بسم الله الرحمن الرحيم

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تم رفع هذه الرسالة بواسطة / حسام الدين محمد مغربي

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

ملاحظات : لا يوجد

Comparison between Erector Spinae Plane Block and Thoracic Epidural in Breast Cancer Surgeries under General Anesthesia

A Thesis

Submitted for partial fulfillment of M.D degree in
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قالوا

سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم الحكيم

صدق الله العظيم

سورة البقرة الآية: ٣٢

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✍ *Mohamed Ramadan Seleem Eissa*

List of Contents

List of Abbreviations

Abbr.	Full-term
ASA	**:** American Society of Anesthesiologists
ANOVA	**:** Analysis of Variance
BMI	**:** Body Mass Index
Bpm	**:** Beat per minute.
CPC	**:** Clinicopathological cases
CSF	**:** Cerebrospinal fluid
ECG	**:** Electrocardiogram
EM	**:** Emergency medicine
ESM	**:** Erector spinae muscle
ESP	**:** Erector spinae plane
I.V.	**:** Intravenous
IL	**:** Interleukin
LA	**:** Local anesthetic
MAP	**:** Mean Arterial blood Pressure
mmHg	**:** Millimeter Mercury
MTP	**:** Midpoint transverse process to pleura
NIBP	**:** Non-invasive arterial blood pressure
PECS1	**:** Pectoral nerve block type 1
PECS2	**:** Pectoral nerve block type 2
PACU	**:** Post anesthesia care unit
PVS	**:** Paravertebral space

RCTs **:** Randomized controlled trials

SD **:** Standard deviation

SNOSE **:** Sequentially numbered, opaque, sealed envelope

SpO_2 **:** peripheral oxygen saturation

SPSS **:** Statistical package for Social Science

TE **:** Thoracic epidural

TNF **:** Tumor necrosis factor

TP **:** Transverse process

US **:** Ultrasound

VAS **:** Visual analogue scale

List of Tables

List of Tables (Cont...)

List of Figures

A Randomized Trial to Compare between Erector Spinae Plane Block and Thoracic Epidural in Breast Cancer Surgeries under General Anesthesia.

Abstract

Background: Thoracic epidural (TE) analgesia was considered as the gold standard for intraoperative and postoperative analgesia in breast surgeries. However, it is not routinely used because of its associated hemodynamic effects. Erector spinae plane (ESP) block is recognized as a promising perioperative analgesic intervention in breast surgeries.

Aim of the study: To compare between ESP block and TE analgesia in unilateral breast cancer surgeries without axillary clearance performed under general anesthesia.

Patient and Methods: Forty female patients scheduled for unilateral cancer breast surgeries without axillary clearance under general anesthesia were enrolled in this study. After induction of general anesthesia patients were divided into two groups; TE group received single-shot 10 ml 0.25% bupivacaine in the thoracic epidural space, while ESP group received single-shot 20 ml 0.25% bupivacaine ultrasound-guided erector spinae plane block. The primary outcome was to assess the analgesic effects through recording intraoperative fentanyl consumption and postoperative narcotic consumption (morphine in the post anesthesia care unit (PACU) and pethidine in the surgical ward), visual analogue scale (VAS) score for pain assessment in the first postoperative 24 hours. The secondary outcomes were to compare hemodynamic changes and any complications related to the technique or drugs used, and patient satisfaction.

Results: No statistical differences were found between the two groups regarding their demographic data. As regards narcotic consumption; intraoperative fentanyl consumption was significantly higher in ESP group ($p < 0.001$), post-operative morphine consumption in

PACU was not statistically different between the groups (p 0.67), while pethidine consumption in the surgical ward was higher in TE group (p <0.001). Concerning pain assessment, VAS scores in ESP group were statistically lower when compared with TE group starting from 2 hours till 12 hours postoperatively, and higher in patients' satisfaction about analgesia in the first 24 hours postoperatively (i.e., 95% satisfied in ESP versus 55% in TE) (p value 0.01). As regards hemodynamic effects; TE group showed lower mean arterial blood pressure (MAP) recordings with significant difference between the ESP group at 10 min., 30 min. and 1 hr. after the intervention (p-value 0.034, <0.001 and 0.006 respectively), TE group showed significant difference with lower heart rate recordings in comparison to ESP group; at 30 min after the block (p-value 0.002).

Conclusion: The current study revealed that ESP block showed lower postoperative pethidine consumption and lower VAS scores from 2 hrs. Till 12 hrs. Postoperatively, while TE block showed lower intraoperative fentanyl consumption. ESP block showed better hemodynamic stability and higher patients' satisfaction to analgesia. We propose that ESP block should be included in the armamentarium of regional analgesic techniques for breast surgeries.

Keywords: Erector spinae plane block, ultrasound-guided, cancer breast surgeries, narcotic consumption, VAS score.

Introduction

Breast cancer is the first common cancer among women and is the second common as regards whole incidence of cancer in Egypt. In the United States, 1 out of 8 women develop breast cancer during their lifetime ***(Ibrahim et al., 2014).***

Breast cancer surgeries are common procedures, particularly in middle-aged women ***(Bolin et al., 2015)*** with an increased incidence of postoperative pain that is moderate to severe in nature. Acute postoperative pain is an integral risk factor in the development of chronic post mastectomy pain; 40% of women will have severe acute postoperative pain after breast cancer surgery, whereas 50% will develop chronic postmastectomy pain with impairment of quality of life ***(Gärtner et al., 2009).*** Increase in postoperative morbidity and mortality could be a consequence of inadequate analgesia ***(Blanco, 2011).***

There're challenges encountered in achieving optimum postoperative analgesia and prevention of chronic postsurgical pain in these types of procedures. Several analgesic methods have been used over years, including systemic medications, local anesthetic (LA) infiltration, intercostal nerve block, pectoral nerve block, thoracic paravertebral nerve block and thoracic epidural (TE) analgesia ***(Bolin et al., 2015).***

TE analgesia has many drawbacks; high failure rate even in experienced hands, technical difficulty in application, hemodynamic effects in the form of hypotension and bradycardia, risk of bleeding (epidural hematoma), dural puncture, risk of spinal cord damage and patchy block. Regional analgesic techniques have provided better quality acute pain control and subsequently less chronic pain ***(Kao and Lin, 2017).***

Proposed mechanisms for decreased persistent pain include decreased central sensitization (wind-up) and lower incidence of opioid-induced hyperalgesia ***(Doehring et al., 2013).*** Furthermore, effective acute pain control preserves immune functions, both by suppressing the surgical stress response and by decreasing the need for general anesthetics and opioids. Opioids especially morphine inhibit both cellular and humoral immune functions, this effect may be responsible for the higher rates of postsurgical local recurrence and /or metastasis ***(Gupta et al., 2002).***

Good postoperative analgesia can inhibit migration of cytokines, slowing down movement of proinflammatory factors to wound tissue and reducing release of inflammatory factors such as tumor necrosis factor (TNF) and Interleukin 6 (IL-6). Wounds can recover quickly in this context ***(Xing, 2015).***

Erector spinae plane (ESP) block which is a novel analgesic technique that was described by **Forero, and colleagues** ***(2016)*** has become a recognizable peripheral nerve plane block for regional analgesia in thoracic surgeries. ESP block is technically much easier to apply generally as compared to neuraxial, peripheral nerve blocks, and other regional modalities ***(Nagaraja et al., 2018)*****.** An LA is injected deep to the erector spinae muscle (ESM) and superficial to the tip of the transverse process (TP) of a thoracic vertebra at the myofascial plane. The instilled LA can induce sensory block at the multi-dermatomal levels across the posterior, lateral, and anterior thoracic wall, probably due to the diffusion of the LA into the paravertebral space and it affects the dorsal and ventral primary rami of the thoracic nerves ***(Ince et al., 2018)*****.** Since much of breast tissue innervation is from thoracic nerves, therefore ESP block possible role in perioperative analgesia for cancer breast surgeries should be considered. We postulate that ESP block could have comparable analgesic efficacy and possible longer duration of action in comparison to TE block.