ORIGINAL ARTICLE

CONTENTS

Modified radical mastectomy under local anesthesia using Tumescent Technique experience of Teaching Hospitals in Iraq

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ABSTRACT

Aim: To evaluate the advantages, disadvantages, safety, and restrictions of local anaesthetic against general anesthesia for mastectomy.

Materials and Methods: In this prospective clinical trial, which was carried out at Al-Sader teaching hospital from October 2020 to September 2023, 25 patients (LA group) with a mean age of 64.0±6.3 years (range 55-76 years) underwent a unilateral total mastectomy for breast cancer under local anesthesia using tumescent technique (by manual infiltration technique), and an additional 25 patients (GA group) as a control group with a mean age of 64.9±6.9 years (range 55-75 years) underwent a unilateral mastectomy.

Results: With use of light sedation for 6 patients, anesthetic is sufficient for all 25 patients. The amount of blood loss intraoperatively measured by number of gauze used during the procedure, approximately 3 gauze, 20 cc of blood for each gauze was significantly lower in LA group than GA group, 2.7±0.4, 5.4±0.4 gauze respectively P<0.001. More than 8 hours after surgery, patients are pain-free. No postoperative complications like necrosis of skin flap, wound infection, or hematoma, when compared to GA group, surgery took substantially longer in LA group 48.9±14.3 minutes than in GA group 38.2±2.9 minutes; P<0.001. The day after the surgery, the patient was discharged.

Conclusions: The use of tumescent anesthesia (which is safe and effective) is an attractive alternative method for general anesthesia in properly selected candidates (class IV according to American society of anesthesia).

KEY WORDS: Mastectomy, local anesthesia, tumescent technique

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INTRODUCTION

In Western nations, breast cancer is the most common cause of death for middle-aged and older women. This alarming statistic highlights the importance of early detection and effective treatment options available to combat this disease [1]. The use of tumescent local anesthesia [by infiltration of large volumes of local anesthetic and isotonic saline (25 ml of 1% lidocaine and 1 ml of 1:1000 epinephrine in 1 L of isotonic saline)] can be an alluring alternative method to general anesthesia in elderly women with breast cancer and medical comorbidities that made them at risk for general anesthesia like chronic obstructive pulmonary diseases [2].In both industrialized and developing nations, breast cancer is the most common reason for mortality for women in their middle years. Up to a quarter of a million new cases were diagnosed globally in 2010 [3]. It is the cause of 29% of all newly identified malignancies in females and accounts for 14% of all cancer-related fatalities in females [4].

ETIOLOGICAL FACTORS

Geographical: In the Western world, breast cancer affects more women than any other type of cancer. It is becoming more common in developing nations and annually kills hundreds of thousands of women globally [5]. **Gender:** Men make up less than 0.5% of breast cancer patients, yet their diagnosis often comes at a later stage, underscoring the importance of education and vigilance among all genders regarding the signs and symptoms of this disease [6]. **Age:** Breast cancer is extremely rare in those under the age of 20. After that, it becomes more

common, affecting 20% of women by the time they are 90 years old [7]. **Genetic:** Women with a family history of breast cancer tend to experience it more frequently. Around 5% of all breast cancers are linked to a specific mutation, yet this has significant effects on tumor counseling and prevention in these women [7]. **Diet:** Due to the high prevalence of breast cancer among women in developed nations, dietary variables may contribute to its genesis. Research suggests that diets high in saturated fats and low in fruits and vegetables may increase risk, while a balanced diet rich in antioxidants could offer protective benefits [8]. **Endocrine:** Breastfeeding appears to be particularly beneficial against breast cancer since it affects nulliparous women more than multiparous women. Additionally, it seems protective to have your first kid young, especially if it coincides with a late menarche and an early menopause. Furthermore, hormonal factors such as prolonged exposure to estrogen without the balancing effects of progesterone can elevate risk, highlighting the importance of understanding individual reproductive histories in cancer prevention strategies [9]. **Previous radiation:** This was thought to be interesting historically. However, it is a serious issue for women who have undergone mantle radiation therapy, which involves receiving high doses of radiation to the breast, as part of the treatment for Hodgkin's lymphoma. The risk increases if radiation was administered while the breast was developing and manifests approximately ten years after treatment [10]. The most frequent type of anesthesia used in cutaneous surgery is localized anesthesia. Some patients, such as those with congestive heart failure and chronic obstructive pulmonary disease, have comorbid conditions that put them at risk for general anesthesia [11]. One of the earliest risk classification schemes was developed by the American Society of Anesthesiologists; it is divided into five strata [12].

I. A healthy, normal patient.

II. People who have a minor systemic illness.

III. Those who suffer from a serious systemic illness that restricts daily activity but is not life-threatening.

IV. People who suffer from incapacitating conditions that constantly endanger their lives.

V. It is unlikely that a morbidly ill patient will survive for 24 hours, with procedure or not.

A technique for localized anesthesia called tumescent anesthesia involves injecting large amounts of isotonic saline and local anesthetic into the skin. This method has the following benefits:

(1) Simplicity;

(2) Postoperative analgesia;

(3) Minimal incidence of bleeding; and

(4) Ability to anesthetize a sizable portion of the body [13].

AIM

In order to analyze the risks, advantages, safety, and limitations of mastectomy under local anaesthetic with general anesthesia, this study will execute a mastectomy utilizing the tumescent technique under local anaesthetic.

MATERIALS AND METHODS

With approval from the scientific council of the board center and patient agreement for surgery, video recording, and taking images while preserving patient's dignity, the study was a prospective clinical experiment carried out from October 2020 to September 2023 at Al-Sader teaching hospital. Fifty patients in total, divided into two groups, under local anesthesia, 25 patients (LA group) with a mean age of 64 years (range 55-76 years) underwent mastectomy for breast cancer, and additionally 25 patients with a mean age of 64.9 years (range 55-75 years) and unilateral breast carcinoma underwent mastectomy under general anesthesia as the control group (GA group). All patients were diagnosed using the triple assessment method (history and physical examination, radiological examination, and histopathological examination, including fine needle aspiration and/or trucut biopsy), before being staged according to TNM staging. In our study, all patients fell into the [T3, N0, N1 and M0] in both groups. The tumescent technique uses (25 ml of 1% lidocaine and 1 ml of 1:1000 epinephrines to 1 L of Ringers lactate) by manual infiltration technique. Every patient is followed up with routine visits to the private clinic and the breast clinic.

PROCEDURE

A mark is made on the skin ellipse before the procedure. Excellent access to the axillary region is provided by a low horizontal ellipse that rests in the skin folds with slight obliquity, keeping the medial end of the incision low and below the area of apparent cleavage. The breast is injected using a syringe (50 cc), infusion set, three-way valve, small caliber multirole blunt spinal needle, and the tumescent solution is manually infused along the lateral sternal line (T1-T6) and along the midaxillary line (T2-T7).Following solution infusion, the breast turns pale and tight. Using unipolar cautery and blunt dissection, the skin is excised as intended, and the incisions are then deepened through the subcutaneous fat. The optimal dissection plane lies between the subcutaneous fatty tissue and the mammary tissue, but with the help of hydrostatic dissection, which is made easier by tumescent solution; it is a very simple plane to follow. Too small skin flaps put the skin at risk of ischemia, whereas too thick skin flaps leave a significant amount of remaining breast tissue in place. The plane

Table 1. Age distribution of the studied group

LA		Group		P
		GA		
Age(years)	Mean ± SD	64.0 ± 6.3	64.9 ± 6.9	0.67
	Range	55 – 76	55 – 75	

Table 2. Distribution of chronic diseases among the studied groups

Disease	LA		GA		P-value
	No.	%	No.	%	
HT	21	84.0	6	24.0	< 0.001
DM	16	64.0	7	28.0	0.011
HF	9	36.0	0	0.0	0.001
IHD	17	68.0	8	32.0	0.011
Valvular heart disease	4	16.0	0	0.0	0.037
Respiratory diseases	8	32.0	1	4.0	0.010

Table 3. Comparison of mean bleeding amount and operation time between the LA and GA groups

Variable	LA	GA	P
Bleeding amount	2.7 ± 0.4	5.4 ± 0.4	< 0.001
Operation time	48.9 ± 14.3	38.2 ± 2.9	0.001

descends onto the deep fascia with the upper flap raised first, followed by the lower flap. The bleeding vessels are then cauterized with unipolar cautery (occasionally do ligation of larger vessels) after the breast has been separated from the chest wall by the pectoralis fascia from the top down. The axilla is treated either through dissection (19 patients) or sampling (6 patients), which is the most painful and sensitive place in the process. These pains are alleviated by using propofol or midazolam as a moderate sedative. Traditionally, subcuticular suturing over vacuum drainage is used to close skin flaps.

RESULTS

Twenty five patients (the mean age of LA group was 64.0±6.3, range 55-76 years) as in Table 1 with breast cancer undergone a unilateral total mastectomy by local anesthesia. All individuals encompassed within this study exhibit a significant prevalence of chronic medical comorbidities, which are meticulously detailed in the accompanying Table 2.The anesthesia is adequate in all 25 patients with the use of mild sedation in 6 patients. The amount of blood loss intraoperatively measured by number of gauze used during the procedure, approximately 3 gauze, 20 cc of blood for each gauze was significantly lower in LA group than GA group, 2.7±0.4, 5.4±0.4 gauze respectively P<0.001 as in Table 3. There are no postoperative complications such as wound infection, hematoma or skin flap necrosis. The operation time was significantly longer in LA group 48.9±14.3 minutes than in GA group 38.2±2.9 minutes P-value=0.001 as in Fig. 1. The patient was discharged in the first day after the surgery.

DISCUSSION

Tumescent anesthesia usually used in plastic and dermatological surgeries, elderly female patient with breast cancer has comorbid conditions that might increase their operative risks if they underwent general anesthesia, so in the current study we try to use tumescent anesthesia as an alternative way for mastectomy and it is the first study in Iraq that concern the mastectomy under local anesthesia. The anesthetic infiltration effect and pain control in all 25 patients are excellent combined with mild sedation (6 patients) by using propofol or midazolam. Regarding intraoperative events the patients are fully conscious during the procedure and experience mild pain when doing axillary dissection that is overcome by mild sedation. The time of procedure is prolonged due to infiltration of tumescent solution. The bleeding during the procedure is little in comparison to procedures under general anesthesia due to the effect of adrenalin which causes vasoconstriction. The dissection is very easy due to the aid of hydrostatic dissection which is performed by tumescent solution. No patient develops lidocaine allergy or toxicity mainly due to the loss of most infiltrative solutions during the dissection and the excised breast tissue. Regarding the postoperative complications: no patient develops wound infection, hematoma or skin flap

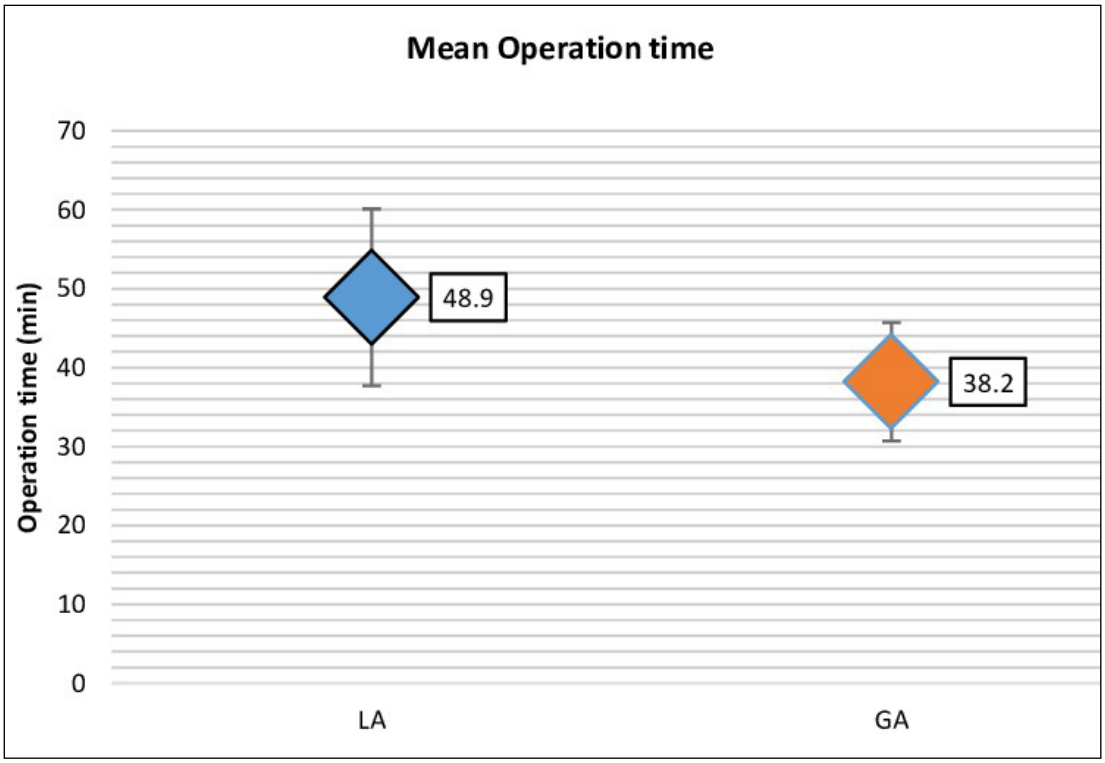

Fig. 1. Comparison of operation time of the studied group.

necrosis with tumescent technique, one patient develop hematoma postoperatively in GA group. Regarding the pain, all patients with tumescent technique are pain free for at least 8 hours without the use of analgesia compared with the use of analgesia for all patients in GA group. Numerous publications have described modified radical mastectomy surgeries carried out under local anesthesia utilizing various techniques using scalpel, scissor, and electrocautery. Four patients aged 61 to 91 who were ASA class IV received a total mastectomy for breast cancer utilizing the tumescent procedure, according to Grant W. Carlson's [14] description, there was no postoperative morbidity in the form of hematoma, skin flap necrosis, or wound infection. The patients were discharged from the hospital 1- 4 days after surgery, which is longer than in our study. The average operating time was 35 minutes, whereas in our study, the mean operating time for the LA group was 48.9 minutes. The operating time varied from 24 to 46 minutes according to Joseph et al., [15] a straightforward mastectomy was performed under local anesthetic and sedation on seven patients with ASA grades III or IV, their ages ranged from 80 to 94 years old (with a mean of 88 years), blood loss was minimal (mean = 95.7cm^3), compared to our study which is lower 54 cm3, as was operating time (mean = 62 min), while the operating time is 48.9 min in our study. Most patients were returned to their homes in day 2, compare to our study which is in day one after surgery. There were no complications related to the procedure as our study. Shoher et al. [16] described 53 patients with multicentric disease, of the 53 cases, there have been no cases of flap necrosis or 'button-holing' of the skin flap, which is certainly a possibility with electrocautery compare to our study. There have been no cases of systemic complications from the tumescent solution. No patient developed bleeding requiring transfusion, nor did any patient develop a hematoma postoperatively. One patient developed a small, superficial stitch abscess 2 weeks post-operatively. A knotted suture was removed and the patient recovered without further complication, as compared to our study also there is no systemic complication, wound infection, hematoma or skin flap necrosis.

CONCLUSIONS

It is concluded that use of tumescent anesthesia (which is safe and effective) is an attractive alternative method for general anesthesia in properly selected candidate (class IV according to American society of anesthesia).

RECOMMENDATIONS

1. Using tumescent anesthesia for mastectomy in patients has breast cancer with ASA IV who was unfit for general anesthesia.
2. Improvement technique by using infusion pumps to decrease time and effort of the procedure.
3. Further study with a larger sample size of patients to assess the possible side effect of the tumescent anesthesia and to assess the ability and benefit of application of tumescent technique for patients with ASA I & II.

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CONFLICT OF INTEREST

The Authors declare no conflict of interest

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