

Effect of Dexamethasone as an Adjunct to Ultrasound Guided Erector Spinae Plane Block on Postoperative Status Following Lumbar Fixation Surgery Under General Anaesthesia

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ABSTRACT

Background: Lumbar fixation surgery is commonly performed for spinal instability, fractures, and deformities. However, postoperative pain remains a major challenge, often resulting in increased opioid consumption and delayed recovery. Erector spinae plane block (ESPB) provides effective analgesia for spinal surgery, and the addition of dexamethasone may prolong its analgesic effect and reduce opioid requirements. This study assessed the impact of dexamethasone as an adjunct to ultrasound-guided ESPB on postoperative status following lumbar fixation surgery under general anaesthesia. **Methods & Materials:** This quasi-experimental study included 60 adult patients undergoing lumbar fixation surgery who were allocated into two groups. Group P received 20 mL of 0.25% bupivacaine with placebo, while Group D received 20 mL of 0.25% bupivacaine with dexamethasone for ESPB. Postoperative outcomes included pain intensity, time to first rescue analgesia, total opioid consumption, haemodynamic parameters, and Quality of Recovery-15 (QoR-15) scores. **Results:** Baseline demographic and clinical characteristics were comparable between the groups. Group D showed significantly lower heart rates and Numerical Rating Scale pain scores at the 12th and 14th postoperative hours ($p < 0.05$). The mean time to first opioid requirement was significantly longer, and total opioid consumption within 24 hours was significantly lower in Group D than in Group P ($p < 0.05$). QoR-15 scores were similar at 24 hours but significantly higher in Group D at 72 hours ($p < 0.05$). **Conclusion:** Dexamethasone as an adjunct to ESPB improved postoperative analgesia, reduced opioid requirements, prolonged time to first rescue analgesia, and

enhanced recovery following lumbar fixation surgery under general anaesthesia.

Keywords: Dexamethasone, Erector Spinae Plane Block, Lumbar Fixation Surgery, Postoperative Pain, Opioid Consumption, Quality of Recovery.

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INTRODUCTION

Lumbar fixation surgeries are among the most prevalent surgeries and are associated with a severe level of pain^[1]. This pain is caused by extensive surgical dissection of the ligaments, bones and subcutaneous tissues. Severe pain is associated with delayed recovery, haemodynamic instability, prolonged immobilisation and delayed discharge from the hospital after surgery.

General anaesthesia is used for lumbar fixation surgeries due to a variety of factors, including greater patient compliance, its ability to enable long surgeries, and the capacity for secure airway establishment in the prone position. However, increased analgesic drugs are required to control postoperative pain after general anaesthesia^[2].

Techniques to control postoperative pain include epidural analgesia, non-steroidal anti-inflammatory drugs, local wound infiltration, and opioid administration as a

part of multimodal analgesia. Opioids are the primary modality for postoperative analgesia and are often required in substantial amounts after lumbar fixation surgery. However, opioid-based analgesic techniques are associated with complications such as nausea, vomiting, constipation, respiratory depression, sedation and cognitive dysfunction. These complications delay postoperative recovery and increase the length of hospital stay. Thus, improved postoperative status depends on adequate analgesia with decreased opioid administration^[3]. One emerging technique, the erector spinae plane block (ESPB), shows promising effects in addressing this challenge^[4]. Initially introduced by Forero et al., ESPB involves the injection of local anaesthetic into the plane between the deep fascia of the erector spinae muscles and the vertebral transverse process^[5]. It is recognised for its simplicity, safety and efficacy in providing postoperative analgesia across

various surgical procedures including lumbar fixation surgery. ESPB offers enduring analgesia with reduced opioid consumption. It targets both the ventral and dorsal rami of the spinal nerves^[6]. That can effectively reduce incisional pain and potentially preventing visceral autonomic pain, promoting improved postoperative comfort and early mobilisation.

The integration of ultrasound guidance enhances the precision and safety of ESPB administration. Real-time visualisation of needle tip placement using ultrasonography ensures accurate deposition of local anaesthetic, minimising the risk of complications. This technique with simplified sonoanatomy reduces the risk of puncturing vital structures and enhances the safety profile of ESPB.

In recent years, the use of dexamethasone as an adjunct to local anaesthetics has gained attention due to its ability to prolong analgesia and reduce inflammation. Dexamethasone, a

corticosteroid, is known for its anti-inflammatory properties, which can enhance the effects of local anaesthetics when used in nerve blocks. By adding dexamethasone to ESPB, the duration of pain relief may be extended, which may help in reducing the overall requirement for opioids in the postoperative period. Additionally, dexamethasone has been shown to reduce inflammation at the site of surgery, further aiding in pain control and promoting a quicker recovery. Its use as an adjunct to ESPB may improve the overall postoperative status by providing more effective pain management and reducing opioid consumption. This combination can potentially lead to a faster recovery, improved patient comfort and shorter hospital stays.

Quality of recovery-15 (QoR-15) score is an important tool to measure the early postoperative health status of patients [7]. The QoR-15 score is internationally recognised as a validated means of assessing patients' quality of recovery after surgery. It is a patient-reported outcome questionnaire that measures the quality of recovery after surgery and anaesthesia [8]. The QoR-15 provides a valid, extensive and efficient evaluation of postoperative recovery [7].

It can be stated that, while opioid-centric analgesia carries notable risks, ESPB presents a hopeful substitute, offering prolonged pain relief with decreased reliance on opioids and their associated complications. Combined with dexamethasone as an adjunct, ESPB holds greater potential in patient recovery status by providing adequate pain management, reducing opioid consumption, improving haemodynamic stability and decreasing the length of hospital stay. Given the scarcity of data on dexamethasone as an adjunct to ESPB in lumbar surgery, this study seeks to provide evidence on its ability to prolong analgesia, reduce opioid requirements, and enhance postoperative recovery in lumbar fixation surgery. Therefore, the purpose of this study was to evaluate the effect of ultrasound guided erector spinae plane block with dexamethasone as an adjunct on postoperative status in lumbar fixation surgery under general anaesthesia.

METHODS & MATERIALS

This quasi-experimental study was conducted in the Orthopaedic Operation Theatre under the Department of Anaesthesia, Analgesia and Intensive Care Medicine, Bangladesh Medical University (BMU), Dhaka, Bangladesh, from October 2024 to September 2025. A total of 60 adult patients aged 18–65 years, with American Society of Anesthesiologists (ASA) physical status I–II, scheduled for 2–3 level lumbar fixation surgery under general anaesthesia, were enrolled by purposive sampling. Patients with infection at the injection site, severe coagulopathy, opioid abuse, allergy to study drugs, or body mass index ≥ 40 kg/m² were excluded. Participants were allocated into two groups by alternative allocation. Following induction of general anaesthesia and placement in the prone position, ultrasound-guided bilateral erector spinae plane block (ESPB) was performed at the L3 level. Group P received 20 mL of 0.25% bupivacaine with 1 mL normal saline on each side, while Group D received 20 mL of 0.25% bupivacaine with 1 mL dexamethasone (5 mg/mL) on each side. The patients were blinded to group allocation, and study solutions were prepared in identical syringes.

Anaesthesia was standardized for all patients. Postoperatively, all patients received intravenous paracetamol and ketorolac for multimodal analgesia. Rescue analgesia with intravenous pethidine (1 mg/kg) was administered when the Numerical Rating Scale (NRS) pain score was ≥ 4 .

The primary outcomes were postoperative pain intensity measured by NRS over 24 hours, time to first rescue opioid requirement, and total opioid consumption within 24 hours. Secondary outcomes included postoperative haemodynamic parameters (heart rate, systolic blood pressure, and mean arterial pressure) and Quality of Recovery-15 (QoR-15) scores at 24 and 72 hours. Data were analysed using SPSS version 26.0. A p-value < 0.05 was considered statistically significant.

RESULTS

This study was conducted at the Department of Anaesthesia, Analgesia and Intensive Care Medicine, Bangladesh

Medical University, in the orthopaedic surgery operation theatre. A total of 60 patients were enrolled in this quasi-experimental study. Patients were selected based on the inclusion and exclusion criteria. They were allocated into two groups, each with 30 patients, using a purposive sampling technique. ESPB was administered, and one group received dexamethasone, while the other group received a placebo. One patient from each group was excluded due to block failure, leaving 29 patients in each group for analysis. Postoperatively, haemodynamic parameters (heart rate, systolic blood pressure and mean arterial pressure), pain scores, first opioid consumption time, total opioid requirements and Quality of Recovery-15 (QoR-15) score were assessed. The patients were compared with each other in terms of age, gender, American Society of Anaesthesiologist class, Body Mass Index, and comorbidities. The patients were also compared in terms of haemodynamic parameters, including baseline and postoperative HR, SBP, and MAP. Postoperative pain score was assessed by Numerical Rating Scale score. Time to first opioid requirements and total opioid was measured postoperatively. After 24 and 72 hours of surgery, the quality of recovery was assessed by the QoR-15 scale. They are described below:

The demographic and clinical characteristics of patients in both groups are presented in Table I. The mean age of patients was comparable between Group P (49.03 ± 9.7 years) and Group D (48.27 ± 13.3 years), with no significant difference ($p = 0.806$). The distribution of American Society of Anaesthesiologist (ASA) physical status was identical in both groups, with 79.31% classified as ASA I and 20.69% as ASA II ($p = 1.0$). Mean Body Mass Index values were also similar between the groups (23.48 ± 2.4 in Group P vs. 23.21 ± 2.9 in Group D, $p = 0.701$). Regarding comorbidities, hypertension was present in 6.89% of patients in Group P and 10.34% in Group D ($p = 0.654$), while diabetes mellitus was observed in 16.0% of Group P and 11.53% of Group D ($p = 0.705$). None of these differences reached statistical significance.

Table I
Comparison of demographic and clinical characteristics of the patients between two groups.

Characteristics		Group P (n=29)	Group D (n=29)	p-value
Age (years)		49.03 $\pm$ 9.7	48.27 $\pm$ 13.3	0.806
Gender	Male	17 (58.62%)	15 (51.72%)	0.723
	Female	12 (41.38%)	14 (48.27%)	0.694
ASA class	ASA I	23 (79.31%)	23 (79.31%)	1.000
	ASA II	6 (20.69%)	6 (20.69%)	1.000
BMI		23.48 $\pm$ 2.4	23.21 $\pm$ 2.9	0.701
Co-morbidity	Hypertension	2 (6.89%)	3 (10.34%)	0.654
	DM	4 (16.00%)	3 (11.53%)	0.705

Gender, ASA class and comorbidities were expressed as percentage (%). Age and BMI were expressed in Mean±SD.p-value was determined by student's t-test for quatitative data and chi-square test for qualitative data. Group P = ESPB with placebo; Group D = ESPB with dexamethasone. p-value <.05 is significant. ASA= American Society of

Anaesthesiologist. BMI=Body Mass Index. DM= Diabetes Mellitus

Baseline haemodynamic parameters were comparable between the two groups (*Table II*). The mean heart rate was 78.37 ± 7.1 beats per minute in Group P and 77.58 ± 7.2 beats per minute in Group D, with no significant difference (p = 0.675).

Similarly, the mean systolic blood pressure was 120.6 ± 7.6 mmHg in Group P and 120.9 ± 7.2 mmHg in Group D (p = 0.888). The mean arterial pressure was also similar, being 90.0 ± 5.5 mmHg in Group P and 89.4 ± 4.8 mmHg in Group D (p = 0.705).

Table II
Comparison of preoperative haemodynamic data between the groups.

Characteristic (Baseline Mean)	Group P n=29	Group D n=29	p-value
Heart Rate (beats/min)	78.37 (±7.1)	77.58 (±7.2)	0.675
Systolic Blood Pressure (mmHg)	120.6 (±7.6)	120.9 (±7.2)	0.888
Mean Arterial Pressure (mmHg)	90.0 (±5.5)	89.4 (±4.8)	0.705

Values are expressed as Mean ± SD. p-value was determined by Student's t-test. Group P = ESPB with placebo; Group D = ESPB with dexamethasone. p-value <.05 is significant.

Postoperative pain scores assessed by the Numerical Rating Scale (NRS) at different time points are presented in *Table III*. At the 12th hour, Group P reported a higher mean NRS score (3.7 ± 2.0) compared with

Group D (2.8 ± 0.74), and this difference was statistically significant (p = 0.038). Similarly, at the 14th hour, mean NRS was significantly higher in Group P (5.2 ± 2.2) than in Group D (4.1 ± 1.4) (p = 0.045). At

other time points, no statistically significant differences were noted between the two groups (p > 0.05).

Table III
Comparison of postoperative Numerical Rating Scale score of the patients between the groups.

Time point	Group P n=29	Group D n=29	p-value
1st hour	0.665±0.66	0.551±0.68	0.581
2nd hour	0.896±0.617	0.689±0.712	0.242
4th hour	1.75±0.68	1.55±0.63	0.239
6th hour	2.8±1.2	2.5±0.9	0.273
8th hour	3.0±1.1	2.5±0.82	0.070
10th hour	3±1.6	2.8±0.9	0.565
12th hour	3.7±2.0	2.8±0.74	0.038
14th hour	5.2±2.2	4.1±1.4	0.045
16th hour	3.6±2.0	3.0±1.8	0.268
18th hour	2.4±0.68	2.2±0.73	0.203
20th hour	3.3±1.9	2.9±1.1	0.332
22nd hour	2.4±0.685	2.6±0.603	0.161
24th hour	3.1±1.0	2.8±0.35	0.261

Values are expressed as Mean ± SD. p-value was determined by Student's t-test. Group P = ESPB with placebo; Group D = ESPB with dexamethasone. p-value <.05 is significant.

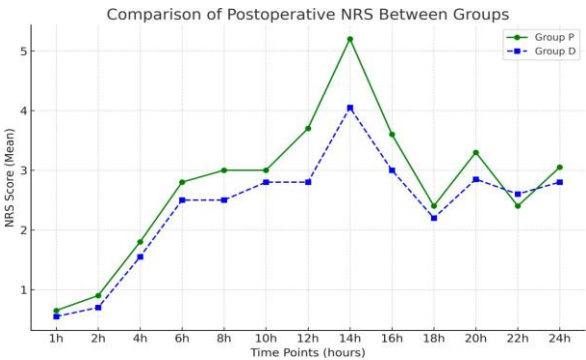


Figure 1 Comparison of Postoperative Numerical Rating Scale (NRS) score of the Patients.

Figure 1 illustrates the postoperative Numerical Rating Scale (NRS) scores of the two groups over 24 hours. Both groups showed a progressive increase in pain scores during the early postoperative

period, with peak values observed around the 12th to 14th hour. Group P consistently demonstrated higher NRS scores compared to Group D, with statistically significant differences at the 12th hour (3.7 ± 2.0 vs.

2.8 ± 0.74) and the 14th hour (5.2 ± 2.2 vs. 4.1 ± 1.4). At other time points, differences were not statistically significant.

The comparison of time to first opioid use between the two groups is shown in Table IV. The mean time to first opioid

administration was significantly longer in Group D (695.17 ± 196 minutes) compared to Group P (527.58 ± 142.86 minutes),

with the difference reaching statistical significance ($p < 0.05$).

Table IV

Comparison of time to first opioid use between the groups.

Time point	Group P(Minutes) n=29	Group D (Minutes) n=29	p-value
Time to first opioid use	527.58 ± 142.86	695.17 ± 196	<0.05

Values are expressed as Mean $\pm$ SD. p-value was determined by Student's t-test. Group P = ESPB with placebo; Group D = ESPB with dexamethasone. p-value $< .05$ is significant.

The postoperative mean heart rate at various time intervals is summarized in Table V. At the 12th hour, Group P demonstrated a higher mean heart rate (85.20 ± 11.8 beats/min) compared to

Group D (79.58 ± 7.8 beats/min), which was statistically significant ($p = 0.038$). Similarly, at the 14th hour, Group P showed a significantly elevated mean heart rate (83.58 ± 9.8 beats/min) compared to

Group D (77.1 ± 10.3 beats/min) ($p = 0.002$). At other time points, no significant differences were noted between the two groups ($p > 0.05$).

Table V

Comparison of postoperative mean heart rate of patients between the groups.

Time Point	Group P n=29	Group D n=29	p-value
1st hour	78.89 ± 6.1	78.86 ± 7.1	0.577
2nd hour	76.27 ± 5.9	77.31 ± 7.8	0.596
4th hour	77.68 ± 5.2	77.24 ± 5.5	0.754
6th hour	79.72 ± 7.1	78.93 ± 6.8	0.433
8th hour	80.68 ± 7.9	78.48 ± 5.8	0.234
10th hour	77.24 ± 5.8	80.13 ± 7.7	0.114
12th hour	85.20 ± 11.8	79.58 ± 7.78	0.038
14th hour	83.58 ± 9.8	77.1 ± 10.3	0.002
16th hour	78.93 ± 6.8	80.0 ± 7.3	0.519
18th hour	77.58 ± 6.5	77.37 ± 5.4	0.897
20th hour	77.82 ± 5.3	77.1 ± 5.7	0.622
22nd hour	79.0 ± 7.1	77.37 ± 7	0.389
24th hour	76.2 ± 6.8	77.13 ± 7.7	0.387

Values are expressed as Mean $\pm$ SD. p-value was determined by Student's t-test. Group P = ESPB with placebo; Group D = ESPB with dexamethasone. p-value $< .05$ is significant.

The Quality of Recovery (QoR-15) scores at 24 and 72 hours postoperatively are presented in Table VI. At 24 hours, the mean QoR-15 score was slightly higher in Group D (112.24 ± 10.56) compared to

Group P (108.52 ± 9.06), although the difference was not statistically significant ($p = 0.155$). At 72 hours, Group D demonstrated a significantly higher QoR-15 score (119.68 ± 5.04) compared with

Group P (113.24 ± 10.68), and this difference was statistically significant ($p = 0.005$).

Table VI

Comparison of Quality of Recovery-15 Score at 24 hours and 72 hours among patients between the groups.

Time point	Group P n=29	Group D n=29	p-value
QoR-15 Score at 24 hours	108.52 ± 9.06	112.24 ± 10.56	0.155
QoR-15 Score at 72 hours	113.24 ± 10.68	119.68 ± 5.04	0.005

Values are expressed as Mean $\pm$ SD. p-value was determined by Student's t-test. Group P = ESPB with placebo; Group D = ESPB with dexamethasone. p-value $< .05$ is significant.

DISCUSSION

Pain after lumbar fixation surgeries is caused by extensive surgical dissection of the subcutaneous tissues, ligaments and bones, which is associated with delayed recovery, haemodynamic instability, and prolonged immobilisation. It also results in delayed discharge from the hospital, which increases hospital costs [9].

Several techniques can be employed to control postoperative pain, including epidural analgesia, non-steroidal anti-inflammatory drugs, local wound infiltration, and opioid administration as

part of multimodal analgesia. Opioids have various disadvantages, and regional techniques can mitigate those effects. The erector spinae plane block (ESPB) has been recognized for its simplicity, safety and effectiveness in providing postoperative analgesia, reducing opioid consumption, improving comfort and enabling early mobilization [10].

Dexamethasone, a corticosteroid with anti-inflammatory properties, enhances the effects of local anaesthetics when used in nerve blocks. It extends the duration of pain relief, reduces postoperative opioid

requirements, and promotes quicker recovery. Its use as an adjunct to ESPB may potentially lead to a faster recovery, improve patient comfort and shorter hospital stays.

In this study, the effect of ultrasound guided erector spinae plane block with dexamethasone as an adjunct on postoperative status in lumbar fixation surgery under general anaesthesia was assessed.

There was no statistical difference observed between the two groups regarding demographic characteristics (age, Body

Mass Index, comorbidities and American Society of Anaesthesiologist classification). The findings were consistent with the result of the study conducted by Şehirlioğlu et al., [11]. Like this study, Tulgar et al., also reported no differences between patient groups regarding age, Body Mass Index, American Society of Anaesthesiologist class and comorbidities [12].

In this current study baseline mean HR, SBP and MAP was recorded and compared between two groups and there was no statistical significance found as $p > 0.05$. There was no difference on baseline parameters in both groups. Verma et al., found that comparison of baseline HR, MAP was comparable in both groups without any statistical significance [13]. In the present study, postoperative HR, SBP and MAP were observed at thirteen points after surgery. Parameters were recorded from 1st hour to 24th hour with 2 hours gap. Postoperative HR were assessed between two groups and findings shown that there was no statistical difference between two groups in HR changes except 12th and 14th hours. At 12th hour, difference of p-value between Group P and Group D was 0.038 which is statistically significant. Similarly, at 14th hour mean HR in Group P was 83.58 ± 9.8 and 77.1 ± 10.3 in Group D with p value 0.002 which was statistically significant. The significant HR difference at 12 and 14 hours was likely due to prolonged analgesic effect of dexamethasone, resulting in reduced pain and sympathetic response in Group D. Rest of the time these differences were found to be statistically not significant as $p > 0.05$). Postoperative haemodynamic results in Thakur et al., study were similar to these results [14]. They observed that HR showed significant difference at 2h and at 0,2,4,12,18,24 h postoperative respectively. Findings were similar to the study of Verma et al., who found that comparison of pulse rate and mean arterial pressure were comparable in both groups without any statistical significance [13].

Postoperative SBP and MAP were also observed and compared between two groups at thirteen points of time and found no statistical difference in two groups. In a case report conducted by Forero et al., demonstrated that no statistical changes were observed regarding SBP, DBP or MAP when using dexamethasone as adjunct in ESPB [5]. There was no statistically significant difference observed among the two groups in terms of heart rate and mean arterial blood pressure [15]. Singla et al., found that no significant difference between groups in the postoperative haemodynamic parameters in their study to assess analgesic efficacy of dexamethasone and dexmedetomidine when added as

adjuvant [16]. In another meta-analysis conducted by Huang et al., reported that no significant differences were found when using dexamethasone as an adjunct in ESPB, which is in agreement with this current study [10].

Pain after lumbar fixation surgeries was measured using the Numerical Rating Scale (NRS) score. In this study NRS scores were documented at 13 time points from the 1st hour to the 24th hour. At most intervals, no statistically significant difference was observed between the two groups when using dexamethasone as an adjunct to ESPB compared with ESPB with bupivacaine alone. However, at the 12th and 14th hours, NRS scores were significantly lower in the dexamethasone group, indicating superior analgesia at these time points. The reason may be due to the ability of dexamethasone to increase the duration of nerve block [12]. But Fusco et al., reported better pain control when dexamethasone was used as an adjunct with LA for bilateral ESPB, which was not similar to this study [17]. Additionally, Gao et al., conducted a similar study, demonstrating significant statistical differences in VAS scores between the two groups [18]. They compared dexamethasone and dexmedetomidine as adjuvants in ESPB. Altıparmak et al., conducted a study using ESPB and TAP block and found no statistical differences between the two groups regarding postoperative pain score observed by the NRS scale [19].

In this study, the opioid requirement was assessed in two groups, at first the requirements of rescue analgesics time were measured and then total opioid requirements was also measured and compared in two groups. The time to first rescue analgesic request was 527.58 ± 142.86 minutes in Group P and 695.17 ± 196 minutes in Group D with p value < 0.05 which was statistically significant. These results demonstrated that group of ESPB with dexamethasone as adjunct has better pain control than ESPB group with bupivacaine alone. Total amount of opioid required in Group P was 150.06 ± 68.7 mg and 80.4 ± 24.3 mg in Group D with p value < 0.05 which was statistically significant. Group of ESPB with dexamethasone as adjunct had less opioid required after surgery. These results explained that dexamethasone as adjunct works better in patient's pain control. In a study conducted by Nousheen et al., reported that the mean total duration of analgesia in Group D was 445 ± 42.3 minutes and in Group P was 668 ± 39.8 minutes [20]. Mean difference in total duration of analgesia was 223 ± 55.13 minutes (95% CI 207, 239 Range 120, 360 minutes) ($p < 0.001$) which is statistically significant. Authors concluded that USG guided Bilateral ESPB with dexamethasone

as an adjunct to bupivacaine 0.25% 20 mL was found to significantly prolong the duration of analgesia with significant reduction in analgesic dose requirement postoperatively, that is an agreement to this current study. In a meta-analysis Leong et al., showed that the erector spinae plane block is more effective than systemic analgesia for controlling acute pain following breast surgery [21]. Performing erector spinae plane blocks pre-operatively led to a significant decrease in pain scores at all time-points and was associated with a corresponding decrease in 24 h opioid consumption.

In another study, Farahata et al., reported that patients in dexamethasone as adjunct demonstrated prolonged postoperative analgesia compared to those without dexamethasone group [15]. In the first 24 hours, dexamethasone group had a significantly lower postoperative VAS score, lower cumulative pethidine doses and longer duration until the first request for analgesia than group without dexamethasone. Fusco et al., utilized 20 mL of 0.5% levobupivacaine and 4 mg dexamethasone for bilateral ultrasonography ESB through laparoscopic abdominal surgery and found that adding dexamethasone delayed the first need for analgesia, but up to no postoperative opioid was necessary [17]. Furthermore, Singariya et al., proved, in a study of 90 patients who underwent unilateral umbilical hernia and got quadratus lumborum block using levobupivacaine with dexamethasone in one of two study groups [22]. This combination resulted in lengthening of the time to first rescue analgesia, which is consistent with the result of this current study. Dexamethasone is a long-acting glucocorticoid with anti-inflammatory, analgesic with immunosuppressive and antiemetic properties. Use of dexamethasone as an adjunct to local anaesthetic is known to prolong duration of nerve block, decrease the incidence of postoperative nausea and vomiting, which can have greater impact on patient comforts [23]. Dexamethasone probably acts through decreasing perineural edema, decreasing systemic absorption of LA by inducing vasoconstriction, reducing neural discharge and suppressing pain transmission [24].

The QoR-15 (Quality of Recovery-15) score is a tool used to assess a patient's recovery after surgery and anaesthesia. It's a standardized way to measure how well patients are recovering, focusing on physical, emotional, and functional aspects. The QoR-15 is a widely used 15-item version of the QoR-40 score, and it is scored from 0 to 150, with higher scores indicating a better quality of recovery [7]. In this present study, QoR-15 score was assessed after 24 hours and 72 hours. At 24 hours, the QoR-15 score was 108.52 ± 9.06

in Group P and 112.24 ± 10.56 in Group D with a p value of 0.155, which was not statistically significant. However, at 72 hours, the QoR-15 score was 113.24 ± 10.68 in Group P and 119.68 ± 5.04 in Group D, with a p value of 0.005, which was statistically significant. This indicates that the addition of dexamethasone to ESPB resulted in a better quality of recovery at 72 hours, although no difference was observed at 24 hours. Farahata et al., concluded that using dexamethasone as an adjunct to in ESPB in patients undergoing total hip arthroplasty allowed better effective postoperative analgesia through delaying the first analgesic request, lowering the total rescue analgesic consumption, and diminishing pain VAS score without any reported haemodynamic or postoperative complications [15]. Zhang et al., demonstrated that there was a significant difference in QoR-15 score at 24 h after surgery, reaching the minimum clinical difference, that means patients in dexamethasone group have better quality of recovery at postoperative 24 h, which is of great clinical significance [25]. This may be due to a reduction in pain, nausea and vomiting, resulting in a faster and better recovery. Result is consistent with this current study. Dexamethasone may act as an additive to local anaesthetics and may be useful by attenuating the release of inflammatory mediators, reducing ectopic neuronal discharge, and inhibiting potassium channel-mediated discharge of nociceptive C-fibers [18]. Also, Farahata et al., showed that using dexamethasone as an adjunct of ESPB with Levobupivacaine, provided effective postoperative analgesia through reducing pain Visual Analog Scale score without any reported haemodynamics or postoperative complications and overall improving quality of recovery [15]. The present study found that using dexamethasone in ESPB led to better postoperative outcomes than ESPB with bupivacaine alone, reduced opioid consumption, reduced duration of rescue analgesic requirements and improved quality of recovery. In summary, this study found that dexamethasone as adjunct with ESPB has shown better postoperative status in lumbar fixation surgery under GA.

LIMITATIONS

This study may have selection bias due to lack of randomization. The study was conducted at a single tertiary care center with a relatively small sample size, which may limit the generalizability of the findings. Postoperative outcomes were assessed only up to 72 hours; therefore, the long-term effects of dexamethasone as an adjunct to erector spinae plane block on pain control and functional recovery could not be evaluated. In addition, patient

satisfaction and potential block-related complications were not assessed separately.

CONCLUSION

Based on the study finding it can be concluded that use of dexamethasone as an adjunct to erector spinae plane block demonstrated a superior effect on postoperative status in terms of pain intensity, time to first rescue analgesia, opioid consumption, heart rate and quality of recovery compared to erector spinae plane block with bupivacaine alone following lumbar fixation surgery under general anaesthesia.

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CONFLICTS OF INTEREST

There are no conflicts of interest.

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