



CODEN [USA]: IAJ PBB

ISSN : 2349-7750

INDO AMERICAN JOURNAL OF PHARMACEUTICAL SCIENCES

SJIF Impact Factor: 7.187

<http://doi.org/10.5281/zenodo.4308400>Available online at: <http://www.iajps.com>

Research Article

OUTCOME AND EFFICACY OF MODIFIED RADICAL MASTECTOMY WITH AXILLARY CLEARANCE USING A HARMONIC SCALPEL

Dr Sumbal Nayab¹, Dr Kiran Sarfraz², Dr Hafiza Seerat E Amna³^{1,2} Holy Family Hospital, Rawalpindi³ Sir Gangaram Hospital, Lahore

Article Received: October 2020

Accepted: November 2020

Published: December 2020

Abstract:

Background: Surgical treatment of breast cancer has changed radically from radical surgery to breast conserving technique. The most common complications of conventional modified radical mastectomy with axillary dissection, electrocoagulation (diathermy), and suture ligation are serous, lymphoedema with a frequency of 11% to 85% and 2% to 50%, respectively

Purpose: The study was conducted to assess feasibility, safety and efficacy modified radical mastectomy with axillary preparation with a harmonic scalpel in terms of time of operation, sealing of lymphatic vessels, hemostasis and postoperative complications.

Place and Duration: This prospective observational study was conducted in the Surgical department of Holy Family Hospital, Rawalpindi for one-year duration from March 2019 to March 2020.

Methodology: During this period, a total of 60 patients underwent a modified radical mastectomy and axillary removal. The study included patients with indications for modified radical mastectomy and ASA (American Society of Anesthesia) with a result of 1 and 2. The study group excluded patients with early breast cancer (T1), after breast surgery, neoadjuvant surgery, a patient with diabetes and other diseases coexisting.

Results: All data were entered and analyzed in SPSS 17. Descriptive statistics were used to summarize continuous variables and presented as mean \pm standard deviation and categorical variables in frequencies and percentages because it is an observational study, no statistical test and p-value are required. The mean intraoperative blood loss was 45 ± 12 ml, and the mean operative time was 90 ± 7 minutes. There was no postoperative bleeding or hematoma. But on the other hand, there was seroma (2), lymphedema, and wound infection. The mean volume of flap and axillary drainage was 20 ± 8 ml and 155 ± 35 ml, respectively, and the mean drainage time was 1.3 ± 0.2 and 2.7 ± 0.5 days, respectively. The mean stay in hospital was 3.7 ± 0.6 days. Of the 60 patients, 19 (31.6%) patients had positive axillary nodes, of which 6 patients (10%) had 1-2 positive lymph nodes and 13 patients (21.6%) had four or more positive lymph nodes.

Conclusion: The modified radical mastectomy and axillary preparation using a harmonic scalpel was safe, feasible and effective. This device simplifies surgery, surgery time, perioperative blood loss, drainage volume and drainage time. In addition, the incidence of seroma and lymphoedema also decreased.

Key words: modified radical mastectomy, harmonic scalpel, seroma.

Corresponding author:**Dr Sumbal Nayab,**

Holy Family Hospital, Rawalpindi

QR code



Please cite this article in press Sumbal Nayab et al, **Outcome And Efficacy Of Modified Radical Mastectomy With Axillary Clearance Using A Harmonic Scalpel.**, Indo Am. J. P. Sci, 2020; 07(12).

INTRODUCTION:

The harmonic scalpel has recently emerged as an alternative surgical instrument for dissection and hemostasis¹⁻². It is widely used in the field of minimally invasive surgery. Despite the emergence of the breast conserving technique (surgery), modified radical mastectomy is still the most frequently performed surgery for breast cancer today. The conventional method of diathermy (ie, electrocoagulation) is associated with a moderate degree of operative morbidity in 35% to 50% of patients.³ Many of these cases are attributed largely to extensive, severe post mastectomy, lymphatic transection, and electrocoagulation³⁻⁴. Sealing of lymph vessels and hemostasis are usually done with clamps, suture ligation, or electrocoagulation. However, ligation of the sutures is time-consuming and carries the risk of the knot slipping and the clips may become detached. In addition, electrocoagulation spreads heat to adjacent tissues and is considered a risk factor for serous and another post-mastectomy wound complications⁵⁻⁶. Modified radical mastectomy and axillary preparation using a harmonic scalpel have recently been described. The electrothermal bipolar vascular occlusion system, a novel hemostatic device,

is used in general surgery to ensure safety and efficacy in terms of hemostasis, complications and reduction of operative time⁷⁻⁸. The objectives of this study were to assess the feasibility, safety and efficacy of a modified radical mastectomy with axillary dissection with a harmonic scalpel in terms of lymphatic vessels sealing hemostasis and perioperative complications.

METHODOLOGY:

This prospective observational study was conducted in the Surgical department of Holy Family Hospital, Rawalpindi for one-year duration from March 2019 to March 2020. A total of 60 patients underwent modified radical mastectomy. Patients with unilateral breast disease with all indications for modified radical mastectomy with American Society of Anesthesiology scores 1 and 2 were included in the study. The study group excluded patients with early breast cancer (T1), previous breast surgeries, treated with neoadjuvant treatment and with diabetes and other comorbidities. Informed consent was obtained from all patients before the operation, and the operation was performed by the same group of surgeons. Data are given as mean (SD) and range, or as number and percentage of patients.



Figure 1: Harmonic Scalpel device



Figure 2: Dissection in progress with Harmonic Scalpel

RESULTS:

Data was entered and analyzed in SPSS 17. Descriptive statistics were used to summarize continuous variables and presented as mean \pm standard deviation and categorical variables in frequencies and percentages because it is an observational study, no statistical test and p-value are required (Table 1).

Table 1: Clinical and postoperative complication data among 60 patients

Variables/Mean, SD & Range	Mean	Standard Deviation	Range
Age in years	48.5	6.3	28-75
Number of Axillary nodes removed	19	5.4	13-38
Intra-operative blood loss in ml	45	12	25-70
Operative time in minutes	90	07	80-120
Flap drainage volume in ml	20	08	05-40
Duration of fl ap drain in days	1.3	0.2	1-2
Axillary drainage volume in ml	155	35	90-265
Duration of axillary drain in days	2.7	0.5	2-4
Stay in Hospital in days	3.7	0.6	3-6

Within one and a half years, sixty (60) patients were operated on by the same team of surgeons, and sealing of lymphatic vessels and hemostasis was achieved with a harmonic scalpel in all cases. No clips-, sutures or diathermy (electrocoagulation) were used. The mean intraoperative blood loss was 45 ± 12 ml, and the mean operative time was 90 ± 7 minutes.

Table 2: Postoperative complications

Postoperative complications	No. of Patients
Postoperative bleeding	0
Hematoma	0
Seroma	2
Upper limb lymphedema	1
Wound infection	1
Wound necrosis	0
Skin burn	0
Pneumothorax	0

There was no postoperative bleeding, hematoma, lobe necrosis, or pneumothorax. While two patients (3.33%) had seroma, one (1.66%) had lymphedema and one (1.66%) had a wound infection. The mean volume of flap and axillary drainage was 20 ± 8 ml and 155 ± 35 ml, respectively, and the mean duration of drainage was 1.3 ± 0.2 and 2.7 ± 0.5 days, respectively. The mean stay in hospital was 3.7 ± 0.6 days. Among 60 patients, 19 (31.6%) patients had positive axillary nodes: of which 6 (10%) had 1-2 positive nodes, and 13 (21.6%) had four or more axillary nodes.

DISCUSSION:

The harmonic scalpel is an innovative device designed as an alternative to the conventional vessel sealing technique. It turned out to be an alternative surgical instrument for dissection and hemostasis⁹⁻¹⁰. It is widely used in minimally invasive surgery and open surgery as well as in the thyroid gland and breasts. The ultrasonic energy generated by the harmonic scalpel breaks down the hydrogen bonds and forms a denatured protein clot that seals the vessels and lymphatic system, thus reducing blood loss and

lymphatic drainage. Conventional MRM with axillary dissection using electrocoagulation, clamping and binding techniques is associated with moderate morbidity in terms of blood loss, hematoma, lobe necrosis, serous, and prolongation of axillary drainage. Deo and Shukla used a harmonic scalpel for dissection in MRM and showed promising results in terms of operative time, intraoperative blood loss, lymphatic drainage and seroma formation. However, a study by Galatius H & Okholm et al. Showed that there was no significant difference in the use of both techniques in

terms of operative time, perioperative bleeding, and wound complication. In addition, they noted a high frequency of seroma formation in both groups¹¹. One of the important considerations in the use of a harmonic scalpel is the extent of the spread of lateral thermal injury and associated tissue damage. Several experimental studies have shown that the extent of lateral thermal damage is limited to 2-3 mm. Our results of using the harmonic scalpel technique in MRM are encouraging. The device is handy, easy to use, safe and reliable. We did not encounter any technical problems with its use. There were no significant perioperative or postoperative complications and the estimated blood loss was significantly lower compared to the other studies reported¹². Moreover, two (2) patients in our study experience serous formation unlike other literature, with a reported frequency of between 11% and 85%. Second, the mean volume of drainage is comparatively lower than in another studies¹³⁻¹⁴. None of our patients had skin burns or flake necrosis, contrary to the complication rate of 18% reported in some studies. In addition, only in our study One (1) case of upper limb lymphedema was observed. However, this result should be carefully evaluated as lymphedema takes a longer break to develop after surgery. The observation period should be at least four years or longer to assess the incidence of lymphedema. Our study was limited due to the shorter follow-up period, so we cannot comment on the incidence of lymphedema. Although the harmonic scalpel is expensive than the conventional technique, the benefits and potential reduction of complications have made this device cost effective. Although there was no control group in our study, comparing our results with data from other studies in the literature suggests that there may be significant benefits to using this device in breast surgery¹⁵.

CONCLUSION:

Recapitulation of a modified radical mastectomy with axillary clearance using a harmonic scalpel is feasible, safe and effective. The main advantage of this technique is that it simplifies surgery and eliminates the need for clips, ligatures and diathermy (electrocoagulation), and provides effective lymphatic sealing and hemostasis. Thus, it reduces morbidity in patients.

REFERENCES:

1. Michalik T, Matkowski R, Biecek P, Szynglarewicz B. The use of ultrasonic scalpel lowers the risk of post-mastectomy seroma formation in obese women. *Journal of Cancer*. 2019;10(15):3481.

2. Sharma AK, Kumar M, Singh A, Porwal R, Somani SK, Soni A. A prospective randomized study comparing ultrasonic dissector with monopolar electrocautery for dissection in modified radical mastectomy. *Int J Surg Sci*. 2019;3(3):149-53.
3. Gambardella C, Clarizia G, Patrone R, Offi C, Mauriello C, Romano R, Filardo M, Conzo A, Sanguinetti A, Polistena A, Avenia N. Advanced hemostasis in axillary lymph node dissection for locally advanced breast cancer: new technology devices compared in the prevention of seroma formation. *BMC surgery*. 2019 Apr;18(1):1-9.
4. Salama AM, Nawar AM, Zayed ME, Essa MS. Evaluation of ultrasonic axillary dissection in preservation of intercostobrachial nerve and lymphatic sealing in breast cancer patients: Randomized controlled trial. *Annals of Medicine and Surgery*. 2020 Nov 1.
5. Hamdy O. Sutureless Mastectomy Using Monopolar Electrocautery Only-A Report of 100 Consequent Cases. *Surg. Gastroenterol*. 2020;25(1):37-42.
6. Shaukat A, Anjum MA. Comparison of Axillary Lymph Node Dissection by Using Ligasure Vessel Sealing System Vs Conventional Thread Ligation in Patients Undergoing Modified Radical Mastectomy for Carcinoma of Breast. *Annals of Punjab Medical College*. 2020 Sep 30;14(3):254-8.
7. de Rooij L, van Kuijk SM, Granzier RW, Hintzen KF, Heymans C, Theunissen LL, von Meyenfeldt EM, van Essen JA, van Haaren ER, Janssen A, Vissers YL. Reducing Seroma Formation and Its Sequelae After Mastectomy by Closure of the Dead Space: A Multi-center, Double-Blind Randomized Controlled Trial (SAM-Trial). *Annals of Surgical Oncology*. 2020 Oct 19:1-0.
8. Kim KJ, Chung JH, Lee HC, Lee BI, Park SH, Yoon ES. Comparison of Harmonic scalpel and monopolar cautery for capsulectomy at the second stage of expander/implant breast reconstruction. *Archives of Plastic Surgery*. 2020 Mar;47(2):140.
9. Contreras N, Jakub JW. The achilles heel of minimally invasive inguinal lymph node dissection: Seroma formation. *The American Journal of Surgery*. 2020 Apr 1;219(4):696-700.
10. Raghavendra RT, Neogi S. Role of flap fixation during modified radical mastectomy in locally advanced breast carcinoma patients: a randomised control study. *International Surgery Journal*. 2019 Nov 26;6(12):4465-70.
11. 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 Aug 27;7(9):2919-24.
12. Abraham Jebakumar R, Sathish Kumar D. A Study of Pathogenesis and Prevention of Seroma Formation after Mastectomy in Tertiary Care Centre.
 13. Tokgöz S, Karaca Umay E, Yilmaz KB, Akkoca M, Akinci M, Azili C, Saydam M, Ucar Y, Balas Ş. Role of intraoperative nerve monitoring in postoperative muscle and nerve function of patients undergoing modified radical mastectomy. *Journal of Investigative Surgery*. 2019 Nov 8:1-8.
 14. Huang S, Qiu P, Chen W, Zhang Y, Luo K, Li J. Modified radical mastectomy for anterior thoracic nerve and intercostobrachial nerve protection (case report). *Gland Surgery*. 2020 Apr;9(2):463.
 15. Faisal M, Salem S, Kamel N, Abd El-Zaher H, Bakr AA. Effect of Autologous Fibrin Glue on Seroma Reduction after Modified Radical Mastectomy for Breast Cancer: A Randomized Controlled Trial.