

SURGICAL MANAGEMENT OF BREAST CANCER PATIENTS USING LIGASURE™ SMALL JAW VERSUS MONOPOLAR ELECTROCAUTERY

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ABSTRACT

Background: Electrocautery is commonly used for various surgical procedures such as mastectomy is used to stop bleeding and perform dissection. It has been suggested that thermal spread can cause flap necrosis, wound infection, prolonged drainage, and damage to the surrounding tissues. Several studies have reported that the LigaSure Small Jaw device can reduce the incidence of seroma. The present study aimed to evaluate the effectiveness of monopolar electrocautery compare to LigaSure™ Small Jaw in reducing the postoperative seroma in patients with breast cancer who undergoing radical mastectomy. Patients and methods: this study included 40 females with breast cancer who attending for modified radical mastectomy. The patients were divided equally into the monopolar electrocautery group and the LigaSure™ Small Jaw group. Results: There was statistically significant difference between groups as regard duration surgery. Also, amount of blood loss was statistically larger among Electrocautery group than LigaSure™ Small Jaw group. As regard Post-operative complications, seroma was the commonest complication followed by flap necrosis and wound sepsis respectively, with no difference between both groups. There was statistically significant difference between different VAS readings at different timings between studied 2 groups. Conclusion: LigaSure™ Small Jaw was more effective than Electrocautery in reducing the intraoperative and postoperative complication in breast cancer patients undergoing modified radical mastectomy.

Keywords: Breast Cancer; Ligasure™ Small Jaw, Electrocautery ; Mastectomy

INTRODUCTION

Breast cancer surgery continues to become more conservative (1). Seromas are the most common complication of breast cancer surgeries such as mastectomy, axillary lymph node dissection, and flap reconstruction (2).

Monopolar electrocautery commonly performed during flap surgery allows easier dissection and coagulation; however, it causes heat dispersion that can injure the normal tissues, vessels, and lymph around the point of action. These injuries can lead to exudate collection during the inflammatory phase of the healing process and increase the risk of lymphorrhea and seroma (3,4).

Devices and methods that can minimize thermal damage and complications while maintaining the ease of use of electrocautery devices are consistently being researched (5).

The LigaSure Small Jaw is the newest BVSS in the LigaSure family, introduced in 2010. This device has features like a small curved jaw, low-temperature profile, minimal thermal spread, and multifunctionality (6).

This study aimed to evaluate the effectiveness of monopolar electrocautery compare to LigaSure™ Small Jaw in reducing the postoperative seroma in patients with breast cancer who undergoing radical mastectomy.

PATIENTS AND METHODS

A total of 40 patients attending the Oncosurgery Unit, General Surgery Department, Zagazig University Hospitals from January 2018 to January 2019 were included in this prospective randomized clinical study. They were randomized into two groups (20 patients in each group): the monopolar Electrocautery group and the LigaSure™ Small Jaw group.

Inclusion and exclusion criteria:

Female Patients with unilateral breast disease, with all indications for modified radical mastectomy with American Society of Anesthesiology Scores 1 and 2. While, Patients with early breast cancer (T1), patients with history of previous breast surgeries and patients on neo-adjuvant therapy were excluded.

Operative Assessment:

The operation was done through Halested incision for modified radical mastectomy. An oblique elliptical incision from the infero-medial breast toward the axilla is employed. The upper and lower flaps are elevated. Once the anterior surface of the breast is free from the skin, the surgeon begins a medial to lateral dissection of the pectoralis fascia. Dissection of the infero-medial aspect of the breast ends with the axillary tail, which wraps around the pectoralis minor in most women. Axillary clearance is done by using monopolar diatherapy probe or LigaSure™ Small Jaw according to the study groups.

Statistical analysis:

The collected data were analyzed by computer using Statistical Package of Social Services version 24 (SPSS). Suitable statistical tests of significance were used after checked for normality. Categorical data were cross tabulated and analyzed by the Chi-square test, Continuous data were evaluated by Mann Whitney test. The results were considered statistically significant when the significant probability was less than 0.05 ($P < 0.05$). P -value < 0.001 was considered highly statistically significant (HS), and P -value ≥ 0.05 was considered statistically insignificant (NS).

RESULTS

This study was conducted on 40 female patients their age ranged from 22-59 years divided into 2 groups to compare the use of monopolar diatherapy probe and LigaSure™ Small Jaw, there is no significant difference between both groups regarding age (**Figure 1**).

There was statistically significant difference between groups as regard duration surgery (**Figure 2**). Also, amount of blood loss was statistically larger among Electrocautery group than LigaSure™ Small Jaw group (**Figure 3**).

As regard Post-operative complications, seroma was the commonest complication followed by flap necrosis and wound sepsis respectively, with no difference between both groups (**Table 1**). There was statistically significant difference between different VAS readings at different timings between studied 2 groups, where VAS readings is statistically significantly higher among Electrocautery group than LigaSure™ Small Jaw group at 1 Hrs, 6 Hrs, 12 Hrs, and 24 Hrs (**Table 2**).

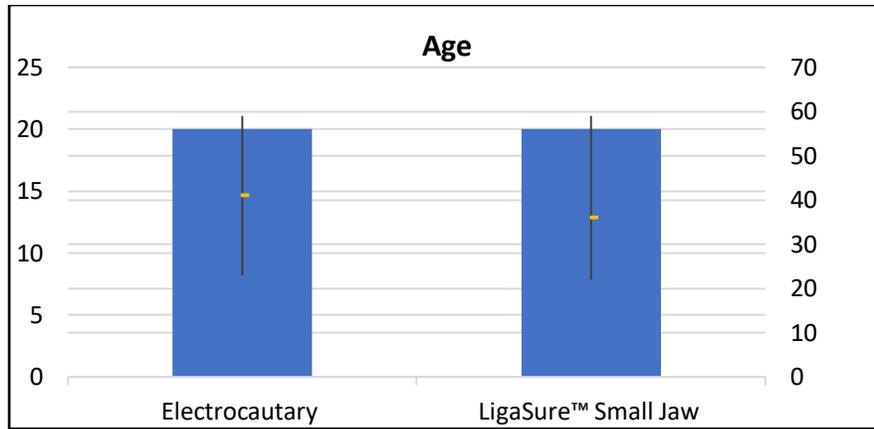


Figure (1): Age of the studied groups

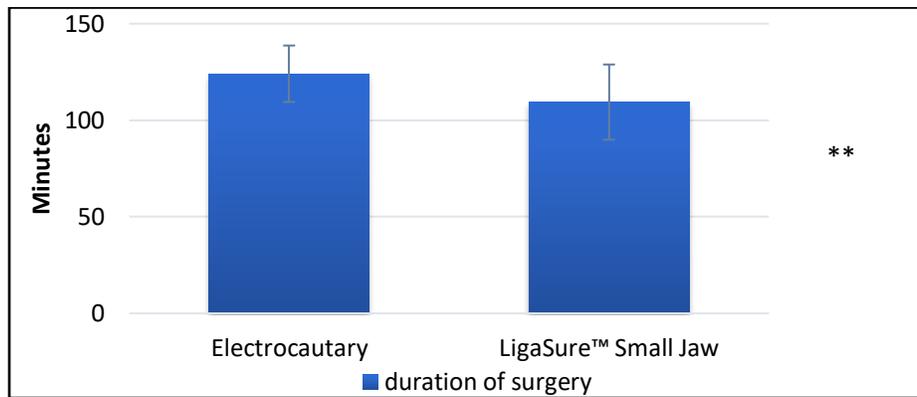


Figure (2): Duration of surgery in minutes among the studied groups.

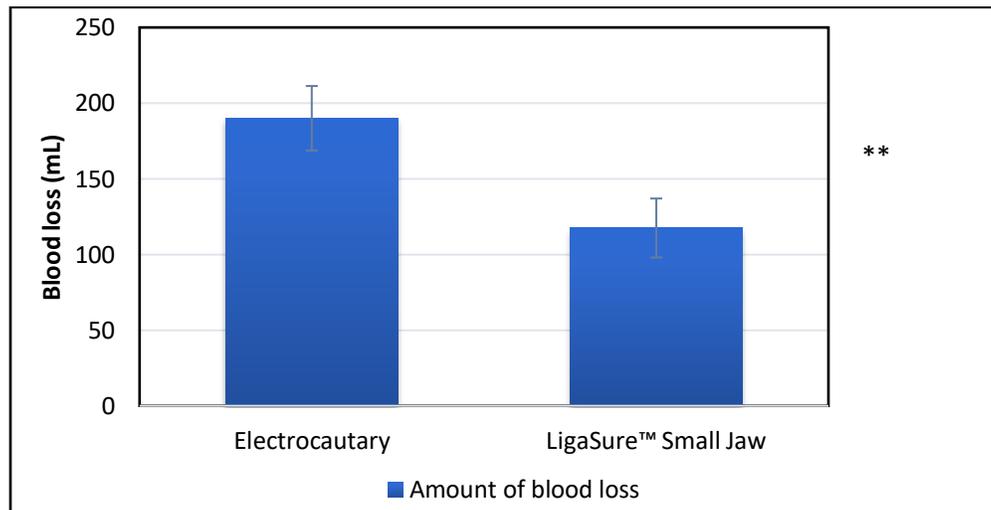


Figure (3): Amount of blood loss among the studied groups.

Table (1): Post-operative complications among the studied groups:

Item	Electrocautery group (N=20)		LigaSure™ Small Jaw group (N=20)		P-value
	No.	%	No.	%	
• Seroma	4	20.0	1	5.0	0.313
• Flap necrosis	3	15.0	1	5.0	0.293
• Wound sepsis	2	10.0	1	5.0	0.151

Table (2): Visual analogue scale postoperatively among the studied groups:

VAS (postoperative)		Electrocautery group (N=20)	LigaSure™ Small Jaw group (N=20)	P value
at 1 hour	Median (Range)	4(4-5)	2(1-4)	0.000*
at 6 hour	Median (Range)	5(4-6)	3(2-4)	0.000*
at 12 hour	Median (Range)	6(5-7)	4(3-5)	0.000*
at 24 hour	Median (Range)	7(5-9)	5(4-6)	0.000*

DISCUSSION

Breast cancer is the most frequently diagnosed life-threatening cancer in women and the leading cause of cancer death among women (7). Researches related to the breast cancer has lead to extraordinary progress in our understanding of the disease, resulting in more efficient and less toxic treatments (8).

Depending on the stage and type of the tumor, surgical removal of the entire breast (mastectomy) is performed. Standard practice requires the surgeon to establish that the tissue removed in the operation (9). Increased public awareness and improved screening have led to earlier diagnosis at stages amenable to complete surgical resection and curative therapies (10).

The current study included 40 female patients divided into 2 groups. Age of electrocautery group to identify the operative outcome in both techniques and to compare operative time, compare intraoperative and postoperative outcomes using conventional Electrocautery and LigaSure™ Small Jaw in patients undergoing MRM.

In the present study the most common complication was seroma which occur in four patients (20% and 5% among Electrocautery group and LigaSure™ Small Jaw group respectively with no significant difference between both groups), other complication was flap necrosis and wound sepsis this matched with Lee et al., (5) reported an early surgical complication rate of 20%. Postoperative hospital stays which is determined based on the volume of fluid drain loss, in the current study there was significant difference between Electrocautery group and LigaSure™ Small Jaw group regarding total amount of drainage and days till drain removal, this matched with (4).

With the trend toward minimally invasive therapies for breast cancer, such as breast conserving therapies, sentinel node biopsies, and early treatments of radiation and chemotherapy, pain after breast cancer surgery is a major problem and women undergoing mastectomy and breast reconstruction experience postoperative pain syndromes in approximately one-half of all cases. Patients post mastectomy and breast reconstruction can suffer from acute nociceptive pain and chronic neuropathic pain syndrome (1). Also it was suggested that nearly 60% of breast surgery patients experience severe acute postoperative pain, with severe pain persisting for 6-12 months in almost 10% of patients (7).

In the present study the most common complication was seroma which occur in four patients (20% and 5% among Electrocautery group and LigaSure™ Small Jaw group respectively with no significant difference between both groups), this matched with (Campbell et al., (11) reported an early surgical complication rate of 20% .

With the trend toward minimally invasive therapies for breast cancer, such as breast conserving therapies, sentinel node biopsies, and early treatments of radiation and chemotherapy, pain after breast cancer surgery is a major problem and women undergoing mastectomy and breast reconstruction experience postoperative pain syndromes in approximately one-half of all cases. Patients post mastectomy and breast reconstruction can suffer from acute nociceptive pain and chronic neuropathic pain syndrome (12).

Also it was suggested by Fecho et al., (13) that nearly 60% of breast surgery patients experience severe acute postoperative pain, with severe pain persisting for 6-12 months in almost 10% of patients.

Conclusion:

LigaSure™ Small Jawis recommended over Electrocauteryin reducing the intraoperative and postoperative complication in breast cancer patients.

Further studies are recommended to suggest and examine different new interventional approaches for patients undergoing modified radical mastectomy.

REFERENCES

1. **Franceschini, G., Sanchez, A. M., Moschella, F., Accetta, C., Masetti, R. (2015):** Update on the surgical management of breast cancer. *Ann Ital Chir*, 86(2), 89-99.
2. **Akinci, M., Cetin, B., Asian, S., & Kulacoglu, H. (2009):** Factors affecting seroma formation after mastectomy with full axillary dissection. *Acta Chirurgica Belgica*, 109(4), 481-483.
3. **Currie, A., Chong, K., Davies, G. L., Cummins, S. (2012):** Ultrasonic dissection versus electrocautery in mastectomy for breast cancer—a meta-analysis. *European Journal of Surgical Oncology (EJSO)*, 38(10), 897-901.
4. **Lee, D., Jung, B. K., Roh, T. S., & Kim, Y. S. (2020):** Ultrasonic dissection versus electrocautery for immediate prosthetic breast reconstruction. *Archives of plastic surgery*, 47(1), 20.
5. **Lee, J. S., Kim, D. G., Lee, J. W., Choi, K. Y., Yang, J. D. (2019):** Usefulness of the LigaSure™ small jaw sealing device for breast reconstruction with a latissimus dorsi flap. *Journal of plastic surgery and hand surgery*, 53(5), 295-300.
6. **Seki, T., Hayashida, T., Takahashi, M., Jinno, H., Kitagawa, Y. (2016):** A randomized controlled study comparing a vessel sealing system with the conventional technique in axillary lymph node dissection for primary breast cancer. *Springerplus*, 5(1), 1-8.
7. **Wyld, L., Markopoulos, C., Leidenius, M., & Senkus-Konefka, E. (Eds.). (2018):** Breast cancer management for surgeons: a European multidisciplinary textbook. Springer International Publishing.
8. **Miles G and Kelvin F (2010):** Surgical technique in breast cancer surgery. *J Clin Oncol*. 2010; 28:135-9.
9. **Koshy, A., Buckingham, J. M., Zhang, Y., Craft, P. (2005):** Surgical management of invasive breast cancer: a 5-year prospective study of treatment in the Australian Capital Territory and South-Eastern New South Wales. *ANZ journal of surgery*, 75(9), 757-761.
10. **Agre, A. M., Upade, A. C., Yadav, M. A., Kumbhar, S. B. (2021):** A Review On Breast Cancer And Its Management.
11. **Campbell PA, Cresswell AB, Frank TG and Cuschieri A (2003):** Real-time thermography during energized vessel sealing and dissection. *Surg Endosc*. 2003;17:1640–5.
12. **Vadivelu N, Schreck M, Lopez J, Kodumudi G and Narayan D (2008):** Pain after mastectomy and breast reconstruction, *Am Surg*. 2008 Apr;74(4):285-96.
13. **Fecho K, Miller NR, Merritt SA, Klauber-Demore N, Hultman CS and Blau WS (2009):** Acute and persistent postoperative pain after breast surgery. *Pain Med*. 2009 May-Jun;10(4):708-15.