The Use of Ultrasound-Guided Transversus Abdominis Plane (TAP) Block for Inguinal Herniorrhaphy

Thesis

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" قالوا سبحانك لا علم لنا إلا ما
علمتنا إنك أنت العليم الحكيم "

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ABSTRACT:

Pain after inguinal hernia repair is still a challenging task especially in the ambulatory setting. TAP block has been suggested as an adequate analgesic option. In this prospective, randomized, double-blind study, our aim was to compare the analgesic efficacy of the of transversus abdominis plane (TAP) block with a placebo block in patients undergoing unilateral inguinal hernia repair.

Methods: Following the institutional review board approval, and informed patient consents, fifty adult (ASA) I–IV patients aged 18–80 were enrolled in this study. Under Ultrasound guidance, 20 ml of ropivacaine 0.5% (Group A) or normal saline (group B) were injected in the TAP block. General anesthesia was used for all patients. Serum IL6 levels were measured intraoperative and postoperative. The verbal analog scale (VAS) was recorded immediately postoperative; 1 hour after; the average VAS during the total PACU time; 24 hours postoperative; one month postoperative. The amount of narcotics used (in mg oral-morphine equivalent) in the PACU and in the first 24 hours postoperative as well as anti-emetic drugs were recorded.

Results: Patients in (group A) had significantly lower pain scores than (group B) at all times except the immediate postoperative VAS scores, which were comparable for the two groups. The amount of narcotics used for group A was also significantly lower in the PACU as well as for the first postoperative 24 hours with P value<0.05. The serum rise of IL-6 level was lower in group A than group B (however with no statistical significance)

Conclusion: TAP block provided effective analgesia, reducing total 24-hour postoperative analgesic consumption and opioid requirement in patients undergoing unilateral inguinal hernia repair.

Keywords: inguinal hernia, pain, transversus abdominis plane block.

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List of Abbreviations:

AMPA:	α-amino-3-hydroxy-5-methylisoxazole-4-proprionic acid
ARKS	Anesthesia Record Keeping System
ASA	American Society of Anesthesiologists
ASIS:	Anterior Superior Iliac Spine
BIS	Bispectral index
BMI	Body mass index
BP	Blood pressure
bpm	Beat per minute
CPNB:	Continuous peripheral nerve block
CT	Computerized Tomography
DCIA:	Deep circumflex iliac artery
DIEA:	Deep inferior epigastric artery
ELISA	Enzyme-linked immunosorbent assay
Fig.:	Figure
G	Gauge
GABA:	γ-amino butyric acid
GE	General Electric
IHN:	Iliohypogastric nerve
IIN:	Ilioinguinal nerve
IL	Interleukin
INR	International Normalized Ratio
IP:	In-plane
IV	Intravenous
kg/m^2	Kilogram per square meter
L:	Lumbar
LAX:	Long-axis
m	Meter

m/sec	Meter per second
MAP	mean arterial pressure
mcg	Microgram
mg	milligram
mg/dl	milligram per deciliter
mg/kg	milligram per kilogram
MHz	Mega Hertz
min	minute
ml	Milliliter
mm	Millimeter
n	Number
NMDA:	N-methyl-D-aspartate
NSAIDs:	Non-steroidal anti-inflammatory drugs
OOP:	Out-of-plane
P value	Probability value
PACU	Post Anesthesia Care Unit
pg/ml	Pico gram per Milliliter
POD 1	Postoperative day one
PONV	Postoperative nausea and vomiting
SAS	Statistical analytical system
SAX:	Short-axis
SD	Standard deviation
T:	Thoracic
TAP:	Transversus Abdominis Plane
TAPP	Transabdominal preperitoneal procedure
TGC:	Time Gain Compensation
VAS:	Verbal analog score
WDR:	Wide dynamic-range

β	Beta
δ	Delta
x^2	Chi-square

INTRODUCTION

Introduction:

Inguinal hernia repair is one of the most common surgical procedures world-wide [1]. More than one million abdominal wall hernias are repaired in the United States annually. Inguinal hernias represent the vast majority of these. It is estimated that more than 700,000 inguinal hernias are repaired each year in the United States [2]. For men, the risk is substantial, with a lifetime incidence of 6% to 27% [3,4].

One of the most common long and short term complaints after inguinal hernia repair is pain. This is especially worrisome since many patients presenting for hernia repair have minimal or no pain at baseline from their hernia. The challenge is to adequately quantify an individual's pain and compare it to another's pain. Reports continue to surface that up to 60% of patient experience some degree of pain even 12 months after inguinal hernia repair [5].

Chronic pain is a significant long-term complication that can occur after inguinal hernia repair and can compromise the patient's quality of life. Postherniorrhaphy pain can be nociceptive or neuropathic. Nociceptive pain is due mainly to tissue injury, inflammatory reaction or scar tissue. Neuropathic pain is due to nerve injury which may be caused by nerve compression or transection. The nerves most at risk for injury are ilioinguinal, iliohypogastric, and genital branch of genitofemoral nerve [6].

Intense postoperative pain increases the likelihood of developing chronic pain after hernia repair [5]. As a consequence of postherniorrhaphy chronic pain, almost one third of patients have limitations in their daily leisure activities. Moreover, treatment of this complication is difficult and controversial, ranging from conservative measures (local injections) to operative exploration and neurolysis [7]. Neurectomy for chronic pain after inguinal hernia repair is a final option for patients who fail to improve with injections and conservative management [5].

Although opioid analgesics are highly effective in decreasing pain in the early postoperative period, their use may be associated with unwanted side effects (e.g., itching, nausea and vomiting). Local Anesthetics are popular adjuvants during outpatient procedures because they can provide perioperative analgesia without opioid-related side effects [8]. In a recent systematic review, multimodal postoperative analgesic recommendation consists of a combination of paracetamol, a NSAID and a local anesthetic technique [9].

The Transversus Abdominis Plane (TAP) Block is a local anesthetic block used to provide analgesia to the anterior and lateral abdominal wall. Rafi et al (2001) [10] and McDonnell et al (2004) [11] were the first to describe this novel abdominal field block. They described an anatomical landmark technique and provided evidence of blockade to the mid/lower thoracic and upper lumbar spinal nerves (from T6 to L1) as they travelled in the fascial plane between the transversus abdominis and internal oblique muscles.