katia, M., Marie-Lucile, B. et al. **Prevention of lymphocele or seroma after mastectomy and axillary lymphadenectomy for breast cancer: Systematic review and meta-analysis.** Sci Rep. 2022 Jun 15; 12(1):10016. https://doi.org/10.1038/s41598-022-13831-9.

11. Najeeb E, Rasid R, Zaffar S. **Effect of flap fixation technique in modified radical mastectomy on incidence of postoperative seroma formation.** Journal of the College of Physicians and Surgeons Pakistan 2019, Vol. 29 (5): 410-413.

12. Kabbash MM, Salem AA, Elshenawy AA, Mohamed AR. **Evaluation of different modalities in prevention of seroma formation post modified radical mastectomy.** The Egyptian Journal of Hospital Medicine. 2020; 80 (3): 1144-1150.

13. Rabab U, Shaikh A, Fatima S, Sandano M. **Frequency of seroma formation after modified radical mastectomy in patients who receive neo-adjuvant chemotherapy.** JSZMC. 2022; 13(3):3-7. https://doi.org/10.47883/jszmc.v13i3.218.

14. Shaikh Sh, Munir A, Abro Sh, Khatoon Sh, Laghari Z A, Memon A. **Comparison of outcome of one versus two drains insertion for seroma formation following modified radical mastectomy in breast carcinoma.** Ann Pak Inst Med Sci.2020; 17(1): 52-55.doi.10.48036/apims.v17i1.499.

15. Ramadanus, Khambri D, Harahap WA. **Association of early drain removal with formation of seroma in breast cancer patients after modified radical mastectomy.** Bioscientia Medicina. 2022; 6(7): 1989-1993. https://doi.org/10.37275/bsm.v6i7.544.

16. Sharma R, Rajan N Singh, Singh R. **Comparative study of complications following electrocautery dissection vs conventional scalpel/scissor dissection in modified radical mastectomy.** Curr Trends Diagn Treat 2018; 2(2):98-101.

17. Zahid A, Javed T, Kaleem M, Andrabi WI, Jamil T, Qureshi SS et.al. **Comparison of seroma formation with harmonic scalpel versus monopolar electrocautery in axillary dissection following modified radical mastectomy.** P J M H S. 2022; 16(2): 198-200. DOI: https://doi.org/10.53350/pjmhs22162198.

18. Shahid MF, Ibrahim T, Muazzam MA, Chaudhary H, Bukhari US, Ahmed G. **Comparative study of seroma formation in harmonic scalpel versus electrocautery in post modified radical mastectomy.** Pak Armed Forces Med J. 2021; 71 (2): 451-53.

19. Lee KT, Mun GH. **Fibrin Sealants and quilting suture for prevention of seroma formation following latissimus dorsi muscle harvest: A systematic review and meta-analysis.** Aesth Plast Surg. 2015; 39: 399-409.

20. Hadi A, Faridoon S, Shah FO, Khan SA, Shah M, Raza TA. **Early complications of modified radical mastectomy with level II axillary clearance.** J Surg Pakistan. 2021; 26 (1):23-27. Doi:10.21699/jsp.26.1.6.

AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Zain Bashir	Conceived idea, Literature search.	
2	Muhammad Taimur	Data interpretation, Statistical analysis and manuscript writing.	
3	Muhammad Imran	Manuscript writing and Literaturereview.	
4	Inamullah Shah	Manuscript final reading and approval.	
5	Mahvish Noor	Designed Research, Methodology.	
6	Burhan Ahmad	Data collection and compilation.