بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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MONA MAGHRABY

The Efficacy of Ultrasound Guided Bilateral Pectoralis Nerve Block for Postoperative Pain Control in Cardiac Surgery, Randomized Control Trial

Thesis

Submitted for Partial Fulfillment of M.Sc. Degree in
Anesthesiology, Intensive Care and Pain Management.

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Omar Ragaie Mohamed Elhelaly

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Abb.	Full term
CS	*Cardiac surgery*
CWFPB	*Chest wall fascial plane blocks*
DRG	*Dorsal root ganglia*
ERAS	*Enhanced recovery after surgery*
LA	*Local anesthetics*
LPN and MPN	*Lateral and medial pectoral nerves*
MA	*Multimodal analgesia*
NMDA	*N-methyl-D-aspartate*
PAG	*Periaqueductal grey*
PECS	*Pectoral nerves block*
PNB	*Peripheral nerve blockade*
PVBLM	*Landmark-based paravertebral blocks*
RA	*Regional anesthesia / analgesia*
RVM	*Rostroventromedial medulla*
SEH	*Spinal epidural hematoma*
TEA	*Thoracic epidural anesthesia*
US	*Ultrasound*

INTRODUCTION

Cardiac surgery (CS) generates a unique set of challenges compared to non-cardiac surgery. Postoperative outcomes and quality of life result from several factors, including comorbidities, type and quality of surgical intervention, the extent of the systemic inflammatory response, range of organ dysfunction and pain ***(Wahba et al., 2019)***.

Conveniently, many of these factors are amenable to optimization. To this end, enhanced recovery after surgery (ERAS) programs have evolved and are now commanded by a multidisciplinary consensus in CS. Pain management is a crucial element of cardiac ERAS. Adequate analgesia is a prerequisite to ensure patient comfort, low morbidity, early mobilization, and cost effectiveness ***(Engelman et al., 2019)***.

Postoperative pain may result from various interventions, including sternotomy, thoracotomy, chest drains and leg vein harvesting. One study found that maximal pain intensity in CS was usually moderate ***(Mueller et al., 2000)***, but severe acute postoperative pain was also reported elsewhere and more frequently associated with chronic post-sternotomy pain ***(Lahtinen et al., 2006).***

Traditionally, opioids were considered the mainstay for pain management after CS based on a predictable hemodynamic profile. Acknowledged risks associated with

their use (e.g., hyperalgesia, opioid dependence, respiratory depression, nausea and vomiting, immunosuppression, ileus, delirium, prolonged postoperative recovery) fueled that which now represents a central tenet in the ERAS paradigm– multimodal analgesia (MA***) (Ochroch et al., 2020)***. MA built on drug combinations is not faultless ***(Shanthanna et al., 2020***); N-methyl-D-aspartate (NMDA) antagonists may bring about sympathetic hyperactivity, central alpha-2 agonists can cause bradycardia and hypotension, and nonsteroidal anti-inflammatory agents are associated with renal dysfunction and abnormal clotting.

Regional anesthesia/analgesia (RA) represents a valid alternative for the MA repertoire.

It obviates many of the drawbacks of drug-based MA strategies, albeit with its challenges ***(Mittnacht et al., 2019).*** Classical neuraxial techniques such as thoracic epidural anesthesia (TEA) and landmark-based paravertebral blocks (PVBLM) constituted the standard regional approach to ensure chest wall pain relief before ultrasound (US) virtually revolutionized RA. Bleeding complications (e.g., spinal epidural hematoma (SEH)) were the primary concern regarding the use of TEA and PVBLM in CS ***(Horlocker et al., 2018)***. This may explain to some extent why CS fell behind other surgical specialties regarding the large-scale implementation of ERAS programs. Since its inception, US-guided RA has helped improve existing techniques (i.e., PVB) and favored the design

of new ones. Specifically, real-time US needle-tracking is essential to perform chest wall fascial plane blocks (CWFPB) ***(Kelava et al., 2020)***.

Delivery of local anesthetics (LA) between myofascial layers spares the neuraxium and blocks the nerves as they course within that tissue plane. Reasons for the growing popularity of CWFPB include (1) ease of performance; (2) excellent safety profile; (3) good efficacy in various clinical settings.

Aim of the Work

To evaluate the efficacy of postoperative bilateral US guided Pecs block on postoperative pain control in patients undergoing cardiac surgery through mid-line sternotomy.

ANATOMY OF THE THORACIC WALL

For adequate treatment of patients after cardiac surgery, Anesthesiologists as those responsible for pain management, as well as surgeons, should have a complete understanding of the anatomy of the thoracic wall ***(De la Pared, 2006).***

Anatomy of the thoracic wall:

Skeleton of the thoracic wall is formed by the twelve thoracic vertebrae posteriorly, the sternum anteriorly and, on each side, by the twelve ribs and the respective costal cartilage (Fig 1)

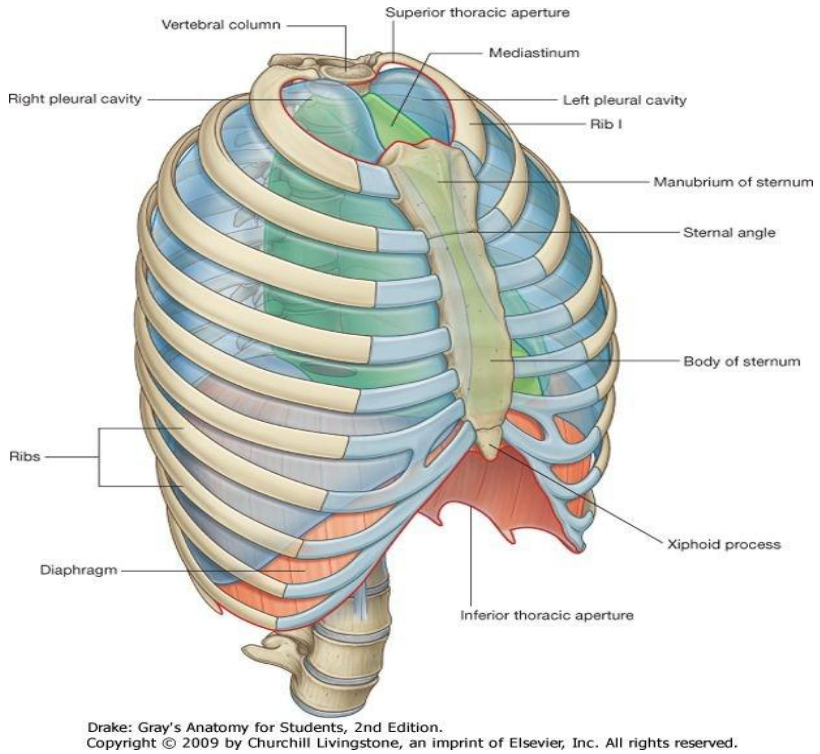

Figure 1: Skeleton of the thoracic wall ***(gray's anatomy for students, 2nd edition 2009).***