DOI: 10.7860/JCDR/2026/88942.24534

Case Series

Anaesthesia Section

Guided Posterior Quadratus Lumborum Block for Postoperative Pain Control in Abdominal Surgery: A Case Series

AJINKYA AKULWAR[1], NEETA CHAUDHARY[2], AMREESH PAUL FRANCIS[3]

ABSTRACT

Effective postoperative analgesia is essential for patients recovering from abdominal surgery, as adequate pain relief plays a key role in achieving positive surgical outcomes. Most patients receive systemic opioid medications after their procedure; however, these medications can cause side-effects that make them less than ideal analgesic agents. There has been a significant movement toward using regional anaesthesia techniques to provide an alternative to using systemic opioids as part of a multimodal approach to postoperative analgesia for patients undergoing surgical procedures. One form of regional anaesthesia that has become quite popular is the use of fascial plane blocks. An example of a fascial plane block is the Posterior Quadratus Lumborum Block (PQLB), which has been shown to be very effective in providing analgesia to the abdominal wall by helping to deliver local anaesthetic agent to the thoracolumbar fascia. The purpose of this case series was to evaluate three patients who received PQLB performed under ultrasound guidance following general anaesthesia for postoperative analgesia. The primary variables that were evaluated included postoperative pain scores, time to the first dose of an analgesia, amount of opioids consumed, and haemodynamic stability throughout the course of each patient's procedure. Results of this study demonstrated that patients receiving ultrasound-guided PQLB had adequate postoperative analgesia, as evidenced by low pain scores, delayed requiring supplemental analgesics, and relatively low opioid consumption. This case series demonstrated that ultrasound-guided PQLBs may be an effective option for use as part of multimodal analgesia techniques as an adjunct therapy to improve postoperative pain control and comfort for patients undergoing abdominal surgery, as well as improve the surgical recovery process for these same patients between surgical procedures.

Keywords: Analgesia, Fascial plane block, Multimodal analgesia, Regional anaesthesia, Ultrasonography

INTRODUCTION

Adequate pain management is necessary for a positive perioperative experience after abdominal surgery. Pain control after surgery is critical; uncontrolled pain can impede the patient's ability to breathe adequately, ambulate, and recover in a timely manner. Systemic opiate analgesics are the primary means of managing postoperative pain but are associated with numerous side-effects. As such, there has been a shift toward a multimodal approach to postoperative pain management with regard to providing adequate pain relief while minimising opioid consumption [1,2].

Regional anaesthesia has become a key component of multimodal analgesia. With the development of ultrasound-guided regional anaesthesia, abdominal fascial plane blocks have become immensely popular, as they allow precise placement of Local Anaesthetic (LA) and enhance patient safety. Additionally, among regional techniques, the PQLB has been an effective option for postoperative pain relief in patients who have undergone abdominal and pelvic surgeries, owing to its ability to provide a large sensory block of abdominal wall pain [3,4]. However, there remains limited clinical data describing the practical application and perioperative outcomes of PQLB across different abdominal surgeries in routine practice. This case series highlights the analgesic efficacy, safety profile, and opioid-sparing benefits of ultrasound-guided PQLB in varied abdominal surgical procedures. All blocks were performed by an anaesthesiologist experienced in ultrasound-guided regional anaesthesia with experience of more than 50 fascial plane blocks.

This case series aims to describe the outcomes of three patients who had undergone abdominal surgery with postoperative pain management using ultrasound-guided PQLB. The following parameters were recorded for each patient, including postoperative pain scores, time to first rescue analgesia after surgery, total opioid consumption, haemodynamic stability, and any adverse events associated with ultrasound-guided PQLB.

CASE SERIES

Case 1

A 46-year-old female weighing 54 kg with a diagnosis of cholelithiasis was scheduled to undergo laparoscopic cholecystectomy. She was classified as American Society of Anaesthesiologists (ASA) physical status II and had a history of treatment with Amlodipine 5 mg for five years for hypertension. Her airway assessment demonstrated Mallampati class II, normal mouth opening, and normal range of motion of the neck. Her Heart Rate (HR) was 78 bpm, Blood Pressure (BP) was 132/84, and her oxygen saturation while on room air was 99%. All routine preoperative laboratory tests, including a complete blood count, were normal prior to surgery.

The patient's fasting status was confirmed prior to transferring her to the Operating Room (OR). Standard ASA monitoring was performed prior to surgery. An 18-gauge intravenous cannula was inserted. The patient was premedicated with glycopyrrolate 0.2 mg, midazolam 1 mg, and ondansetron 4 mg. The patient was induced with propofol 120 mg and fentanyl 100 mcg. Neuromuscular blockade was obtained with vecuronium 6 mg to facilitate endotracheal intubation. Ventilation was provided with Volume-Controlled Ventilation (VCV) at a tidal volume of 6-8 mL/kg, and the respiratory rate was adjusted to maintain normocapnia. Anaesthesia was maintained with a mixture of sevoflurane (2%), oxygen, and air (FiO2-50%), with vecuronium administered intermittently.

A cholecystectomy was completed laparoscopically using a total of four ports. The surgery lasted approximately 70 minutes, and the entire procedure, including anaesthesia and recovery, lasted 95

minutes. HR and BP of the patient remained less than 20% above baseline levels throughout surgery.

Bilateral ultrasound-guided PQLB were performed at the end of the procedure. The patient was placed in the lateral decubitus position on her side, with a low-frequency curvilinear ultrasound probe placed over the flank. A 2-5 MHz curvilinear probe was used, and the block was performed at the L3-L4 vertebral level. The abdominal wall musculature was identified. Using an in-plane technique, a 22-gauge, 100-mm echogenic needle was advanced to the posterior aspect of the quadratus lumborum muscle. Hydrodissection with normal saline was performed to confirm correct fascial plane placement before injection of local anaesthetic. After negative aspiration, 20 mL of 0.25% bupivacaine was then injected bilaterally. Correct placement was confirmed by visualising the spread of LA within the posterior fascial plane of the quadratus lumborum muscle. The neuromuscular blockade was reversed with neostigmine 2.5 mg and glycopyrrolate 0.5 mg. The patient was extubated after regaining adequate spontaneous respiration and neuromuscular recovery.

Paracetamol 1g was given every eight hours postoperatively for pain control. The patient's pain scores were assessed using the Numeric Rating Scale (NRS) at 2, 6, 12, and 24 hours postoperatively, with scores of 2/10, 2/10, 3/10, and 3/10, respectively. A single dose of rescue analgesia consisting of 50 mg of intravenous tramadol was required at 14 hours following the patient's surgery. There were no immediate postoperative complications. The patient did experience some mild postoperative nausea, which resolved with one dose of 4 mg ondansetron. Patient satisfaction with postoperative pain management was assessed verbally and was reported as satisfactory. The patient was discharged on the third postoperative day. At the time of follow-up two months later, the patient reported no ongoing abdominal pain, sensory deficits, or neurological deficits.

Case 2

A 52-year-old male weighing 70 kg and classified as ASA II had been scheduled for an elective right-sided open inguinal hernia repair. He had previously been diagnosed with type II diabetes mellitus for six years, and was compliant on metformin 500 mg twice daily. The results of a preoperative airway assessment indicated a Mallampati Class II airway with sufficient mouth opening, normal neck mobility, HR of 82 bpm, BP of 136/86 mmHg, and oxygen saturation of 98% in room air. Routine laboratory tests were all essentially normal.

In the OR, he underwent standard ASA monitoring. An 18-gauge cannula was inserted. Glycopyrrolate 0.2 mg, midazolam 1 mg, and ondansetron 4 mg were administered as premedication. Anaesthesia induction was achieved using propofol 140 mg, fentanyl 100 mcg, and vecuronium 7 mg for neuromuscular blockade to facilitate endotracheal intubation. Mechanical ventilation was provided using VCV, tidal volume set at 6-8 mL/kg. Anaesthesia maintenance was accomplished with sevoflurane (2%) in an oxygen and air (FiO2-50%) and additional doses of vecuronium as needed.

A Lichtenstein tension-free mesh repair to fix the inguinal hernia was performed on the patient, and this took around 60 minutes and required general anaesthesia for an additional 25 minutes. The patient's haemodynamic parameters were stable throughout the procedure.

At the end of the surgery, a unilateral ultrasound-guided PQLB of the affected side was performed on the patient whilst lying in a lateral position. The block was performed at the L3-L4 vertebral level using a 2-5 MHz curvilinear probe to identify the quadratus lumborum muscle behind the abdominal wall tissues. A 22-G, 100 mm echogenic needle was inserted and passed in-plane toward the back of the quadratus lumborum muscle. Hydrodissection with normal saline confirmed the posterior fascial plane before local anaesthetic administration. Approximately 25 mL of 0.25% bupivacaine was injected after confirming negative aspiration and visualising sufficient spread along the fascial plane. Reversal of the neuromuscular blockade was accomplished by administering intravenous neostigmine 2.5 mg and glycopyrrolate 0.5 mg, at which point the patient was extubated.

Following the surgical procedure, postoperative pain relief included paracetamol 1 g every eight hours. The patients' NRS values recorded at 2, 6, 12, and 24-hour intervals were 1/10, 2/10, 3/10, and 3/10, respectively. A rescue pain management protocol included tramadol 50 mg administered when NRS pain values exceeded four at 16 hours following surgery. There was a mild transient hypotensive response on recovery, which required intravenous fluid therapy but did not require any vasopressor support. There were no other complications that occurred during or after the surgical procedure. The patient demonstrated satisfactory ambulation. This patient was discharged in stable condition on postoperative day two. Two months following the procedure, the patient reported performing normal daily activities without experiencing any persistent postoperative pain or sensory deficits.

Case 3

A 38-year-old female weighing 58 kg with an ASA physical status I was scheduled to undergo a laparoscopic ovarian cystectomy for a benign ovarian cyst. She had no significant medical history and was not taking any regularly prescribed medicine. A preoperative airway assessment showed a Mallampati class I airway with adequate mouth opening and normal neck movement, as well as HR 74 bpm, BP 124/80 mmHg, and room air oxygen saturation 99%. All routine laboratory tests were within normal limits before surgery.

In the OR, she received ASA monitoring and had an 18-G intravenous cannula placed. As premedication, the patient was given glycopyrrolate 0.2 mg, midazolam 1 mg, and ondansetron 4 mg. Anaesthesia was induced with propofol 120 mg and fentanyl 100 mcg. The endotracheal tube was placed after administering vecuronium 6 mg to produce neuromuscular block. Mechanical ventilation was maintained with VCV at a tidal volume of 6-8 mL/kg. Anaesthesia was maintained with sevoflurane (2%) in an air and oxygen (FiO_2-50%) mixture.

The laparoscopic ovarian cystectomy procedure lasted approximately 75 minutes, and the overall time under anaesthesia was approximately 100 minutes. Vital signs remained stable during the procedure.

Bilateral ultrasound-guided PQLB were performed on completion of surgery. The blocks were administered at the L3-L4 vertebral level using a 2-5 MHz curvilinear probe, after the quadratus lumborum muscle was located. A 22-G, 100 mm echogenic needle was passed through the posterior fascia of the quadratus lumborum muscle, and hydrodissection with normal saline was used to confirm the appropriate needle tip position before injection. Approximately 20 mL of 0.25% bupivacaine was injected bilaterally under real-time ultrasound visualisation. Neuromuscular blockade was reversed using neostigmine 2.5 mg and glycopyrrolate 0.5 mg, and extubation was performed at the end of the procedure as soon as satisfactory recovery occurred.

Postoperative analgesia prescribed was paracetamol 1g every eight hours. NRS at 2, 6, 12, and 24 hours following surgery were recorded as 1/10, 2/10, 2/10, and 3/10, respectively. After 18 hours, the patient required additional rescue analgesia of 50mg of intravenous tramadol. There were no additional complications noted. The patient was discharged home on the third postoperative day. Verbal assessment indicated satisfactory patient satisfaction with postoperative pain management. Early ambulation was achieved within 8 hours and bowel function returned on postoperative day 1. At the two-month follow-up, she reported no chronic postoperative pain, numbness, or motor weakness, and she had returned to all of her normal daily activities.

DISCUSSION

After an abdominal surgery, there is usually substantial postoperative pain from both somatic and visceral sources. Multimodal analgesia has become the main method of managing pain during the perioperative period. The use of fascial plane blocks, like PQLB, has become popular because they can provide targeted, effective analgesia without all the side-effects that come from providing traditional systemic opioid analgesia. PQLB is performed by injecting LA into the posterior of the quadratus lumborum muscle. This allows the LA to spread through the thoracolumbar fascia and, potentially, up to the area where the spinal cord exits the vertebrae on the side of the body. The spread of LA in this area could extend into the dermatomes of many thoracolumbar regions [1,4,5].

Ultrasound can help improve the overall safety/efficacy of this block because the practitioner will be able to visualise the anatomy of the area being blocked, where the needle is, and where the LA will eventually spread, thereby minimising any complications associated with vascular punctures or other unintentional regional organ damage during insertion of the needle into the targeted muscle area [5,6].

Many factors complicate the management of anaesthesia for abdominal surgery, but one of the most significant is maintaining haemodynamic stability while achieving adequate anaesthesia and analgesia. An example of this is that using excessive amounts of intraoperative opioids can result in prolonged recovery times, sedation, and respiratory depression, while providing insufficient analgesic relief may provoke sympathetic responses such as tachycardia and hypertension. Another important factor is to reduce the incidence of opioid related adverse effects, such as nausea, vomiting, ileus, and delay in ambulation associated with opioids, which may compromise recovery [3,7].

PQLB offers a solution to these difficulties by providing a regional block that allows sufficient analgesia to reduce the need for intraoperative and postoperative opioids. This was demonstrated by Manupipatpong K et al., who showed that most paediatric patients had low pain scores during the first 72 hours following surgery and that they consumed almost no opioids after a PQLB. This suggests that PQLB can alleviate these challenges for patients of all ages [4,8].

Similarly, Parihar A et al., examined patients undergoing elective lower-segment caesarean section. They found that ultrasound-guided PQLB provided significantly better postoperative analgesia than Transversus Abdominis Plane (TAP) blocks, as evidenced by lower pain scores, a later time to first rescue analgesia, and a lower total amount of rescue analgesia within 48 hours of surgery [9]. In addition, Dai J et al., reported that PQLB can be performed in the supine position as part of an opioid-free anaesthesia approach in patients having lower abdominal/pelvic surgery without compromising haemodynamic stability during surgery, and requiring less anaesthetic and muscle relaxant, as well as achieving earlier return of function compared to TAP blocks; therefore, indicating that these blocks can be effective tools for managing perioperative pain [10].

Abdominal surgery has multiple alternative methods of providing analgesia. Thoracic epidural analgesia is often regarded as the "gold standard" for abdominal surgery as it provides excellent analgesia and reduces perioperative stress response. However, it can also be associated with multiple risks and has contraindications for those patients who are on anticoagulation. The TAP block provides anterior abdominal wall analgesia, but has more limited dermatomal coverage than PQLB. PQLB offers greater dermatomal coverage and the potential for longer-lasting analgesia. PQLB is a technique with a high success rate for pain control and minimal adverse events, regardless of age [4,7,11].

Manupipatpong K et al., reported a block failure rate of only 1.2% and no complications attributed to the block. At the same time, Parihar A et al., demonstrated that PQLB is associated with longer duration and superior analgesic quality compared with TAP block, and Dai J et al., provided evidence of its effectiveness in opioid-free intraoperative anaesthesia management [8-10].

The side-effect profile of PQLB in adults is similar to that of children undergoing surgery, as well as women having caesarean sections and patients receiving opioid-free anaesthesia for lower abdominal/pelvic surgeries. PQLB provides patients with low pain, broad dermatomes, a long period of analgesia, and opioid-sparing effects. The posterior approach allows unilateral or bilateral blocks, depending on the requirements of the surgery, and ultrasound-guided placement of local anaesthetic reduces the incidence of complications. PQLB offers advantages over other regional techniques, such as the TAP block, including a broader distribution of anaesthesia across more dermatomes, prolonged analgesia, enhanced pain control, and meeting the needs of anaesthetic care providers for either an opioid-sparing technique or haemodynamic stability [4,5,12].

[Table/Fig-1] [8-10,12] summarises recent studies highlighting the anaesthetic management and postoperative analgesic benefits of the quadratus lumborum block across various abdominal and pelvic surgical procedures.

Author	Case description	Anaesthetic management	Takeaway
Present case series	Three ASA I–II patients undergoing abdominal surgeries, including laparoscopic cholecystectomy, open inguinal hernia repair, and laparoscopic ovarian cystectomy, received ultrasound-guided Posterior Quadratus Lumborum Block (PQLB) for postoperative analgesia.	All patients underwent general anaesthesia with propofol, fentanyl, vecuronium, sevoflurane-based maintenance, and Volume-Controlled Ventilation (VCV). Ultrasound-guided PQLB was administered at the end of surgery using 0.25% bupivacaine (20–25 mL). Postoperative analgesia included scheduled paracetamol with rescue tramadol when required.	Ultrasound-guided PQLB provided effective postoperative analgesia with low pain scores, delayed requirement for rescue analgesics, reduced opioid consumption, stable haemodynamics, minimal complications, and satisfactory recovery following abdominal surgery.
Manupipatpong K et al., 2023, USA [8]	Retrospective review of 204 Quadratus Lumborum Blocks (QLB) performed in 163 paediatric patients undergoing colorectal and lower abdominal surgeries over 4 years.	Ultrasound-guided unilateral or bilateral QLBs were primarily performed using 0.2% ropivacaine with a median volume of 0.6 mL/kg as part of multimodal postoperative analgesia. Pain scores and opioid requirements were assessed over 72 hours postoperatively.	QLB was found to be a safe and effective analgesic technique in paediatric abdominal surgery, providing low postoperative pain scores, reduced opioid consumption, high success rates, and minimal adverse effects.
Parihar A et al., 2021, India [9]	Prospective study involving 100 ASA I–II parturients undergoing elective lower segment caesarean section under spinal anaesthesia comparing QLB with Transversus Abdominis Plane (TAP) block for postoperative analgesia.	Patients received either ultrasound-guided TAP block or QLB as part of multimodal analgesia following spinal anaesthesia. Postoperative pain scores, duration of analgesia, and rescue analgesic consumption were evaluated over 48 hours.	QLB provided superior postoperative analgesia compared with TAP block, with lower VAS pain scores, prolonged duration of analgesia, delayed first rescue analgesic requirement, and reduced analgesic consumption during the first 48 postoperative hours.
Dai et al., 2024, China [10]	Randomised study of 122 patients undergoing lower abdominal or pelvic surgery evaluating ultrasound-guided QLB in the supine position combined with opioid-free anaesthesia (OFA).	Patients received general anaesthesia with OFA and ultrasound-guided anterior QLB in the supine position. Group Q received lidocaine and ropivacaine, while the control group received normal saline. Intraoperative haemodynamics, anaesthetic depth, recovery profile, and postoperative analgesia were assessed.	US-guided QLB combined with OFA provided stable intraoperative haemodynamics, improved recovery characteristics, reduced extubation and awakening times, and superior postoperative analgesia in lower abdominal and pelvic surgeries.

Ökmen et al., 2018 [12]	Prospective, double-blind randomised controlled trial involving 60 patients undergoing laparoscopic cholecystectomy to evaluate bilateral ultrasound-guided PQLB for postoperative pain relief.	Patients received IV patient-controlled analgesia with either bilateral posterior QLB using 0.25% bupivacaine or a saline placebo. Pain scores, tramadol consumption, sedation scores, and side-effects were evaluated up to 24 hours postoperatively.	PQLB significantly reduced postoperative pain scores and tramadol consumption after laparoscopic cholecystectomy without increasing adverse effects, supporting its efficacy as a postoperative analgesic technique.

[Table/Fig-1]: Comparative summary of studies evaluating the quadratus lumborum block for postoperative analgesia in abdominal and pelvic surgeries [8,9,10,12].

CONCLUSION(S)

Ultrasound-guided PQLB is an effective form of pain management in patients who have had abdominal surgeries. This group of patients achieved adequate pain control with PQLB and experienced low pain scores postoperatively, as well as extending the time needed before rescue analgesia was administered. PQLB led to decreased opioid consumption and stable haemodynamics during and after surgery. In addition, there were no adverse events associated with supporting its safe use as an adjunct to multimodal analgesia for patients undergoing abdominal surgery, thereby improving recovery times and comfort.

REFERENCES

[1] Bhatia A, Buvanendran A. Anaesthesia and postoperative pain control-Multimodal anaesthesia protocol. J Spine Surg. 2019;5(S2):S160-S165.
[2] Benyamin R, Trescot AM, Datta S, Buenaventura R, Adlaka R, Sehgal N, et al. Opioid complications and side-effects. Pain Physician. 2008;11(2):S105-S120.
[3] Martin MT, Mariano ER, Valdes-Vilches LF, et al. Analgesia for upper abdominal surgery: A scoping review of the current fascial plane block techniques. J Clin Med. 2025;14(24):8632.
[4] Rytel H, Rashid B, Kaczmarski P, Alvarez SL, Elkassabany N. Quadratus lumborum block: The new gold standard in abdominal analgesia? Cureus. 2025;17(7):e88501.
[5] Ueshima H, Otake H, Lin JA. Ultrasound-guided quadratus lumborum block: An updated review of anatomy and techniques. Biomed Res Int. 2017;2017:2752876.
[6] Fernandes H dos S, Azevedo AS, Ferreira TC, Santos SA, Rocha-Filho JA. Ultrasound-guided peripheral abdominal wall blocks. Clinics. 2021;76:e2170.
[7] Tsai HC, Yoshida T, Chuang TY, Yang SF, Chang CC, Yao HY, et al. Transversus abdominis plane block: An updated review of anatomy and techniques. Biomed Res Int. 2017:2017:8284363. Doi: 10.1155/2017/8284363.
[8] Manupipatpong K, Ghimire A, Tram NK, Wood R, Tobias JD, Veneziano G. Quadratus lumborum blockade for postoperative analgesia in infants and children following colorectal surgery. J Clin Med Res. 2023;15(2):84-89.
[9] Parihar A, Ashraf S, Benazir K, Rafiq W. Ultrasound guided quadratus lumborum block and transversus abdominis plane block for postoperative analgesia after lower segment caesarean section under spinal anaesthesia: A prospective observational study. Indian J Clin Anaesth. 2021;8(1):79-85.
[10] Dai J, Li S, Weng Q, Long J, Wu D. Opioid-free anaesthesia with ultrasound-guided quadratus lumborum block in the supine position for lower abdominal or pelvic surgery: A randomized controlled trial. Sci Rep. 2024;14(1):4652.
[11] Chekol WB, Melesse DY, Denu ZA, Tawuye HY. Evidence-based thoracic epidural nerve block: A systematic review. Int J Surg Open. 2020;24:151-55.
[12] Ökmen K, Metin Ökmen B, Topal S. Ultrasound-guided posterior quadratus lumborum block for postoperative pain after laparoscopic cholecystectomy: A randomized controlled double blind study. J Clin Anaesth. 2018;49:112-17.

PARTICULARS OF CONTRIBUTORS:
1. Junior Resident, Department of Anaesthesia, Jawaharlal Nehru Medical College, Datta Meghe Institute of Higher Education and Research, Wardha, Maharashtra, India.
2. Professor, Department of Anaesthesia, Jawaharlal Nehru Medical College, Datta Meghe Institute of Higher Education and Research, Wardha, Maharashtra, India.
3. Senior Resident, Department of Anaesthesia, Jawaharlal Nehru Medical College, Datta Meghe Institute of Higher Education and Research, Wardha, Maharashtra, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Ajinkya Akulwar,
Junior Resident, Department of Anaesthesia, Jawaharlal Nehru Medical College, Datta Meghe Institute of Higher Education and Research, Wardha, Maharashtra, India.
E-mail: ajinkya.akulwar@gmail.com

PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Apr 04, 2026
- Manual Googling: Jun 12, 2026
- iThenticate Software: Jun 15, 2026 (4%)

ETYMOLOGY: Author Origin

EMENDATIONS: 6

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was informed consent obtained from the subjects involved in the study? Yes
- For any images presented appropriate consent has been obtained from the subjects. Yes

Date of Submission: **Mar 11, 2026**
Date of Peer Review: **Apr 30, 2026**
Date of Acceptance: **Jun 18, 2026**
Date of Publishing: **Oct 01, 2026**