

ORIGINAL

DIATHERMY VERSUS CONVENTIONAL SCALPEL SKIN INCISION IN MODIFIED RADICAL MASTECTOMY – A COMPARISON OF OUTCOME**Saad Sarfraz Janjua¹, Iffat Noureen¹, Ali Sufyan², Muhammad Ahmed², Bilal Irshad Gondal², Muhammad Saad Yousaf²**¹Surgical Unit II, Benazir Bhutto Hospital, Rawalpindi, India²Rawalpindi Medical University, Rawalpindi, India

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Abstract

Modified radical mastectomy (MRM) is a procedure with increasing incidence in parallel with the advancing diagnostics. The postoperative pain following modified radical mastectomy is troublesome and newer strategies and modalities are being introduced to combat this issue. A quasi experimental study was conducted on a total of 100 patients at the surgical department of Benazir Bhutto Hospital, Rawalpindi undergoing MRM for breast cancer. The patients were divided into two equal groups via lottery method. The diathermy skin incision patients were given group A while the surgical scalpel incision was given group B. Postoperative pain was assessed at 6 hours in the postoperative period by VAS. Effect modifiers like age, duration of surgery and side of surgery were controlled by stratification. Poststratification independent sample t test was applied. A p value ≤ 0.05 was considered as significant. There was no significant difference between groups in terms of distribution of age, duration of surgery and side involved. The scalpel group had higher mean pain scores at 6 hours in postoperative period i.e. 4.22 ± 1.250 versus 5.10 ± 1.389 for group A and B respectively (p value 0.001). The electrocautery skin incision is better than steel scalpel incision in terms of postoperative pain reduction in patients undergoing MRM for breast cancer.

Keywords: adult female mastectomy, tissue damage, electrocautery, seroma, axillary lymph node dissection

Introduction

The diathermy was used in the medical field during the early years of the previous century. Initially it was used to burn the tumor tissues, which at that time was considered beneficial. The coagulation and cutting properties of diathermy became one of the most important uses in the modern surgical procedures. Improvement in the diathermy instruments led to the more favorable surgical outcomes. Diathermy needles concentrate electric current at the point that the human body can handle the electric current of 500mA safely [1], [2].

The mechanism of action of electrocautery is coagulation and burning of the target vessels or tissues. The residual scar, necrosis and tissue damage can lead to delayed healing, infection or postoperative pain. These fears have limited the use of diathermy to the tissues other than skin. For skin incisions, steel scalpel has been used from the start of surgical evolution. The diathermy is now being used increasingly for the skin incisions since modern instrumentation can deliver pure sinusoidal current which produces good cosmetic results with targeted approach of cutting and coagulation [3]. Postoperative pain is the major morbidity observed in surgical patients

and the use of electrocautery for skin incisions can be an effective adjunct to reduce it. Surgeries which involve a lot of tissue dissection, like breast surgery, are more prone to get higher intensity of postoperative pain [4], [5].

A study in 2015 compared the diathermy and steel scalpel skin incisions for mastectomy in terms of postoperative pain. The diathermy caused less postoperative pain as compared to the scalpel group at 6 hours' time in the postoperative period (11.84 ± 6.15 mm versus 16.18 ± 8.5 mm ($p=0.001$)) [3]. Some other studies also showed the decreased postoperative pain in diathermy groups in various elective general surgical procedures [1], [5-8].

This study aims to evaluate the electrocautery and steel scalpel skin incisions in patients undergoing modified radical mastectomy (MRM) for breast cancer in terms of frequency of postoperative pain. In Pakistan the data regarding this subject is limited. The study would help to choose the better instrument for skin incisions, which would decrease the morbidity in patients undergoing MRM.

Materials and Methods

A quasi experimental study was conducted on 100 patients at the Department of Surgery, Benazir Bhutto Hospital Rawalpindi via consecutive non-probability sampling technique over one year (1 Jan 2019 to 31 Dec 2019). Female patients with the age range of 30 to 70 years undergoing MRM were included. The sample size was calculated prior to the study with 90% power of test, 5% level of significance and taking diathermy group standard deviation of 6.15, mean pain score of 11.84 and scalpel group mean pain score of 16.18 [3]. Patients with history positive for use of analgesics within three days before surgery, previous history of breast or axillary surgery and/or those with chronic illnesses like diabetes mellitus, ischemic heart disease, chronic liver and renal disease were excluded. After detailed history, clinical examination and relevant investigations the diagnosis was confirmed. Informed written consent was taken from all patients. All patients were admitted, and pre-anesthesia workup was done.

The patients were divided into two equal groups via lottery method i.e. A and B. The diathermy skin incision (pulse sine wave current, power 70 watts) was given in patients of group A while the surgical scalpel incision (no. 23 blade) was given in group B. Rest of the preoperative, postoperative and intraoperative care were kept the same. After surgery, all the patients were kept NPO for 06 hours and received intravenous antibiotics for five days. Injection Ketorolac 30mg (intravenous, every 8 hours) as an analgesic was used. The postoperative pain was assessed at 6 hours in the postoperative period by visual analogue scale (VAS). Data was recorded on structured Performa.

Data was analyzed using SPSS version 24 for windows. For quantitative data like age, duration of surgery and pain scores, mean and standard deviation were calculated. Frequency and percentage were calculated for the qualitative data like the side of surgery. Both groups were compared among each other for mean postoperative pain scores by independent sample t test. Effect modifiers like age, duration of surgery and side of surgery were controlled by stratification. Post-stratification independent sample t test was applied. A p value ≤ 0.05 was considered as significant.

Results

The mean age of the patients was 53.27 ± 7.299 years. The age was divided into two groups based on the cut off value of 50 years. This data was used to combat confounders and was used for stratification purposes. The mean duration of surgery was 103.75 ± 21.664 minutes. Collectively the mean pain score at the end of 6 hours in the postoperative period was 4.66 ± 1.387 . The right and left sides were almost equally involved i.e. 52% for right side. There was no difference between groups in terms of distribution of age, duration of surgery and side involved as p values were 0.796, 0.417 and 0.230 for age, duration and side involved respectively. There was a statistically significant difference among groups in terms of mean pain scores at 6 hours in postoperative period i.e. 4.22 ± 1.250 versus 5.10 ± 1.389 for group A and B respectively (p value 0.001). The data was stratified according to age, duration of surgery

and side involved. There was a significant difference among groups for only following groups; age >50 years, duration of surgery >100 min and left side (p values 0.001, 0.010 and <0.0001 respectively).

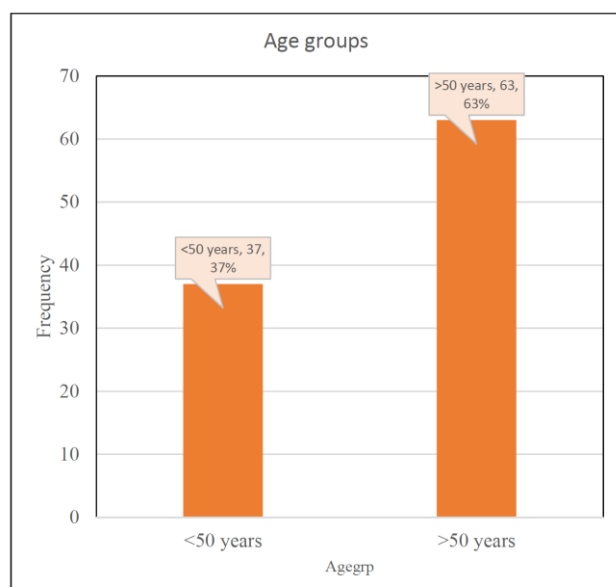


Figure 1 – Graph of age distribution

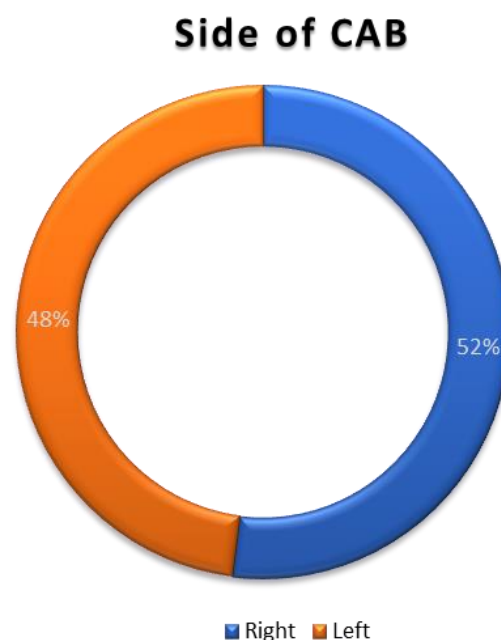


Figure 2 – Side involved

Parameter	Group		p value
	A (50)	B (50)	
Age (years)	53.46 ± 7.163	53.08 ± 7.499	0.796 ^a
Duration of surgery	101.98 ± 20.380	105.52 ± 22.946	0.417 ^a
Pain score at 6 hours	4.22 ± 1.250	5.10 ± 1.389	0.001 ^a

Table 1 – Quantitative variables among groups

Variable	Group	N	Mean	p value ^b
Age (years)	<50	A	17	4.47 ± 1.375
		B	20	4.85 ± 1.387
	>50	A	33	4.09 ± 1.182
		B	30	5.27 ± 1.388

Table 2 – Comparison among groups after age stratification

Variable	Group	N	Mean	p value ^c
Side involved	Right	A	29	4.31 ± 1.257
		B	23	4.61 ± 1.500
	Left	A	21	4.10 ± 1.261
		B	27	5.52 ± 1.156

Table 3 – Comparison among groups after involved side stratification

Variable	Group	N	Mean	p value ^d
Duration of surgery (minutes)	<100	A	22	4.05 ± 1.430
		B	21	4.86 ± 1.276
	>100	A	28	4.36 ± 1.096
		B	29	5.28 ± 1.461

Table 4 – Comparison among groups after surgery duration stratification

Discussions

MRM is the most common surgical procedure for breast cancer. The quality of life is compromised after this surgery due to the pain associated with this procedure. Almost all kinds of breast surgeries are associated with pain which affects quality of life. The pain management is required in almost one third of patients in the later phases. This pain is associated with physical and psychological dimensions which should be addressed also [1], [9]. The level of anxiety before surgery is always associated with the frequency of postoperative pain [10]. The other preoperative psychological parameters like poor sleep etc. are also associated with increased frequency of postoperative pain in mastectomy patients [11].

Post MRM pain seriously impacts patients' emotional situation, daily activities, and social relationships and this leads to a huge economic burden on the healthcare system of any country. A study showed that in Turkey the 64.1% experience post MRM pain which requires careful management to reduce the morbidity [12]. To reduce the postoperative pain various drugs and modalities are being used. The oral medications are associated with various gastrointestinal issues and efficacy is also reduced when the motility is not restored properly. The various IV drugs like paracetamol, NSAIDs, opioids are used but every drug has its own merits and demerits. The local anesthetics are very good for the short-term relief of pain but to prolong effect the addition of vasoconstrictors or continuous infusion can be used [13]. The use of local anesthetics for various plane blocks are also showing promising results for the reduction of postoperative pain. Most of these blocks are done under sonographic guidance [14].

The surgical techniques affect the postoperative pain. Most of the techniques follow the basic principles of dissections but the slight modification in the techniques can produce good outcomes [3]. After the advent of diathermy, its use has shown many advantages over the conventional dissection. The esthetic aspect and bleeding are the two most important factors which have shown very promising results [4]. Some studies involving abdominal surgeries show that the frequency of postoperative pain is always reduced by diathermy as compared to

steel scalpel [2,5,7]. The same may be proved during the head and neck surgeries as well [15]. Ayandipo, O., et al. (2015) compared steel scalpel and diathermy incision in mastectomy patients in terms of postoperative pain. The results showed that mean pain scores in diathermy versus scalpel groups were 11.84 ± 6.15 mm versus 16.18 ± 8.5 mm ($p=0.001$) respectively at six hours in the postoperative period [3].

In our study the postoperative pain was reduced in diathermy group i.e. 4.22 ± 1.250 versus 5.10 ± 1.389 for scalpel group (p value 0.001). Elbohuty, A. E., et al. (2015) showed that diathermy reduces the duration of surgery and bleeding during cesarean section while there was no effect on the postoperative pain in both groups [8]. In general, the diathermy reduces the complications and morbidity in terms of postoperative pain [6],[16]. But, as mentioned before, the results are always in question when some studies showed that there is no effect of diathermy on postoperative pain or other complications in various surgical procedures like hernia repair [17]. The data was stratified according to age, duration of surgery and side involved. There was a significant difference among groups for only following groups; age >50 years, duration of surgery >100 min and left side (p values 0.001, 0.010 and <0.0001 respectively).

Conclusion

The electrocautery skin incision is better than steel scalpel incision in terms of postoperative pain reduction in patients undergoing MRM for breast cancer. Multicenter trials would further validate results of the study and would establish latest guidelines for the management of breast cancer.

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