A Comparative Study between Ultrasound Guided Trans-muscular Quadratus Lumborum Block Versus Ultrasound Guided Transversus Abdominis Plane Block as postoperative analgesia in Laparoscopic Bariatric Surgery

Thesis

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By

Peter Nashaat Ramzy Youwakiem

M.B.B.Ch, Faculty of Medicine, Ain Shams University

Under Supervision of

Prof. Dr. Moustafa Kamel Reyad

Professor of Anesthesia, Intensive Care and Pain Management
Faculty of Medicine – Ain Shams University

Dr. Abd El Aziz Abdallah Abd El Aziz Abo Zeid

Lecturer of Anesthesia, Intensive Care and Pain Management
Faculty of Medicine – Ain Shams University

DR Mariam Kamal Habib Basta

Lecturer of Anesthesia, Intensive Care and Pain Management
Faculty of Medicine – Ain Shams University

Faculty of Medicine
Ain Shams University
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Peter Nashaat

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List of Abbreviations

Abbr.	Full-term
ASA	**:** American society of anesthesiologists
BMI	**:** Body mass index
CNS	**:** Central nervous system
$EtCO_2$	**:** End tidal CO_2
GA	**:** General Anesthesia
HR	**:** Heart rate
HRQOL	**:** Health related quality of life
IV	**:** Intravenous
LBW	**:** Lean body weight
LSG	**:** Laparoscopic sleeve gastrectomy
LV	**:** Left ventricle
MAP	**:** Mean arterial blood pressure
OHS	**:** Obstructive hypo ventilation syndrome
OSA	**:** Obstructive sleep apnea
PABA	**:** Para-aminobenzoic acid
PACU	**:** Post anesthesia care unit
PM	**:** Psoas major
QLB	**:** Quadratus lumborum block
QOL	**:** Quality of life

RYGB **:** Roux-en-Y gastric bypass

SpO2 **:** Oxygen saturation

TAP **:** Transversus abdominis plane

TQL **:** Trans-muscular quadratus lumborum

US **:** Ultra-sound

VAS **:** Visual Analog Scale

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Abstract

Background: A variety of unwanted post-operative consequences, including patient suffering, respiratory distress complications, delirium, myocardial ischemia, prolonged hospital stay and an increased likelihood of chronic pain are due to poorly controlled acute pain after laparoscopic abdominal surgery. **Aim of the Work:** is to compare the analgesic efficacy of ultrasound-guided TQL with TAP block during laparoscopic bariatric surgery and to improve the outcome of the patients undergoing laparoscopic bariatric surgery under general anesthesia who suffer from postoperative pain and also in the early postoperative period regarding pain relief, decreasing postoperative opioid requirements, provision of comfort, early mobilization and improved respiratory functions. **Patients and Methods:** The study was conducted on 40 randomly chosen patients in Ain Shams University Hospitals after approval of the medical ethical committee. They were allocated in two groups of 20 patients each: Group TQL (n=20): received combined general anesthesia with TQL block. Group TAP (n=20): received combined general anesthesia with TAP block. **Results:** TQL block has more analgesic efficacy than TAP block. The first call for rescue analgesia (Meprridine), total meprridine consumption and pain scores (visual analog score at rest and movement) indicated the superiority of the analgesic technique TQL block. **Conclusion:** TQL with general anesthesia was more effective technique in providing analgesia after laparoscopic bariatric surgery without associated hemodynamic instability in comparison to TAP block with general anesthesia and also the first call for rescue analgesia (Meprridine), total Meprridine consumption and pain scores (visual analog score at rest and movement) indicated the superiority of the analgesic technique TQL block.

Key words: US-Guided Trans-muscular Quadratus Lumborum Block, US-Guided TAP Block, analgesia, Laparoscopic Bariatric Surgery

Introduction

According to the National Institutes of Health, obesity is a medical condition that has a negative impact on health. It shows an increased risk for mortality in addition to medical, social and psychological co-morbidities as increased risk for coronary artery diseases, hypertension, dyslipidemia, diabetes mellitus, gall bladder diseases, obstructive sleep apnea and socio-economic and psychological impairment ***(Bray et al., 2000).***

Non-surgical management can effectively induce 5%-10% weight loss and improve health in severely obese individuals resulting in cardio-metabolic benefit. Bariatric surgery procedures are indicated for patients with clinically severe obesity; currently, these procedures are the most successful and durable management of obesity. The best choice for any bariatric procedure depends on the individualized goals of the therapy, available local expertise, patient preference and personalized risk satisfaction. In general, laparoscopic bariatric surgical procedures are preferred over open bariatric procedures due to lower early postoperative morbidity and mortality ***(Jeffry et al., 2013).***

In obese patients, comfort, early mobilization and improving respiratory functions without causing sedation or respiratory compromise are the goals of postoperative pain

management. Safe analgesic managements among obese patients are difficult according to the pathophysiology of obesity and the associated co-morbidities with the high incidence of obstructive sleep apnea. Advice on general management includes multimodal analgesic therapy, preference for regional techniques, avoidance of sedatives, non-invasive ventilation with supplemental oxygen and early mobilization ***(Schug and Raymann, 2011)***.

The Transversus abdominis plane (TAP) block was first described by Rafi in 2001, the block has been used since that time as a part of a multimodal regional anesthesia for postoperative pain relief. TAP block showed less consumption of analgesics and less pain in the first two hours up to six hours postoperatively in laparoscopic surgeries (***Xiang et al., 2014).***

The Quadratus lumborumblock (QLB) was first described by Blanco in 2007. Due to the spread of local anesthetics through the quadratus lumborum plane beyond the Transversus abdominis plane to the thoracic paravertebral space, that may produce more analgesic effect and prolong the action of the injected local anesthetics. Previous studies showed that both TAP block and QLB may reduce opioids requirements in the postoperative period. However, studies comparing between trans-muscular quadratus lumborum and transversus abdominis plane blocks are of limited number ***(Rafa, 2015).***

Aim of the Work

The aim of this work is to compare the analgesic efficacy of ultrasound-guided trans-muscular Quadratus lumborum block with Transversus abdominis plane block during laparoscopic bariatric surgery. The efficacy profile is aiming to improve the outcome of the patients undergoing laparoscopic bariatric surgery under general anesthesia who suffer from postoperative pain and in the early postoperative period regarding pain relief, decreasing postoperative opioid requirements, provision of comfort and improved respiratory functions.

Pathophysiology of obesity

Obesity is defined as deviation of 15% to 25% above average body weight due to excess deposition of adipose tissues. Obesity affects about 25% to 40% of population leading to serious comorbidities ***(Angel et al., 2000)***.

Adipose tissue is one of the largest organs of the human body. About 10% to 15% of the body weight of a normal man and about 20% to 25% of a normal woman. Although most of the adipose fat is subcutaneous, considerable amounts are also found in mesentery, omentum and retroperitoneal area. Fat tissue **(Figure 1)** is a specialized form of connective tissue which consists of fat cells embedded in a cartilaginous framework (stroma) that provides support to the cells, as well as blood capillaries and nerve fibers that permeate the tissue. Primitive primordial cells are the source of fat cells that are associated with the capillary network. A variety of nutritional and hormonal factors are responsible for differentiation of these cells into fat-storing adipocytes. Fat cells are the largest cells in the body and they are capable of storing and releasing fat according to the nutritional requirement of the body. Triglyceride forms more than 90% of fat cell mass that represents an efficient and compact way of storing calories ***(Angel et al., 2000).***