بسم الله الرحمن الرحيم

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بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات : لا يوجد

A Comparative Study between Ultrasound-guided Serratus Anterior Plane Block and Conventional IV Analgesics for Postoperative Pain Management in Modified Radical Mastectomy

THESIS

Subitted for partial fulfillment of M.D. degree in Anesthesiology and Intensive care and pain management

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List of Abbreviations

Abb.	Full term
ASA	American Society of Anesthesiology
BMI	Body mass index
CBC	Complete Blood Count
CT	Connective tissue
ECG	Electrocardiogram
HR	Heart rate
INR	International normalized ratio
IV	Intravenous
LA	Local anesthetic
MAP	Mean arterial blood pressure
MRM	Modified Radical Mastectomy
NSAIDs	Non-steroidal anti-inflammatory drugs
PACU	Post anesthetic care unit
Pecs	Pectoral nerve blocks
PT	Prothrombin Time
PTT	Partial thromboplastin time
RR	Respiratory rate
SAPB	Serratus anterior plane block
SD	Standard deviation
SPB	Serratus Plane Bkock
US	Ultrasound
VAS	Visual analogue scale

A Comparative Study between Ultrasound-guided Serratus Anterior Plane Block and Conventional IV Analgesics for Postoperative Pain Management in Modified Radical Mastectomy

Abstract:

Background: Surgery is the first line of treatment for early, localized or operable breast cancer and it is associated with sever postoperative pain**.** Although opioids have been the mainstay for managing postoperative pain, they have undesirable side effects. A variety of methods, including thoracic epidural, paravertebral and intercostal blocks have been used to manage breast surgery pain; however each of these blocks has some drawbacks. Serratus anterior plane block is a relatively novel technique that can block the lateral cutaneous branches of the intercostal nerves as well as the long thoracic nerve. This study compares between the effect of serratus anterior plane block and conventional IV analgesia on postoperative pain after modified radical mastectomy.

Results: Postoperative pain scores were significantly lower in the SAPB group in the first 8 hours compared to the control group ($P < 0.05$), the time to the first rescue analgesic was significantly longer in the SAPB group with a mean 354 min compared to the control group; the mean is 17.8 min, the total dose of rescue analgesic was significantly lower in the SAPB group with a mean 50 mg in the first 24 hours compared to a mean of 212.5 mg in the control group. The patient's satisfaction scores were higher, the incidence of postoperative nausea and vomiting was significantly lower among the SAPB group compared to the control group. No other complications were recorded in either group.

Conclusions: The serratus anterior plane block can be used as one of the modalities in managing the pain of patients undergoing MRM surgery. This procedure was effective in reducing the need for postoperative opioids usage, better patient satisfaction with fewer side effects as; post-operative nausea and vomiting. It is simple and easy-to-learn technique.

Key words: Serratus anterior plane block, modified radical mastectomy, postoperative analgesia.

INTRODUCTION

Female breast cancer statistics shows that in every eight women, there is one develops breast cancer during their lifetime **(DeSantis et al., 2014)**. The most common surgical procedure for breast cancer is modified radical mastectomy (MRM) **(Fecho et al., 2009)**. Patients undergoing breast surgery experience marked acute pain postoperatively (about 60%). When the postoperative pain is not controlled well, this leads to both psychological and physiological negative consequences **(Gärtner et al., 2009)**.

There are several ways to manage pain after mastectomy **(Sonmez et al., 2016).** Common systemic medications, particularly opioids, have different side effects, such as itching, nausea, vomiting and respiratory depression. Non-steroidal anti-inflammatory drugs are associated with impaired renal function and hemorrhagic disorders **(Gharaei et al., 2013).**

Despite producing desirable analgesic effect, a thoracic epidural block may result in hemodynamic changes, including hypotension and decreased tidal volume, unnecessary bilateral block, occurrence of epidural hematoma or abscess and dural puncture **(Davies et al., 2006)**. The post-mastectomy pain management can be performed using regional block techniques

(Kumar et al., 2016), e.g., paravertebral block, which may be associated with potential complications as: pneumothorax, nerve damage and difficult technique despite the use of ultrasound **(Krediet et al., 2015).** Intercostal nerve block is easy to perform using ultrasound and does not contain the sympathetic block; however, it also has some shortcomings, such as pneumothorax, short duration, high plasma absorption of local anesthetics, and need to block multiple nerve levels **(Yakşi, 2017).**

Serratus anterior plane (SAP) block was introduced as a novel regional block technique for unilateral thoracic wall pain. In SAP block, local anesthetics are injected into the serratus plane at the fifth rib level at the mid-axillary line under ultrasound guidance. The local anesthetics spread along the plane where the lateral branches of the intercostal nerves pass through, and thus; the lateral chest wall is blocked **(Blanco et al., 2013)**.

In some studies, the serratus anterior block has shown to cause chest wall analgesia lasting for 12 hours following breast surgery. It was also an effective and low-risk method to ameliorate post-thoracotomy acute pain **(Khemka et al., 2016)**.

The ultrasound-guided serratus anterior plane block can increase the safety and speed up the procedure **(Imani et al., 2016)**.

Considering limited studies on this technique, this decided to investigate the effect of ultrasound-guided serratus anterior plane block on post modified radical mastectomy acute pain.

AIM OF THE WORK

The aim of this study is to compare the effect of ultra-sound guided serratus anterior plane block versus conventional IV analgesics in postoperative pain management in modified radical mastectomy.

The primary outcome measures include:

1. Time to the first rescue analgesic dose required in hours.
2. Assessment of the level of pain (on a VAS scale scores) and cumulative dose of rescue analgesic.

The secondary outcome measures include:

1. Rate of patient tolerability to the procedure and ranks their satisfaction.
2. The incidence of nausea and any attack of postoperative vomiting.
3. The incidence of any of the serratus anterior plane block complications e.g. injection site hematoma or signs or symptoms of local anesthetic toxicity.

Chapter 1

ANATOMY OF THE BREAST

Breasts (mammary glands) are modified sweat glands:

They lie in superficial fascia anterior to deep fascia of the pectoralis major muscle.

Between the breasts and the deep fascia lies the retromammary space (i.e., loose connective tissue plane allowing free movement) thus, the breasts are not firmly attached to the deep fascia.

Compartmentalized fat bounded by connective tissue septae:

- Glandular lobules that are drained by 15-20 lactiferous ducts.
- Lactiferous ducts converge & open into the nipple.
- Areola surrounds the nipple & conceals sebaceous glands. ***(Moore et al., 2009)***

Boundaries **(Fig. 1):**

- Upper border: 2nd rib.
- Lower border: 6th rib.

- Medial border: sternum.
- Lateral border: axilla.
- Supported by: pectoral muscles, serratus anterior muscles, Cooper's ligaments. ***(Drake et al., 2005)***

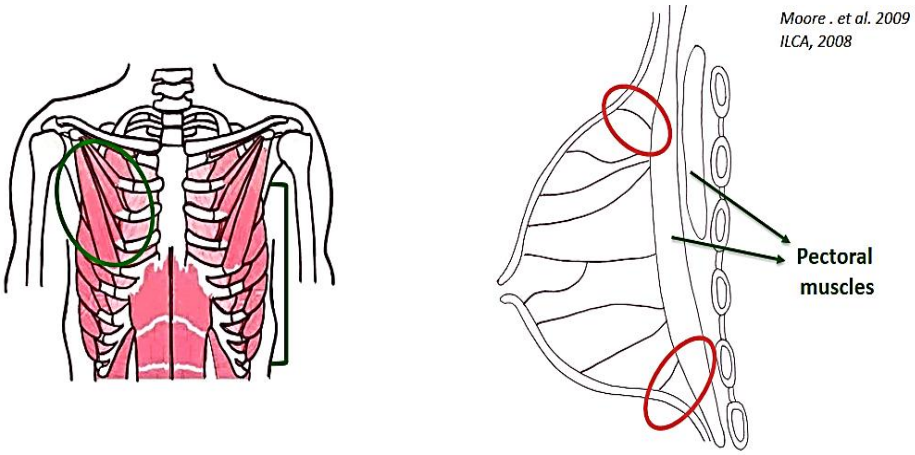

Figure (1): Boundaries of the breast ***(Drake et al., 2005).***

Arterial blood supply of the breast *(De la Pared, 2006):*

From the axillary artery, the superior thoracic artery, the pectoral branch of thoracoacromial and the external mammary artery (emerges from the lateral thoracic arteries) supply the mammary glands. The cutaneous branches of the intercostal arteries arising from the 3rd to the 5th intercostal spaces and the