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EVALUATE THE EFFECTS OF POST OPERATIVE EPIDURAL ANALGESIA ON PATIENT OUTCOMES

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Keywords

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Abstract

Background: *Effective post-operative pain management is vital for recovery under the ERAS protocol. Inadequate pain control delays mobility, prolongs hospital stay, increases complications, and lowers patient satisfaction. Epidural analgesia offers targeted pain relief with benefits over systemic opioids, including faster mobilization, quicker bowel recovery, and reduced opioid use, though it requires skilled administration due to potential risks.*

Methodology: *This prospective comparative cohort study included 150 patients undergoing elective major abdominal or lower-limb surgery over six months. Patients were divided into two groups: Group A received epidural analgesia, while Group B received systemic opioid-based analgesia. Pain was measured using the Visual Analog Scale at 6, 12, 24, and 48 hours post-surgery. Other outcomes evaluated included bowel function recovery, ambulation time, hospital stay, complications, and patient satisfaction. Statistical analysis was performed using SPSS, with $p < 0.05$ considered.*

Results: *showed that epidural patients experienced lower pain scores, earlier mobilization, and faster gastrointestinal recovery within 48 hours ($p < 0.01$). They also had fewer pulmonary complications and lower rates of deep vein thrombosis. Patient satisfaction was higher in the epidural group.*

Conclusion: *post-operative epidural analgesia provides superior pain control and better clinical outcomes than systemic opioids, supporting its use in appropriate surgical patients. Further research is recommended to assess cost-effectiveness and long-term benefits.*

INTRODUCTION

Effective postoperative pain management is crucial across surgical specialties to enhance recovery reduce complications and improve patient satisfaction. Epidural analgesia (EA) and other regional techniques can lower morbidity and perioperative stress, though debate continues regarding regional versus general anesthesia. Variability in study designs, analgesic regimens, and catheter placement complicates interpretation of trial outcomes.{Ackroyd, 2020 #105}

Historically, EA has reduced cardiovascular complications and VAS pain scores, but 28–32% of patients still report inadequate analgesia. Newer approaches, such as transversus abdominis plane blocks (TAPB), including continuous and intermittent administration, provide targeted

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abdominal analgesia with reduced opioid requirements, though single-shot TAPB offers limited duration. (1)

Thoracic surgery poses significant postoperative pain challenges. Opioid-based analgesia, while effective, carries risks such as nausea, respiratory depression, delayed recovery, and potential dependence. Enhanced Recovery After Surgery (ERAS) and ERATS protocols incorporate multimodal analgesia, early mobility, and minimally invasive approaches to shorten hospital stays and reduce opioid use. (2)

Regional techniques remain central in thoracic surgery. Thoracic epidural catheters (TEC), continuous paravertebral catheters (PVC), and single-injection paravertebral blocks (PVB) offer tailored pain control while minimizing systemic opioid use. TEC is considered the gold standard but has risks, whereas paravertebral methods may be safer for minimally invasive procedures like VATS. Evidence-based comparisons of these methods guide analgesic selection. (3)

In gynecologic oncology, epidural analgesia improves postoperative pain, bowel recovery, and reduces systemic opioid need compared to systemic analgesics alone. Risks include hypotension, urinary retention, motor block, infection, and rare neurological complications. Large datasets such as ACS NSQIP enable evaluation of EA's effect on perioperative morbidity in hysterectomy for malignancy. (4)

Spinal surgeries, such as laminectomy, are associated with moderate to severe postoperative pain. Effective pain control prevents delayed mobilization, pulmonary complications, thrombosis, prolonged hospitalization, and poor functional outcomes. Traditionally managed with opioids, multimodal, opioid-sparing regimens—including non-opioid systemic agents, regional techniques, and non-pharmacological strategies—are increasingly used. (5)

Procedure-specific guidelines aim to standardize postoperative pain management and maximize recovery while minimizing side effects. Systematic evaluation of evidence supports safe and effective analgesic strategies tailored to the type of surgery, promoting enhanced patient outcomes. Across specialties, inadequate pain management increases morbidity, prolongs hospital stay, impairs functional recovery, and reduces satisfaction, while multimodal and regional analgesia provide improved pain control and faster recovery. (6)

Continuous monitoring, individualized analgesic plans, and adoption of ERAS principles ensure optimal patient outcomes and safer perioperative care. Emerging evidence supports regional and multimodal approaches as central components of modern postoperative pain management. In summary, effective postoperative analgesia—including epidural, paravertebral, TAPB, and multimodal techniques—is critical for improving recovery, minimizing complications, reducing opioid use, and enhancing overall patient satisfaction across surgical populations. Evidence-based protocols and procedure-specific strategies optimize outcomes in thoracic, gynecologic, abdominal, and spinal surgery. (7)

Material and Methodology

During duration of four months, this cross-sectional study was carried out at the Ghurki Hospital. Lahore and Darul shifa pain management hospital. Using Cochran's formula, a total sample of 86 patients was selected using Open Episoftware with an 80% power and 95% confidence level. Participants were then split equally into two groups of 21. Patients who satisfied the inclusion criteria adults between the ages of 18 and 60 undergoing elective surgical operations under general anesthesia and categorized as ASA physical status I or II were recruited through purposeful sampling.

Individuals with a history of long-term steroid usage, diabetes mellitus, immunosuppressive conditions, peptic ulcer disease, or a known corticosteroid allergy were excluded. In order to guarantee participant rights, confidentiality, anonymity, voluntary involvement, and the right to withdraw at any moment, the Gurki Hospital. Lahore and Darul shifa pain management hospital Lahore granted ethical approval and all institutional regulations were adhered to. After receiving approval from the hospital administration, data were gathered using a standardized questionnaire.

There were no risks or a drawback associated with participation and all information was kept private. Descriptive statistics, frequency distribution, and Chi-square tests were used in the data analysis

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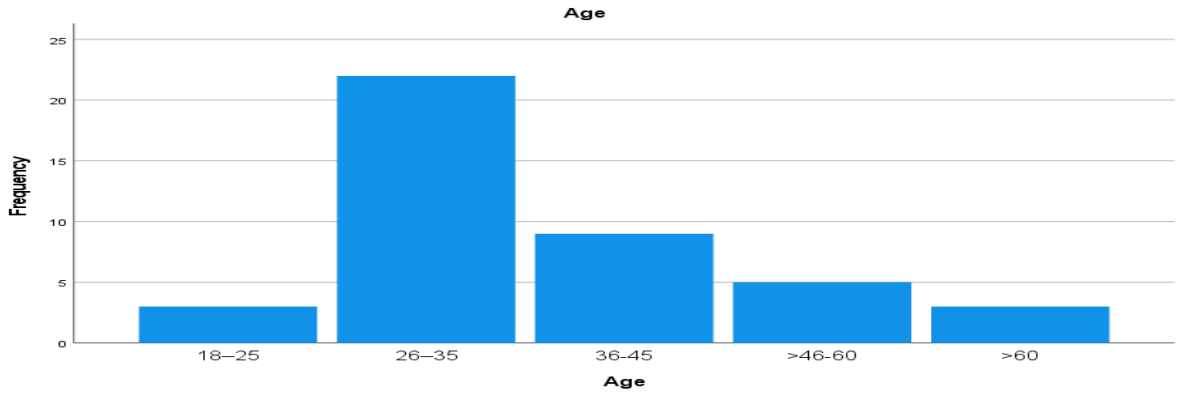
process using SPSS version 26. The findings were displayed in tabular form.

Result

Postoperative pain assessment using the VAS showed that both bupivacaine (0.1–0.12%) and fentanyl (2–5 mcg/ml) provided effective epidural analgesia over 24 hours. At 1 hour, most patients in both groups reported no or mild pain, with no cases of moderate pain. At 6 and 12 hours, a gradual increase in mild and moderate pain was observed; however, pain control remained comparable between the two groups, with mild pain being the most frequent finding. By 24 hours, moderate pain was noted in a higher proportion of patients in both groups, though no significant difference was seen between bupivacaine and fentanyl. Postoperative complications were minimal, with hypotension, vomiting, urinary retention, and pruritus occurring in a small number of patients, while the majority experienced no adverse effects. Overall, epidural analgesia with either bupivacaine or fentanyl was safe, well tolerated, and effective for postoperative pain management



Age This table displays the patient distribution by age group.

Table: Bupivacaine and Fentanyl vs VAS Pain Score After 1 Hour

Drugs	Pain at 1h	Frequency	Percentage
Bupivacaine (0.1–0.12%)	No pain	27	50.0%
Bupivacaine (0.1–0.12%)	Mild	16	37.5%
Bupivacaine (0.1–0.12%)	Moderate	0	12.5%
Fentanyl (2–5 mcg/ml)	No pain	28	45.0%
Fentanyl (2–5 mcg/ml)	Mild	15	42.0%
Fentanyl (2–5 mcg/ml)	Moderate	0	12.5%

Table: Bupivacaine and Fentanyl vs VAS Pain Score After 6 Hours

Drugs	Pain at 1h	Frequency	Percentage
Bupivacaine (0.1–0.12%)	No pain	25	30.9%

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Bupivacaine (0.1–0.12%)	Mild	12	49.4%
Bupivacaine (0.1–0.12%)	Moderate	6	19.7%
Fentanyl (2–5 mcg/ml)	No pain	19	27.2%
Fentanyl (2–5 mcg/ml)	Mild	24	55.6%
Fentanyl (2–5 mcg/ml)	Moderate	0	17.2%

Table 5.6: Bupivacaine and Fentanyl vs VAS Pain Score After 12 Hours

Drugs	Pain at 1h	Frequency	Percentage
Bupivacaine (0.1–0.12%)	No pain	18	22.2%
Bupivacaine (0.1–0.12%)	Mild	17	53.1%
Bupivacaine (0.1–0.12%)	Moderate	8	24.7%
Fentanyl (2–5 mcg/ml)	No pain	15	24.7%
Fentanyl (2–5 mcg/ml)	Mild	20	51.9%
Fentanyl (2–5 mcg/ml)	Moderate	8	23.4%

Table 5.7: Bupivacaine and Fentanyl vs VAS Pain Score After 24 Hours

Drugs	Pain at 1h	Frequency	Percentage
Bupivacaine (0.1–0.12%)	No pain	10	14.8%
Bupivacaine (0.1–0.12%)	Mild	25	46.9%
Bupivacaine (0.1–0.12%)	Moderate	8	38.3%
Fentanyl (2–5 mcg/ml)	No pain	18	17.3%
Fentanyl (2–5 mcg/ml)	Mild	13	45.7%
Fentanyl (2–5 mcg/ml)	Moderate	12	37.0%

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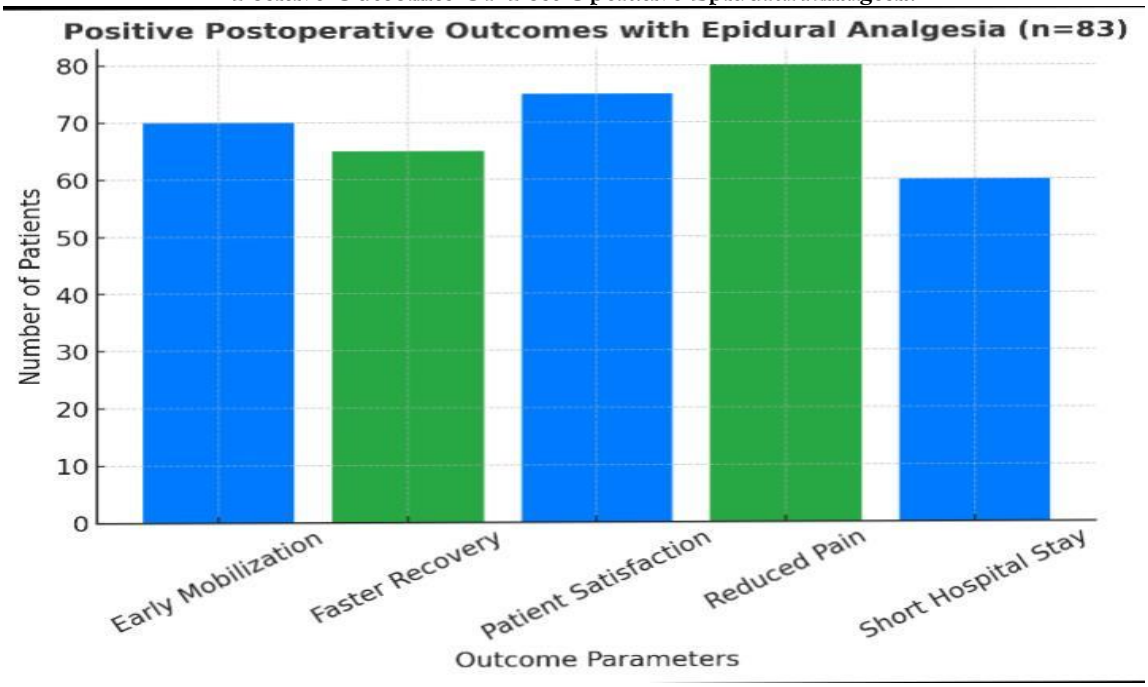
Table: Postoperative Findings

PARAMETER	YES (N)	NO (N)
HYPOTENSION	10	76
VOMITING	17	69
URINARY RETENTION	4	82
PRURITUS	7	79

Positive Outcomes Of Post-Operative Epidural Analgesia



DISCUSSION

This study compared the intraoperative analgesic efficacy of fentanyl and epidural bupivacaine and evaluated the postoperative results. The findings demonstrated that although both drugs successfully controlled pain in the first postoperative phase, their analgesic duration and side effect profiles varied. One hour after surgery, both groups mostly experienced mild discomfort, which might be a sign that the epidural injection's potent analgesic effects were beginning. But as time went on, differences emerged. (3)

After six and twelve hours, those in the bupivacaine group experienced more moderate-to-severe pain than those in the fentanyl group, suggesting a relatively shorter duration of optimal analgesia.

Fentanyl sustained better analgesia over the intermediate postoperative period, which is consistent with other studies demonstrating that opioid-based epidural regimens prolong analgesic effects. But are linked to systemic side effects. (8)

Many patients reported moderate to severe discomfort, and most medications lost their efficacy within a day. This work adds to the discussion of multimodal or continuous infusion techniques in the literature by highlighting the disadvantages of single-agent regimens for long-term pain treatment.

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Although they were often moderate, discomfort, vomiting, and hypertension were the most common surgical side effects. Sepsis and post-Dural Puncture Headache (PDPH) were rare severe adverse effects. These findings are in line with recent studies showing that epidural analgesia is generally safe, despite a few manageable adverse effects (Liu & Wu, 2007). Importantly, most patients had adequate pain relief and minimal long-term morbidity, suggesting that overall patient outcomes were favorable. (9)

The results align with the broader discourse about the role of perioperative epidural anesthesia. It is clear that it reduces postoperative pain and may also improve digestive, cardiovascular, and asthmatic issues, but it is difficult to make generalizations because different studies use different methodology (drug selection, dose, catheter position, and duration).

(Pöpping and others, 2008) Our findings demonstrate that these variables significantly impact safety and effectiveness, especially when choosing between opioids and local anesthetics. (10)

A higher percentage of participants in the Bupivacaine group experienced moderate-to-severe pain than those in the Fentanyl group, according to the painkiller profile at 6 and 12 hours. This suggests that bupivacaine's analgesia lasted somewhat shorter, even if fentanyl maintained superior pain management across the intermediate period. Previous research indicates that opioid-based epidural regimens frequently provide analgesic efficacy that lasts longer than local anesthetics; however, there is a greater chance of opioid-related side effects. By proving this effect in a controlled surgical population, the current study contributes to the body of evidence showing that fentanyl offers stronger intermediate analgesia at the expense of a higher risk of side effects, such as nausea and itching. (7)

Importantly, most patients had sufficient pain relief and minimal long-term morbidity despite these side effects, suggesting a favorable overall patient outcome. This supports the conclusion that the benefits of epidural analgesia outweigh its drawbacks when appropriately monitored and managed. In general, these results contribute to the ongoing conversation on how painkillers and intraoperative regional anesthetic might lower surgical morbidity and mortality. (5)

Despite compelling evidence that epidural analgesia reduces perioperative pathophysiological stress responses and may lessen cardiovascular, gastrointestinal, and lung complications. Although different tests have different methods, it is difficult to make generalizations. The kind of drug utilized (local anesthetics vs opioids or combinations), the catheter position (lumbar versus thoracic), and the duration of distribution (single-shot versus continuous infusion) all have a significant influence on the outcomes. This intricacy is reflected in the current trial, which indicated that both fentanyl and bupievacaine were effective but had distinct effectiveness profiles and that neither medication provided the best long-term pain relief on its own. (6)

CONCLUSION

This study shows that fentanyl provides superior analgesia during the intermediate postoperative period (6–12 hours), while tramadol and epidural bupivacaine are more effective in the early phase. During this interval, fewer patients receiving fentanyl experienced moderate-to-severe pain, indicating a longer-lasting analgesic effect. In contrast, the efficacy of bupivacaine declined earlier, leading to more breakthrough pain. By 24 hours postoperatively, analgesic effects in both groups had significantly reduced, necessitating additional pain control. This highlights the limitation of single-agent epidural regimens in providing sustained analgesia. Multimodal approaches or continuous epidural infusions may improve pain control during recovery. Overall outcomes were favorable, with serious adverse events being rare despite mild side effects.

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