

Original Article

ULTRA SONIC DISSECTION IN MODIFIED RADICAL MASTECTOMY

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Objective: To determine the outcome of ultrasonic dissection in modified radical mastectomy.

Methods: Ninety patients fulfilling the inclusion criteria were selected for study. Modified radical mastectomy was performed by using the ultrasonic dissector. Flaps were raised using coagulating shears/blades of ultrasonic dissector and dissection of the breast tissue was done with same device. Level II axillary clearance was done in all cases. Coaptive coagulation mode was used to occlude and transect the blood vessels and lymphatic vessels. Two closed suction drains placed.

Results: All the patients were females with mean age of 45.81 ± 10.02 years. Mean volume of drainage of pectoral drain was 56 ± 35.45 ml, mean volume of drainage of axillary drain was 250 ± 109.07 ml, and mean total volume of drainage was 306.39 ± 130 ml. The mean duration of drain was 5.87 ± 1.62 days. There were 4 patients (4.44%) who developed seroma out of total ninety patients at 10th postoperative day while 86 patients (95.56%) had no clinical signs of seroma. None of the patients developed wound infection, flap necrosis, or post operative hematoma.

Conclusions: Modified radical mastectomy with axillary dissection using ultrasonic dissection is safe, feasible and effective. With this technique, there is reduced volume of drainage and duration and incidence of seroma.

Keywords: ultrasonic dissection, modified radical mastectomy, suture less mastectomy.

Introduction

Breast carcinoma is the commonest carcinoma in women. It accounts for 22% of all female cancers worldwide and approximately 42% cases occur in the developing world.¹

Modified radical mastectomy with or without reconstruction or breast conservation surgery in addition to axillary lymph node dissection is the commonly performed surgical procedures in breast cancer.² The most frequent complications in the immediate postoperative period of any breast surgery is the lymphocele or seroma formation.³ Other complications include hematoma, prolonged axillary drainage, wound infection, flap necrosis, intraoperative and post operative bleeding⁴ Conventional modified radical mastectomy with axillary dissection using scalpel, clamp and tie technique causes seroma and lymphoedema with incidence of 11% to 85% and 2% to 50 % respectively.⁵ Ultrasonic surgical instrumentation was introduced into clinical practice approximately a decade ago.⁷ Ultrasonic waves at a frequency of 55,000/second are generated by the ultrasonic scalpel for tissue dissection and hemostasis. Covedian Ultrasonic device were used in our setup. Ultrasonic dissection using the Harmonic scalpel has recently emerged as a safe alternative to electrocautery & significantly diminishes seroma

formation, blood loss and operation time.⁷ SVS Deo, N K Shukla did a comparative study of modified radical mastectomy using harmonic scalpel and electrocautery. According to the result of that study, the blood loss was significantly lower in ultrasonic group. There is also significant reduction of drain days (5 ± 3) required with $P < 0.05$. There was no significant difference in seroma rate (16%).⁸

Methods

A Descriptive case series study carried out in Surgical Unit-I Services Hospital, Lahore over a period of six months. Sample size of 90 cases were calculated using non-probability, purposive sampling with 95% confidence level, 8% margin of error and taking expected percentage of seroma formation i.e. 17% in patients undergoing modified radical mastectomy. Patients 20-70 years of age with carcinoma breast assessed clinically (tumor size and palpable nodes) and with a histological diagnosis using a core biopsy were included in the study. Patients with locally advanced, recurrent and metastatic disease with ASA Grade III / IV and those had Radiotherapy to the chest wall were excluded from the study. Ninety patients fulfilling the inclusion criteria were recruited from outdoor and emergency department. A detailed history was taken Including demographic data (age, address). Patients were requested to sign an informed

consent. They were assured regarding confidentiality and expertise used for the particular procedure. All procedures were done by a single operating surgical team to control bias. Preoperatively tumors were staged according to TNM classification.

Modified radical mastectomy was performed by using the ultrasonic dissector. Flaps were raised using coagulating shears/blades of ultrasonic dissector and dissection of the breast tissue was done with same device. Level II axillary clearance was done in all cases. Coaptive coagulation mode was used to occlude and transect the blood vessels and lymphatic vessels. A single closed suction drainage system was placed in the axilla and the other at pectoral region. Drainage duration was recorded when both drain were removed. Patients were examined for seroma formation on 10th post-operative day i.e. by that time drain were removed from most of the patients. Patients were discharged and drains were removed when output was less than 30 ml/day. Stitches were removed on 10th day. All the data was recorded on especially designed proforma. The collected data was entered and analyzed accordingly using SPSS version 11 through its statistical program. The study variables were age,

Table-1: Distribution of Patients by Age (N = 90).

Age (years)	Frequency	Percentage (%)
21-45	46	51.11 %
46-70	44	48.88%

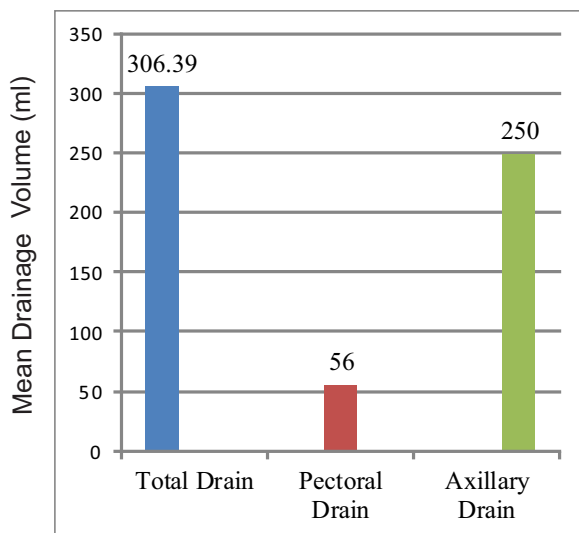


Fig.1: Volume of Drainage.

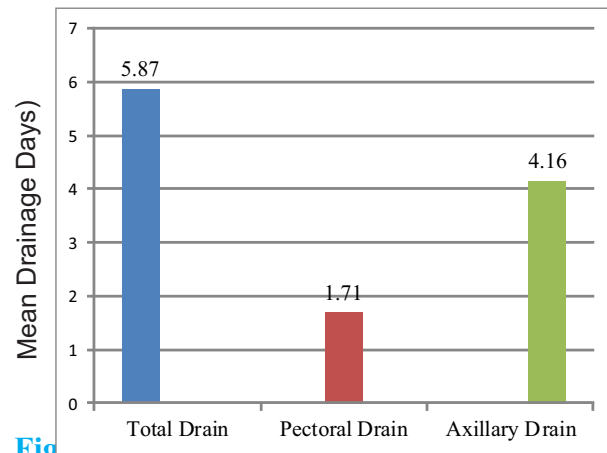


Fig.2: Mean Drainage days.

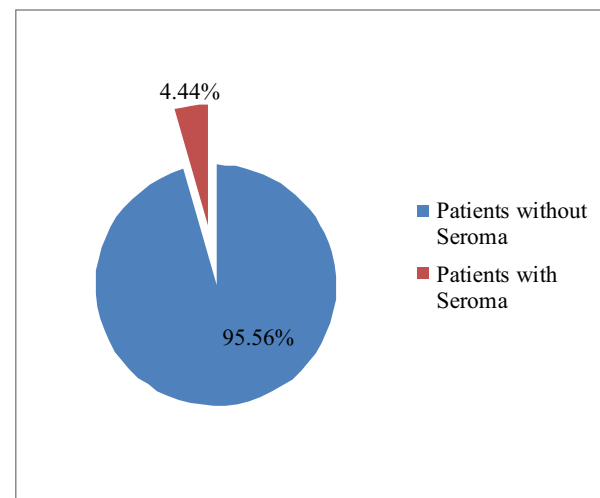


Fig-3: Distribution of Patients with Seroma Formation and without Seroma Formation (N=90).

duration of drain requirement and seroma formation. The variables were analyzed using simple descriptive statistics, calculating mean and standard deviation for numerical values like age and duration of drain. Frequencies and percentages were calculated for qualitative variables like seroma formation. Ninety female patients of breast carcinoma with clinically palpable breast lump were included. The mean age was 45.81+10.02 years and divided in two age groups. The first group had patients aged 21 to 45 years (N=46) 51.11% and in second group, patients aged 46 to 70 years (N=44) 48.88%. **(Table-1)** Mean volume of drainage of pectoral drain was 56 ± 35.45ml, mean volume of drainage of axillary drain was 250±109.07ml, and mean total volume of drainage was 306.39±130. **(Fig-1)** The duration of drain ranged from 4-11 days (pectoral drain 1-3days, and axillary drain 3-8 days) with a mean value of 5.87+1.62 days.

(Fig-2) There were 4 patients (4.44%) developing seroma out of total ninety patients at 10th postoperative day while 86 patients (95.56%) had no clinical signs of seroma. **(Fig-3)** None of the patients developed wound infection, flap necrosis, or post operative hematoma.

Discussion

Breast carcinoma is a commonest malignancy in females all over the world and second leading cause of death in female. In Pakistan, it is more common in young age (incidence in 30-39 years) contrary to west (over 65 years). Incidence of breast cancer in Pakistan stands at 24.4% thus making it commonest malignancy among Pakistani females.⁹ MRM performed using electrocautery is associated with a moderate degree of morbidity¹⁰ in the form of blood loss, haematoma, flap necrosis, seroma and prolonged axillary drainage. Tejler et al¹⁰ reported a post mastectomy morbidity rate of 35% in a series of 385 breast cancer patients and found that 17% of the total hospital stay was due to post mastectomy morbidity. Recently ultrasonically activated scalpel is emerging as an alternative surgical tool for dissection and hemostasis especially in the field of minimally invasive surgery. Ultrasonic waves at a frequency of 55,000/second are generated by the ultrasonic scalpel for tissue dissection and hemostasis. Its use during laparoscopic procedures was very attractive resulting in nearly bloodless and clip less procedures with the advantage of time and effort saving that made surgeons more satisfied. In open surgery its use was limited because of its cost; however some reports showed that it may be cost effective in view of reducing the operative time, blood loss and postoperative pain sensation.¹¹ Most studies on cutting devices used during mastectomies are retrospective and non-randomized. In these studies, ultrasonic dissector has generally been compared to cold scalpel. Although the superiority of ultrasonic dissector to scalpel with respect to wound complications has not been demonstrated, it is obvious that the ultrasonic dissector shortens the operation time by decreasing intraoperative bleeding.¹² In a study of 23 patients, Deo et al¹³ compared ultrasonic dissector with electrocautery and there was no difference observed between the groups with respect to operation time and incidence of seroma. Blood loss and amount of drainage were significantly lower in the ultrasonic dissector group than the electrocautery group. The time needed for

drain removal was also shorter in the ultrasonic dissector group. Seroma is the most frequent wound complication of MRM and the incidence varies between 30 and 40%.¹⁵ At the beginning, lymphatic channels opened during dissection were blamed to cause seroma formation whereas later on the dead space, the irregular anatomy of the chest wall and flap dislodgement related to arm movements were considered as factors causing seroma formation.¹⁶ Ultrasound scissors have recently been more frequently used as an alternative surgical tool for dissection and hemostasis. Sanguinetti et al¹⁷ studied the utility and advantages of this instrument compared with electrocautery to perform axillary dissection and found no significant difference in the operating time between the ultrasound scissors and electrocautery group. In contrast, they found that there were significant differences in terms of blood loss, drainage volume, the number of drainage days and seroma rate. Our study conducted on 90 patients aimed at further defining the role of ultrasonic dissection in our setup. In the present study, mean age of patients was 45.81 ± 10.02 years and 65.55% had lump in upper outer quadrant of breast. Hameed et al¹⁸ also reported a mean age of the patients was 43.99 ± 11.97 years and 66% of the tumors were in upper outer quadrant. So our results are comparable with local and international studies. In our study mean volume of drainage was 306.39 ± 130 ml (pectoral drain volume was 56 ± 35.45 ml and axillary drain volume was 250.22 ± 109.07 ml). The duration of drain ranged from 4-11 days (pectoral drain 1-3 days, and axillary drain 3-8 days) with a mean value of 5.87 ± 1.62 days (figure 12). In a comparative study conducted by Ashraf Khatar¹⁹, total drainage volume in harmonic scalpel group was 446.00 ± 70.64 (ml) and in electrocautery group was 773.50 ± 159.82 ml with a P value <0.001 (S), and drainage days in harmonic scalpel group was 5.90 ± 0.85 day while in electrocautery group was 13.37 ± 0.93 days with a P value <0.001 (S). So our results are in agreement with most of the literature as reported by Deo et al¹³, and Ashraf Khatar.¹⁹ Ultrasonically activated scalpel is effective in sealing the lymphatic and blood vessels. Ultrasonic energy generated by the harmonic scalpel causes a breakage of hydrogen bonds and the formation of denatured protein coagulum. This coagulum seals off the vessels and lymphatics in decreased blood loss and lymphatic drainage. So it significantly reduces the drainage volume and duration.

In our patients, seroma formation was 4.44%. The incidence of seroma formation was not decreased by

use of the harmonic scalpel as reported in majority Literature. However Lumachi et al reported decrease of seroma with use of the harmonic scalpel.¹² In our study frequency of seroma formation is less because ultrasonic dissector causes less lateral damage so resulted in reduced acute inflammatory response. Also we delayed the removal of drain until the drain output is less than 30ml per day. It is noticed during study that patients who developed seroma have greater drain output after surgery. Yilmaz et al²⁰ concluded that Ultrasonic dissector decreases the duration of surgery by diminishing the bleeding without increasing the seroma incidence. High cytokine levels detected in seroma fluids of the patients in the electrocautery group were an indicator of greater tissue damage and inflammatory response. Therefore, it can be argued that seroma as a result of acute inflammatory response was observed at

higher frequencies in the electrocautery group than with Ultrasonic dissector.

Conclusion

Ultrasonic dissection is useful technique for breast surgery. Modified radical mastectomy with axillary dissection using this technique is safe, feasible and effective. It simplified the surgical procedure, while achieving efficient lymph vessels sealing and hemostasis. Compared with historical data, this technique seems to result in reduced operative time, drainage volume and duration and incidence of seroma.

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References

- Parkin DM, Bray F, Ferlay J, Pisani P. Estimating the world cancer burden: Globocan 2000. *Int J cancer* 2001; 94: 153-6.
- Hashemi E, Kaviani A, Najafi M, Ebrahimi M, Hooshmand H, Montazeri A. Seroma formation after surgery for breast cancer. *World J Surg Oncol* 2004; 2: 44.
- Douay N, Akerman G, Clement D, Malartic C, Morel O, Barrenger e. Seroma after axillary lymph node dissection in breast cancer. *Gynecol Obstet Fertil* 2008; 36: 130-5.
- Shah SH, Rasool I, Awais S. Modified radical mastectomy; morbidity during early postoperative period. *The Professional* 2004; 2: 442-5
- Manouras A, Markogiannakis H, Genetzakis M, Filippakis G M, et al. Modified radical mastectomy with axillary dissection using the electrothermal bipolar vessel sealing system. *Arch Surg* 2008; 143: 575-80.
- Matthews B, Nalysnyk L, Estok R, Fahrbach K, et al. Ultrasonic and nonultrasonic instrumentation *Arch Surg* 2008; 143: 592-600.
- Deo S V S, Shukla N K, Asthana S, Niranjana B, Srinivas G. A comparative study of modified radical mastectomy using harmonic scalpel and electrocautery. *Singapore Med J* 2004; 43: 226-28.
- Deo S V S, Shukla N K, Asthana S, Niranjana B, Srinivas G. A comparative study of modified radical mastectomy using harmonic scalpel and electrocautery. *Singapore Med J* 2002; 43: 226-28.
- Osteen RT, Cady B, Chmiel JS, et al. National survey of carcinoma of the breast by the commission of cancer. *J Am Coll Surg* 1991; 178: 213-9.
- Tejler G, Aspegren K. Complications and hospital stay after surgery for breast cancer: a prospective study of 385 patients. *Br J Surg* 1985; 72: 542-4.
- Miccoli P, Berti P, Dionigi GL, D'Agostino J, Orlandini C, Donatini G. Randomized controlled trial of harmonic scalpel use during thyroidectomy. *Arch Otolaryngol Head Neck Surg* 2006; 132: 1069-73
- Lumachi F, Brandes AA, Burelli P, Basso SM, Iacobone M, Ermani M. Seroma prevention following axillary dissection in patients with breast cancer by using ultrasound scissors: a prospective clinical study. *Eur J Surg Oncol* 2004; 30: 526-30.
- Deo SV, Shukla NK, Asthana S, Niranjana B, Srinivas G. A comparative study of modified radical mastectomy using harmonic scalpel and electrocautery. *Singapore Med J* 2002; 43: 226-8.
- Adwani A, Ebbs SR. Ultracision reduces acute blood loss but not seroma formation after mastectomy and axillary dissection: a pilot study. *Int J Clin Pract* 2006; 60: 562-4.
- Coveney EC, O'Dwyer PJ, Geraghty JG, O'Higgins NJ. Effect of closing dead space on seroma formation after mastectomy-a prospective randomized clinical trial. *Eur J Surg Oncol* 1993; 19: 143-6.
- Kuroi K, Shimozuma K, Taguchi T, Imai H, Yamashiro H, Ohsumi S, et al. Pathophysiology of seroma in breast cancer. *Breast Cancer* 2005; 12: 288-93.
- Sanguinetti A, Docimo G, Ragusa M, Calzolari F, D'Agello F, Ruggiero R, et al. Ultrasound scissors versus electrocautery in axillary dissection: our experience. *G Chir* 2010; 31: 151-3.
- Newman LA. Lymphatic mapping techniques and sentinel lymph node biopsy in Newman EA breast cancer. *Surg Clin N Am* 2007; 87: 353-64
- Hameed S, Hussain A, Riaz S. Sentinel lymph node ; lymphatic mapping in patients with breast carcinoma. *Professional Med J* 2007; 14: 648-52
- Khatar A. Harmonic scalpel as a single instrument in modified radical mastectomy. Is it more cost effective than electrocautery and ligature? *Egyptian J of Surg* 2010; 29: 59-63.