

Comparison of Quadratus Lumborum Block and Transversus Abdominis Plane Block for Postoperative Pain Management

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Affiliation:

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Grant/Financial Support:

None

KEYWORDS: Regional anesthesia, abdominal, quadratus lumborum block, transversus abdominis plane block, interfascial plane block

Abstract

Enhanced recovery after surgery (ERAS) protocols for open abdominal cases suggest preoperative epidural, wound catheter, or transversus abdominis plane (TAP) block placement can be effective for postoperative pain management.¹ This case-based poster presents a middle-aged woman who undergoes a pancreateoduodenectomy (PD) and receives a postoperative fascial plane block, a quadratus lumborum (QL) block, rather than the currently recommended TAP block, wound infiltration, or neuraxial anesthesia. Based on quality evidence regarding the benefits of the QL block, expanding ERAS protocols to regional anesthesia beyond wound infiltration and TAP blocks has the potential to produce increased pain management postoperatively, aiding in enhanced recovery and improved outcomes.

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Introduction

- Enhanced recovery after surgery (ERAS) guidelines for pancreatoduodenectomy surgery suggests preop epidural, wound infiltration (WI), or transversus abdominis plane (TAP) block for postop pain management¹
- Although TAP block reduces overall opioid consumption and enhances rapid recovery when compared with neuraxial anesthesia,² TAP blocks only provide somatic analgesia
- Quadratus Lumborum (QL) blocks are an alternative fascial plane block, aside from TAP block, that provides substantially increased analgesia spread
- QL block spread shown to aid in visceral and somatic analgesia due to injected local anesthetic (LA) spreading to thoracolumbar fascia (TLF), targeting sympathetic fibers and paravertebral space³

Case Summary

Pre-Anesthetic Evaluation

- 58-year-old disabled female, NKDA, ASA 2, BMI 31.2
- History of pancreatic head mass & obstructive jaundice status post biliary stent
- Medical history: anxiety & GERD
- Surgical history: EGD & ERCP
- Home medications: pantoprazole 40 mg PO q morning
- Preoperative medications: acetaminophen 650 mg PO, celecoxib 200 mg PO, gabapentin 300 mg PO, transdermal scopolamine & midazolam 2 mg IV

Intraoperative Course

- General anesthesia induction: RSI with IV ketamine 50 mg, lidocaine 100 mg, & propofol 150 mg; muscle relaxation via succinylcholine 120 mg
- Antibiotics & adjuncts: cefepime 2 g, dexamethasone 8 mg, magnesium sulfate 2 g bolus, lidocaine drip 2000 mg/500 mL at 2 mg/min
- Maintenance: isoflurane, rocuronium titrated to twitches, 1 PRBC & 2 PLT received
- Opioids & pain adjuncts: fentanyl 200 mcg, hydromorphone 2 mg, ketamine 10 mg/hr for a total of 50 mg

Postoperative Course

- Postoperative QL block: Ultrasound (US) guided, QL2 technique with 25 mL 0.25% bupivacaine bilaterally
- Awake extubation, patient transferred to PACU comfortably post-extubation, with 8 L/min oxygen via simple facemask
- 24-hr follow-up: 4/10 pain at rest, 5/10 pain during movement & patient verbalizes pain "relatively well controlled"

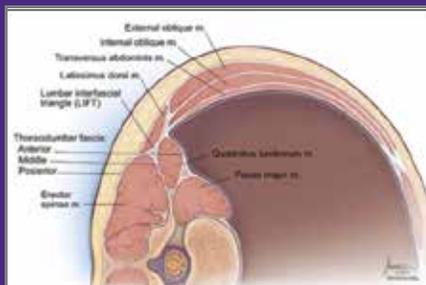


Figure 1. Cross Section of TLF and Muscles Viewed During US for QL Block⁶

Quadratus Lumborum Block

- QL approaches: QL1, QL2, QL3
- Blocks dorsal rami—somatic analgesia to skin & muscles of posterior abdominal wall⁶
- Blocks ventral rami—somatic analgesia to skin & muscles of anterolateral abdominal wall⁶
- Blocks sympathetic trunk within TLF—visceral analgesia of the abdomen⁶
- LA spread within TLF potentially reaches paravertebral space, generating indirect paravertebral block³
- Needle passage is further from abdominal organs, great vessels, and peritoneal cavity⁴
- Fascial plane blocks require volume for adequate spread; current practice suggests a max LA dose of 2.5 mg/kg⁵

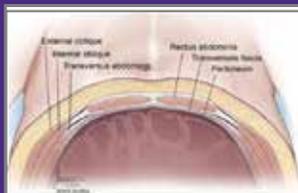


Figure 4. Cross Section of Anterolateral Muscles, Myofascial Planes, and Surrounding Tissues for TAP Block⁶

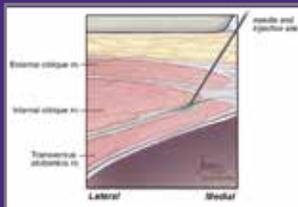


Figure 5. Demonstration of TAP Block via Anterolateral Approach. LA is Injected Between IOM and TAM⁶

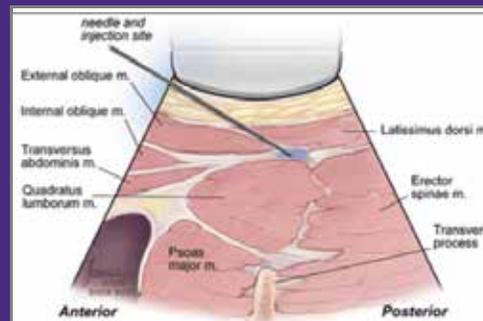


Figure 2. Demonstration of Posterior, QL2 block. LA Injected Posterior to QL and Adjacent to/or within the LIFT⁶

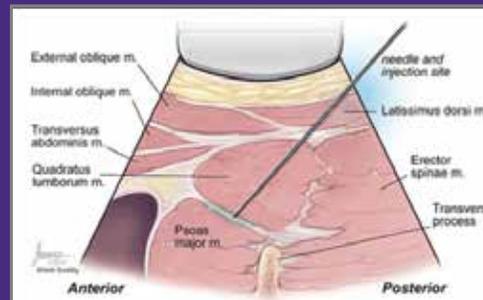


Figure 3. Demonstration of Anterior, QL3 block. LA Injected Between QL and Psoas Major Muscles⁶

Transversus Abdominis Plane Block

- TAP approaches: subcostal, lateral, anterior & posterior
- Blocks ventral rami of spinal nerves T7-T10 located in plane between internal oblique muscle (IOM) and transversus abdominis muscle (TAM)⁶
- Blocks anterolateral skin, muscles, and parietal peritoneal sensory nerve fibers of abdominal wall⁴
- No inhibitory effect on visceral pain, only somatic
- Complications researched include abdominal organ injury, nerve injury, vascular injury⁴
- Compared to the gold standard epidural, TAP blocks result in significantly less opioid consumption, postop pain, and incidences of hypotension, with no difference in opioid consumption at 72 hrs²
- When compared to QL blocks, TAP blocks are shown to have increase patient pain scores, opioid consumption, and number of patients requiring analgesia postoperatively³



Discussion

- A systemic review (SR) & meta-analysis of 22 RCTs comparing postop analgesia of TAP & QL blocks showed a statistical decrease in opioid consumption, visual analogue scale (VAS) scores at 24 hrs postop, number of patients requiring postop analgesia within QL group
- In lieu of current ERAS guidelines, QL blocks tout clinical superiority in postoperative analgesia when compared to TAP blocks

Case Critique

- After 6-hour, open abdominal case, outcomes demonstrated stark similarities to current literature over QL efficacy
- ERAS guidelines for PD procedure were followed, with alternative interfascial plane block—QL block—used instead of WI, TAP block, or epidural
- Patient was ambulating the day after surgery, with well managed pain of 4/10 at rest and 5/10 upon activity

Conclusions & Recommendations

- Regional anesthesia, specifically truncal blocks, are a major component of multimodal pain management for enhanced postoperative recovery
- QL blocks have proven clinically superior to TAP blocks for multiple major surgeries involving anterior & lateral abdominal wall^{3,4}
- Based on quality evidence, ERAS protocols for PD and other open abdominal cases should be expanded to QL blocks for postoperative analgesic management

Recommendations for Research

- Larger RCTs with ASA I-IV, as well as BMIs > 30 kg/m² should be considered for increased generalizability of data
- Evaluation of LA diffusion via the TLF & adjacent structures to validate mechanism of action

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