Comparitive Study Between Ultrasound Guided Rectus Sheath Block versus Local Wound Infiltration for Post-Operative Analgesia in Patients Undergoing Midline Exploratory Surgeries.

Thesis

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Ahmed Abdelrahman Abdelaleem Abdelhalim

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List of Abbreviations

Abb.	Full term
1ry	Primary
ADH	Antidiuretic hormone
ASA	American Society of Anesthesiologists
COX	Cyclooxygenase enzymes
CRH	Corticotrophin-releasing hormone
ECG	Electrocardiogram
GABA	Gamma-amino butyric acid
HR	Heart rate
IASP	International Association for the Study of Pain
IV	Intravenous
NHS	National Health Service
NIBP	Non-invasive blood pressure
NRS	Numeric rating scale
NSAIDs	Non-steroidal anti-inflammatory drugs
P.O.P	Postoperative pain
PGE2	Prostaglandins E2
PONV	Postoperative nausea and vomiting
SSR	Surgical Stress Response
TENS	Transcutaneous Electrical Nerve Stimulation
VAS	Visual analogue scale
VRS	Verbal rating scale

INTRODUCTION

Abdominal field block was first described in 1899 by Schleich. Various methods of abdominal field block have been used in anaesthetic practice over recent decades. A technique involving multiple injections of local anaesthetic in the abdominal wall was used in the 1980's. This technique was simplified with a single injection non-ultrasound technique used through the 1990's, which was commonly used for paediatric umbilical surgery. Since 2007 the technique has further developed to include ultrasound guidance and placement of rectus sheath catheters ***(Annadurai and Roberts, 2007).***

Ultrasound guidance for regional anaesthesia is associated with higher block success rates, shorter onset times, reduced total anaesthetic dose required and reduced complications. There is also the advantage of direct observation of pattern of anaesthetic spread. Increasing use of ultrasound by the anaesthetic profession, and our evolving appreciation of the benefits of ultrasound in performance of regional techniques has caused some techniques to gain new clinical utility. The rectus sheath block is an example of this evolution, where ultrasound allows accurate placement of catheters and therefore continuous ongoing postoperative analgesia becomes possible ***(Sandeman and Dilley, 2008).***

AIM OF THE WORK

The aim of this study has been to compare the efficacy of Rectus Sheath block versus wound infiltration with local anesthetic agent as regards post operative analgesia, its effect on hemodynamic changes (HR,BP) during rest and during mobilization and opioid consumption. The patients included in this study were having surgery with midline incision.

Chapter 1

ANATOMY OF ANTERIOR ABDOMINAL WALL AND IT'S NERVE SUPPLY

The abdominal wall is composed of 5 paired muscles: 2 vertical muscles (the rectus abdominis and the pyramidalis) and 3 layered flat muscles (the external abdominal oblique, the internal abdominal oblique, and the transversus abdominis muscles) ***(Jankovic et al., 2009).***

Rectus abdominis muscles:

The paired rectus abdominis muscles and their anterior and posterior sheaths are the key anatomical landmarks of this block. These muscles arise from the symphysis pubis and pubic tubercle and insert into the fifth, sixth, and seventh costal cartilages and the xiphoid process. The anterior sheath extends from the aponeurosis of the external oblique muscle and the anterior aponeurosis of the internal oblique muscle. The posterior sheath comprises the posterior aponeurosis of the internal oblique muscle and the aponeuroses of the transversus abdominis muscle ***(Jankovic et al., 2009).***

The external oblique muscle:

This is the largest and most superficial of the three flat abdominal muscles. It is located in the anterolateral aspect of the abdominal wall. Its fleshy part forms the anterolateral

portion and its aponeurosis forms the anterior part ***(Skandalakis and Skandalakis, 2014).*** Its fibers run inferoanteriorly and medially in the same direction as do the extended digits when they are in one's side pockets. It originates from external surfaces of 5th to 12^{th} ribs and insertion; the fibers pass medially, they become aponeurotic. This aponeurosis ends medially in the linea-alba, pubic tubercle and anterior half of the iliac crest. Innervation is via the inferior six thoracic nerves and subcostal nerves ***(Frank and Natter MD, 2006).***

Inferiorly, it folds back on itself to form the inguinal ligament between the anterior superior iliac spine and the pubic tubercle. Just superior to the medial part of the inguinal ligament, there is an opening in the aponeurosis called the superficial inguinal ring ***(Keith and Anne, 2006).***

The internal abdominal oblique muscle:

Is the intermediate layer of the 3 paired flat abdominal muscles. It originates broadly from the anterior portion of the iliac crest, lateral half of the inguinal ligament and thoracolumbar fascia. The internal abdominal oblique inserts on the inferior border of the 10th-12th ribs, the linea Alba and the pubic crest via the conjoint tendon. The muscle fibers of the internal abdominal oblique course upward in a superomedial orientation, perpendicular to the muscle fibers of the external abdominal oblique ***(Abdallah et al., 2015).***

The transversus abdominis muscle:

Is the deepest of the 3 paired flat abdominal muscles. It originates on the internal surfaces of the 7th–12th costal cartilages, thoracolumbar fascia, anterior three fourths of the iliac crest and lateral third of the inguinal ligament. As with the other flat muscles, the transversus abdominis forms a broad aponeurosis that helps make up the rectus sheath before it fuses in the midline to the linea alba. Above the arcuate line the transversus abdominis aponeurosis contributes to the posterior rectus sheath. Below the arcuate line it is fuses with the other flat muscles as the anterior rectus sheath ***(Finnerty and McDonnell, 2012).***

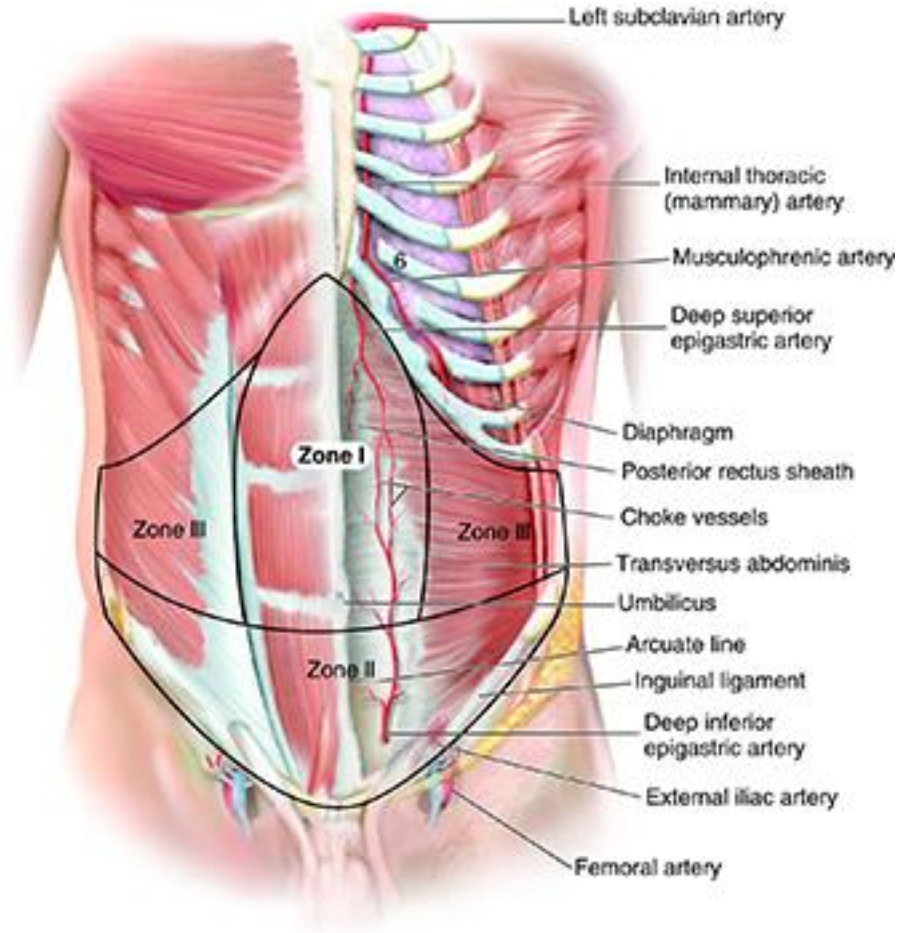

Figure (1): Clinical anatomy of the abdominal wall ***(Johnson et al., 2014).***

Nerve supply:

Innervation of the anterolateral abdominal wall arises from the anterior rami of spinal nerves T7 to L1. Branches from the anterior rami include the intercostal nerves (T7-T11), the subcostal nerve (T12) and the iliohypogastric / ilioinguinal nerves (L1). Intercostal nerves T7 to T11 exit the intercostal spaces and run in the neurovascular plane between the internal oblique and the transversus abdominis muscles. The subcostal nerve (T12) and the

ilioinguinal/ iliohypogastric nerves (L1) also travel in the plane between the transversus abdominis and internal oblique, innervating both these muscles. The T7-T12 nerves continue anteriorly from the transversus plane to pierce the rectus sheath and end as anterior cutaneous nerves. The T7-T11 nerves provide sensory innervation to the rectus muscle and overlying skin. T7 gives sensory innervation at the epigastrium, T10 at the umbilicus, and L1 at the groin ***(Snell, 2008).***

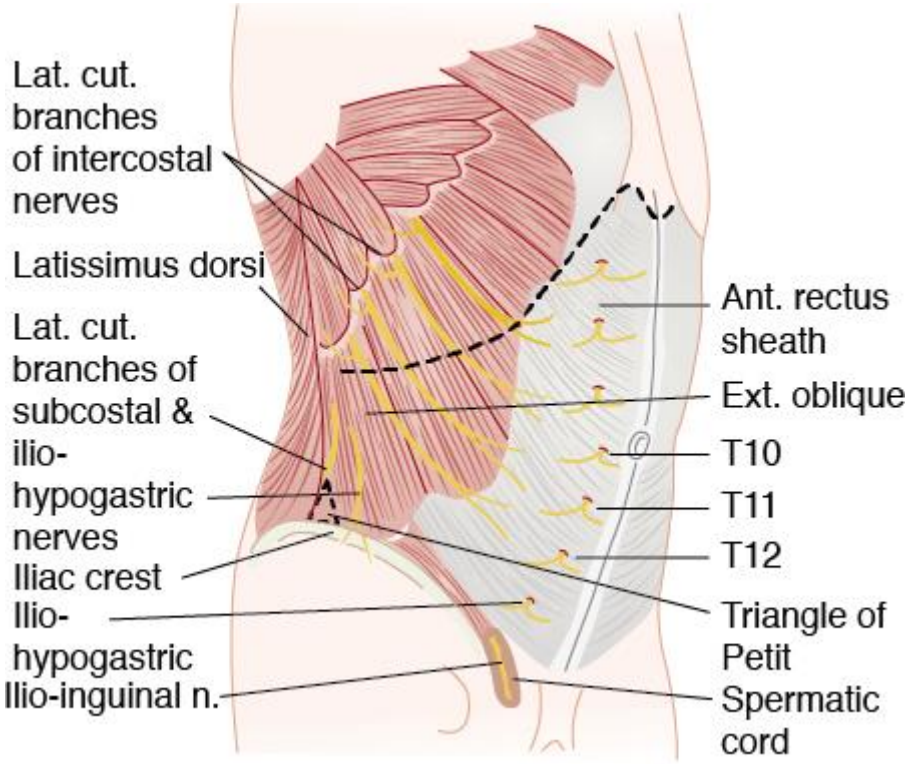

Figure (2): Abdominal wall innervation (superficial layer) ***(Johnson et al., 2014).***