e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(2); 806-809

Original Research Article

Facial Plane Block in Abdominal Surgery

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Received: 12-12-2025 / Revised: 11-01-2026 / Accepted: 14-02-2026
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Conflict of interest: Nil

Abstract:

Background: Fascial plane blocks have emerged as an integral component of multimodal analgesia in abdominal surgery, offering effective perioperative pain control while minimizing opioid requirements. These ultrasound-guided regional anesthesia techniques involve the deposition of local anesthetic within specific fascial planes to achieve blockade of thoracoabdominal nerves supplying the abdominal wall. Commonly used blocks include the transversus abdominis plane (TAP) block, rectus sheath block, quadratus lumborum block, and erector spinae plane block. By providing targeted somatic analgesia, fascial plane blocks improve postoperative pain scores, facilitate early ambulation, and enhance patient satisfaction. Their favorable safety profile, ease of performance, and applicability across a wide range of open and laparoscopic abdominal procedures have contributed to their increasing adoption. These abstract highlights the role of fascial plane blocks as a valuable, opioid-sparing analgesic strategy in contemporary abdominal surgery.

Conclusion: Fascial plane blocks provide effective and reliable postoperative analgesia in patients undergoing abdominal surgery. Their use is associated with reduced pain scores, prolonged duration of analgesia, decreased opioid consumption, and high patient satisfaction.

Keywords: Fascial plane block, Abdominal surgery, regional anesthesia, Multimodal analgesia, Ultrasound guidance, Opioid-sparing analgesia.

DOI: 10.25258/ijcpr.18.2.133

Introduction

Effective postoperative pain management is a cornerstone of enhanced recovery after abdominal surgery. Inadequately controlled pain is associated with delayed ambulation, impaired respiratory function, prolonged hospital stays, and increased morbidity. Traditionally, systemic opioids and neuraxial techniques such as epidural analgesia have been the mainstay of perioperative analgesia. However, opioid-related adverse effects and contraindications to neuraxial blocks have prompted the search for safer and more targeted analgesic strategies. Fascial plane blocks have gained prominence in recent years as part of multimodal analgesia for abdominal surgery. These regional anesthesia techniques involve ultrasound-guided injection of local anesthetic into anatomically defined fascial planes, allowing spread along tissue planes to block multiple thoracoabdominal nerves. Commonly employed blocks include the transversus abdominis plane (TAP) block, rectus sheath block, quadratus lumborum block, and erector spinae plane block, each providing varying degrees of somatic and, in some cases, visceral analgesia.

The increasing availability of ultrasound technology has enhanced the accuracy, safety, and reproducibility of fascial plane blocks, making them accessible to anesthesiologists with varying levels of expertise. Their opioid-sparing effect, favorable safety profile, and compatibility with enhanced recovery after surgery (ERAS) protocols have contributed to their widespread adoption in both open and minimally invasive abdominal procedures.

This introduction aims to outline the anatomical basis, clinical relevance, and growing role of fascial plane blocks in optimizing perioperative analgesia for patients undergoing abdominal surgery.

Objective

The objective of this article is to evaluate the role of fascial plane blocks in abdominal surgery with respect to their anatomical basis, techniques, and clinical efficacy. It aims to assess their effectiveness in providing perioperative analgesia, reducing opioid consumption, improving postoperative recovery, and enhancing patient outcomes, while highlighting their safety profile and relevance within

multimodal and enhanced recovery after surgery (ERAS) protocols.

Materials and Methods

This prospective study was conducted on a total of 52 patients undergoing elective abdominal surgery under general anesthesia. At Government Medical College and Hospital Bettiah, West Champaran. Study duration is One year. After obtaining institutional ethical committee approval and written informed consent, adult patients aged 18–65 years with American Society of Anesthesiologists (ASA) physical status I–II were enrolled. Patients with coagulopathy, infection at the injection site, allergy to local anesthetics, chronic opioid use, or refusal to participate were excluded from the study.

All patients received standardized general anesthesia. At the end of surgery, an ultrasound-guided fascial plane block appropriate to the surgical incision (transversus abdominis plane block or rectus sheath block) was performed using a high-frequency linear probe. A predetermined volume of local anesthetic was deposited in the respective fascial plane under real-time ultrasound visualization. Postoperative pain was assessed using the Visual Analog Scale (VAS) at predetermined intervals (2, 4, 6, 12, and 24 hours). Rescue analgesia was administered when VAS ≥4 and total opioid consumption in the first 24 hours was recorded. Hemodynamic parameters, block-related complications, and patient satisfaction scores were also documented.

The primary outcome was postoperative pain score and opioid requirement within the first 24 hours. Secondary outcomes included time to first rescue analgesia, incidence of adverse effects, and overall patient satisfaction.

Results

All 52 patients completed the study successfully. Demographic characteristics, type and duration of surgery, and intraoperative anesthetic requirements were comparable among patients. Ultrasound-guided fascial plane blocks were performed successfully in all cases without technical difficulty. Postoperative pain scores assessed using the Visual Analog Scale (VAS) were significantly reduced in the early postoperative period. Mean VAS scores remained ≤3 at rest during the first 12 hours and ≤4 at 24 hours postoperatively. The time to first request for rescue analgesia was prolonged, with the majority of patients requiring supplemental analgesia only after 6–8 hours.

Total opioid consumption within the first 24 hours was markedly reduced, reflecting the opioid-sparing effect of fascial plane blocks. Hemodynamic parameters remained stable throughout the postoperative period. No block-related complications such as local anesthetic toxicity, hematoma, or infection were observed. Overall patient satisfaction scores were high, and early ambulation was achieved in most patients. The use of fascial plane blocks contributed to effective postoperative analgesia and enhanced recovery following abdominal

Table 1: Demographic Profile of Patients (n = 52)

Variable	Value
Age (years, mean ± SD)	42.6 ± 11.3
Gender (M/F)	30 / 22
Weight (kg, mean ± SD)	64.8 ± 9.5
ASA Physical Status (I / II)	28 / 24
Type of Surgery (Open / Laparoscopic)	31 / 21

Table 2: Postoperative Pain Scores (VAS)

Time Interval	Mean VAS Score (Mean ± SD)
2 hours	2.1 ± 0.6
4 hours	2.3 ± 0.7
6 hours	2.6 ± 0.8
12 hours	3.1 ± 0.9
24 hours	3.8 ± 1.0

Table 3: Analgesic Requirement and Outcomes

Parameter	Result
Time to first rescue analgesia (hours)	7.4 ± 1.6
Total opioid consumption (24 h, mg morphine equivalent)	8.6 ± 2.4
Patients requiring rescue analgesia (%)	34 (65%)
Postoperative nausea and vomiting	6 (11.5%)
Block-related complications	Nil
Patient satisfaction (Good/Excellent)	48 (92%)

Table 4: Hemodynamic Parameters (Mean ± SD)

Time Interval	Heart Rate (bpm)	Mean Arterial Pressure (mmHg)
Baseline	78 ± 9	92 ± 8
2 hours	76 ± 8	90 ± 7
6 hours	74 ± 7	88 ± 6
12 hours	75 ± 8	89 ± 7
24 hours	77 ± 9	91 ± 8

Discussion

Effective postoperative analgesia is essential for optimizing recovery following abdominal surgery. The present study demonstrates that ultrasound-guided fascial plane blocks provide effective and sustained postoperative pain relief, with reduced opioid consumption and high patient satisfaction. These findings support the growing role of fascial plane blocks as an important component of multimodal analgesia in abdominal surgery. In this study, patients who received fascial plane blocks exhibited low postoperative VAS scores, particularly during the early postoperative period. The prolonged time to first rescue analgesia indicates adequate duration of analgesia, which can be attributed to the spread of local anesthetic along the fascial planes, resulting in blockade of multiple thoracoabdominal nerves. This is consistent with previous studies that have reported superior somatic analgesia with transversus abdominis plane and rectus sheath blocks for abdominal procedures. A significant reduction in opioid requirement was observed in the first 24 hours postoperatively. Opioid-sparing analgesia is particularly beneficial in minimizing opioid-related adverse effects such as postoperative nausea and vomiting, sedation, and respiratory depression. The low incidence of postoperative nausea and vomiting noted in the present study further reinforces the advantages of incorporating fascial plane blocks into perioperative pain management protocols.

The use of ultrasound guidance contributed to the high success rate and absence of block-related complications in this study. Real-time visualization of anatomical structures improves accuracy, reduces the risk of vascular puncture and local anesthetic systemic toxicity, and enhances the safety profile of these techniques. Furthermore, the relative technical simplicity of fascial plane blocks allows their use even in patients where neuraxial techniques are contraindicated. Early ambulation and high patient satisfaction observed in this study align well with enhanced recovery after surgery (ERAS) principles. By providing effective analgesia without significant motor blockade, fascial plane blocks facilitate early mobilization and functional recovery.Despite these encouraging findings, the study has certain limitations. The absence of a control group and the relatively small sample size may limit the generalizability of the results. Additionally, only short-term postoperative outcomes were assessed. Future randomized controlled trials with larger sample sizes and comparison with other analgesic modalities are warranted to further define the optimal role of fascial plane blocks in abdominal surgery. significantly improve postoperative pain control and recovery in patients undergoing abdominal surgery.

Conclusion

Fascial plane blocks provide effective and reliable postoperative analgesia in patients undergoing abdominal surgery. Their use is associated with reduced pain scores, prolonged duration of analgesia, decreased opioid consumption, and high patient satisfaction. With the advantages of ultrasound guidance, ease of performance, and a favorable safety profile, fascial plane blocks represent a valuable component of multimodal analgesia and enhanced recovery after surgery protocols. Incorporation of these blocks into routine anesthetic practice can significantly improve postoperative outcomes in abdominal surgical patients.

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