



## CASE REPORT

# Ultrasound-Guided Quadratus Lumborum Block as A Post-operative Analgesia for Total Abdominal Hysterectomy: A Case Report

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### Abstract

Total Abdominal Hysterectomy is a major invasive abdominal surgery which is accompanied with severe post-operative pain. Multimodal analgesia techniques can provide efficient analgesic coverage with minimal side effects, Quadratus Lumborum Block is an abdominal wall block which gives good analgesic effect for abdominal surgery with lower pain score and less requirement for opioids. A 67-year-old female was scheduled to undergo total abdominal hysterectomy surgery. The patient presented with comorbidities, morbid obesity, bronchial asthma, obstructive sleep apnea and hypothyroidism. The procedure was performed under general anesthesia and by the end of surgery, a Quadratus Lumborum Block was carried out using ultrasound-guided technique. Quadratus Lumborum Block bilaterally was successfully performed which was able to provide a sufficient analgesic effect post total abdominal hysterectomy, thus, provided the patient's with not only an opportunity for early ambulation but also avoided the adverse effects of opioids (especially the respiratory complications).

**Keywords:** Quadratus Lumborum Block and Abdominal Wall Nerve Block, Asthma, General Anesthesia, Hysterectomy, Obstructive Sleep Apnea

### Introduction

Hysterectomy is one of the most frequently operated gynecological surgeries.<sup>1</sup> There are many different surgical approaches through a laparotomy, laparoscopically and vaginally which can be chosen according to the surgical indications, facilities, and patient's safety. Total Abdominal Hysterectomy (TAH) is an invasive surgical approach, the surgical incision involves the full abdominal wall layers, which has an impact on patient's postoperative pain, analgesic requirements,

mobilization, duration of hospital stay, and finally patient's satisfaction.<sup>2</sup> Pain in TAH surgery is a combination of an inflammatory response, nerve injury, and tissue damage which involves the whole abdominal wall layers starting from the superficial layers to the deeper peritoneal layers, with a variant intensity of nociceptive and neuropathic pain.<sup>3</sup>

Reducing the postoperative pain leads to earlier ambulation, avoids respiratory complications and increases patient's satisfaction.<sup>4</sup> Opioids can provide an efficient control of postoperative pain which

are the analgesics of choice, but have many dose-related side effects including nausea, vomiting, drowsiness, respiratory complications and delay patient's ambulation which can increase the risk of Deep Venous Thrombosis (DVT).<sup>5</sup> Depending on a single systemic acting analgesic agent for sufficient management of postoperative pain increases the risk of reaching larger doses of drugs with their adverse events to achieve adequate analgesia. Hence the role of multimodal analgesia technique as a combination of more than one analgesic agent at lower doses of each, allows additive or synergistic analgesics activity, epidural blocks usage for pain alleviation was restricted due to their adverse effects, recently ultrasound-guided nerve block is considered a cornerstone of multimodal analgesia technique as it carries the same advantages with less side effects when compared to others.<sup>6</sup>

There are several techniques to get abdominal wall nerve block, Transversus Abdominis Plane Block (TAPB) with its varieties (subcostal, anterior, lateral and posterior approach), Rectus Sheath Block (RSB) and Quadratus Lumborum Block (QLB) which differ according to the targeted dermatomes to cover the of pain either somatic or visceral.<sup>7,8</sup> QLB has a better analgesic effect for abdominal surgeries rather than other abdominal wall block techniques especially when visceral pain is included.<sup>9</sup>

In this paper we present a case report where we applied a QLB as a postoperative analgesia for postoperative TAH.

### Case Presentation

A 67 years old female patient with a American Society of Anesthesiologist (ASA) Physical Status Class III,<sup>10</sup> was diagnosed as uterine endometrioid endometrial carcinoma and scheduled for laparotomy for TAH. Her other medical conditions were morbid obesity Body Mass Index (BMI) 45.5 Kg/m<sup>2</sup>, hypothyroidism, bronchial asthma, and Obstructive Sleep Apnea (OSA).

Patient on regular follow up with pulmonologist who was treating her on regular medications; Symbicort 320 µg twice daily, Singulair 10 mg and Continuous Positive Airway Pressure (CPAP) machine during sleeping time, also she is receiving

L-Thyroxine 100 µg daily for hypothyroidism.

Type of anesthesia was discussed with the patient in the anesthesia checkup clinic preoperatively as well as Postoperative analgesia options. She was willing for General Anesthesia (GA) and abdominal wall nerve block as a postoperative analgesic technique but also, accepted to consider other additive options like Patient Controlled Analgesia (PCA) Pethidine based as a rescue, We had explained QLB technique as the preferred nerve block of choice suitable for her laparotomy.

A consultation of her pulmonologist was done preoperatively who advised continuing her medications, to give Methylprednisolone 60 mg IV before induction of anesthesia, and after 6 hours, also to consider using CPAP mechanical ventilatory support when needed postoperatively.

Preoperatively, an informed consent was taken, the patient was educated on how to use the incentive spirometer, Visual Analog Scale (VAS) to monitor her pain postoperatively (where 0 represented no pain, and 10 meant the worst possible pain) and how to use PCA for additional pain management when needed.

On arrival at the operating theatre, the patient was monitored by electrocardiography (ECG), non-invasive blood pressure (NIPB), and pulse oximetry. Intravenous infusion of warm ringer's lactate solution was initiated. Midazolam 2 mg was given intravenously, after adequate pre-oxygenation, anesthesia was induced by IV fentanyl 100 µg, propofol 175 mg, and cisatracurium 15 mg. Tracheal intubation was done and ventilator settings were adjusted to maintain the endtidal carbon dioxide tension at 30 to 35 mm Hg. Anesthesia was maintained using 1.2 MAC isoflurane, oxygen-air mixture, IV cisatracurium incremental doses, and Remifentanyl infusion 0.25-0.5 µg/kg/min IV.

By the end of the surgery, an Ultrasound-Guided QLB has been done, using a high-frequency linear probe 7-15 MHZ, a 22 G needle for injection, and an isobaric bupivacaine 0.35% dosage 2mg/kg as local anesthetic (LA) with additive dexamethasone 0.1 to 0.2 mg/kg to increase the LA duration of action. A linear transducer is placed in the axial plane in the midaxillary line between the costal margin and the

iliac crest where the three layers of abdominal wall muscles are visualized: external and internal oblique as well as the transversus abdominis muscles, then the probe was moved posteriorly until the posterior aponeurosis of the transversus abdominis muscle becomes visible as a strong specular reflector and the quadratus lumborum muscle (QL) was identified. The target was just deep to the aponeurosis but superficial to the transversalis fascia (TF) at the lateral margin of the QL muscle. This is just lateral to the pararenal fat compartment. The needle was inserted from the anterior end of the transducer and advanced until the tip just penetrated the posterior aponeurosis of the transversus abdominis muscle. LA was injected between the aponeurosis and the TF at the lateral margin of the QL muscle, 30 ml on each side.

After finishing the block, Remifentanyl infusion was stopped, neuromuscular blockade was antagonized with 0.025 to 0.05 mg/kg neostigmine and 0.01 to 0.02 mg/kg atropine and then extubation was done.

In the Post Anesthesia Care Unit (PACU) patient's ECG, NIBP, pulse oximetry, respiratory rate, and respiratory patterns were monitored and VAS was assessed during rest and movement (or with knee flexion). Non-invasive CPAP ventilator was kept ready to be applied if the patient complained of respiratory difficulty or showed any signs of respiratory distress, also PCA Pethidine based bolus dose 20 mg with lockout interval 45 min as an additive analgesic technique if additional analgesia was required according to VAS. In PACU patient was kept under monitoring and observation for 75 min postoperatively, she didn't require any further analgesia and VAS values were 0 / 10.

The patient was shifted to the high dependency ward attached to cardiac monitoring ECG, SPO<sub>2</sub> and respiratory rate, all data were recorded during the patient's admission period. The analgesic regimen consisted of IV Paracetamol 1 g every 6 hours and PCA rescue. Values of VAS were recorded every 4 hours postoperatively during rest and movement (or with knee flexion), and also the total amount of PCA pethidine consumption was calculated and recorded.

150 minutes after the patient was shifted to the ward she was able to start incentive spirometer 1200 ml/min. And after 300 minutes she was ambulated out of bed.

On the mentioned analgesic regimen the patient didn't complain of pain during her admission period over two days until her discharged from the hospital, also she didn't require any additional analgesia rescue. PCA pethidine consumption was 0, the average VAS on both first and second day were 0 / 10 at rest and 2 / 10 on movement (or with knee flexion).

## Discussion

An abdominal wall block gives good analgesic effect for abdominal surgery with lower pain score and less opioids requirements, Ultrasound-Guided abdominal wall blocks can be administered for abdominal surgeries with different varieties of dermatomes coverage, such as Transversus Abdominis Plane Block (TAPB), Rectus Sheath Block (RSB) and Quadratus Lumborum Block (QLB), QLB was described by Blanco as an analgesia for abdominoplasty surgery.<sup>11</sup> Using the nerve block as a postoperative analgesia reduces the consumption of opioids postoperatively and it's related side effects, with bilateral QLB the sensory block coverage bilaterally involving dermatomes from T4 to L1 and the iliohypogastric, ilioinguinal nerves which was described by Carney that injection of a contrast solution accumulate on the lateral border of QL muscle and reach cranially the paravertebral space. It was as well demonstrated by McDonnell that a single bolus dose of QLB covering dermatomes above and below umbilicus gives good analgesia coverage for the TAH surgery.<sup>12,13</sup>

The volume of injected LA drug and concentration affect on the dermatome cover and duration of analgesic effect, Vasanth used unilateral QLB as a postoperative analgesia for right side laparotomy surgery where administration of 0.3 ml/Kg of 0.5% Ropivacaine gives a sensory block from T8 to L1 and the duration of analgesia was 4 hours

postoperatively, depending on other radiological and ultrasound studies of volunteers higher doses such as 0.6 ml/Kg cover more dermatomes and give longer analgesia duration.<sup>14</sup>

The new advanced techniques of using the ultrasound guided nerve block give the opportunity to perform nerve block under clear vision, where the needle passes through the surrounding structure reaching the target point safely and also the usage of minimal effective amount of LA while observing its spread all around with no risk of structure injury or dose-related toxicity.

In this case report, the QLB had a great role in postoperative pain analgesia for TAH surgery, our case had reduced pain score and opioids requirement postoperatively. Further researches and clinical trials are needed to apply QLB for different laparotomy procedures.

## Conclusion

According to our case a QLB is able to provide a sufficient analgesic effect for TAH which is a major abdominal surgery with less opioids consumption, giving our patient the opportunity of early ambulation and avoiding opioids side effects especially the respiratory adverse effect. We also started to consider QLB as the analgesia of choice for other laparotomy surgeries such as hemicolectomy with the same advantage also our patients are requesting early discharge after such major surgeries.

## Declarations

**Ethics approval and consent to participate:** Not applicable.

**Consent for publication:** Written consent taken from the patient herself.

**Availability of Data and Materials:** The data that support the findings of this study are available in the hospital's data system and can also be obtained from the authors upon reasonable request and permission of the hospital committee. An approval to release patients' medical data was taken from the hospital.

**Competing Interests:** The authors declare no conflicts of interest concerning the research, authorship, and publication of this article.

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