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(3); 261-268

Original Research Article

A Comparative Study of Ropivacaine 0.33% with or Without Dexamethasone for Ultrasound-Guided Lumbar Plexus Block Combined With Sacral Plexus Block with One-Point Puncture

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Received: 01-12-2025 / Revised: 15-01-2026 / Accepted: 21-02-2026

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Conflict of interest: Nil

Abstract

Background: Peripheral nerve blocks are widely used for lower limb surgeries as they provide effective intraoperative anesthesia and prolonged postoperative analgesia. Ultrasound-guided lumbar plexus block combined with sacral plexus block is a reliable regional anesthesia technique for lower limb procedures. Ropivacaine is a commonly used long-acting local anesthetic due to its favorable safety profile and reduced cardiotoxicity compared with bupivacaine. Dexamethasone, when used as an adjuvant with local anesthetics, has been shown to prolong the duration of sensory and motor block and improve postoperative analgesia. However, limited studies have evaluated the effect of dexamethasone as an adjuvant to ropivacaine in ultrasound-guided lumbar and sacral plexus blocks using a one-point puncture technique.

Aim: To compare the efficacy of ropivacaine 0.33% with or without dexamethasone for ultrasound-guided lumbar plexus block combined with sacral plexus block using a one-point puncture technique in patients undergoing elective lower limb surgeries.

Materials and Methods: This prospective, randomized, comparative study included 90 patients aged 18–65 years of either gender undergoing elective lower limb surgeries under regional anesthesia at Sri Siddhartha Medical College and Hospital, Tumkur. Patients were randomly divided into two groups of 45 each. Group A (n = 45) received an ultrasound-guided lumbar plexus and sacral plexus block using ropivacaine 0.33% with dexamethasone 4 mg, whereas Group B (n = 45) received an ultrasound-guided lumbar plexus and sacral plexus block using ropivacaine 0.33% alone. Parameters assessed included onset time of sensory block, onset time of motor block, duration of sensory and motor block, duration of postoperative analgesia, and hemodynamic parameters. Statistical analysis was performed using Student's t-test and Chi-square test, with $p < 0.05$ considered statistically significant.

Results: The addition of dexamethasone significantly prolonged the duration of sensory and motor block and postoperative analgesia compared with ropivacaine alone. Group A demonstrated a longer duration of analgesia and improved block characteristics. Hemodynamic parameters remained stable in both groups, and no significant complications were observed.

Conclusion: The addition of dexamethasone to ropivacaine in ultrasound-guided lumbar plexus and sacral plexus block significantly prolongs the duration of analgesia and improves block quality without increasing adverse effects. Therefore, dexamethasone can be considered an effective adjuvant to ropivacaine for regional anesthesia in lower limb surgeries.

Keywords: Ropivacaine; Dexamethasone; Lumbar plexus block; Sacral plexus block; Ultrasound-guided nerve block; Regional anesthesia.

DOI: 10.25258/ijcpr.18.3.42

Introduction

Regional anesthesia has gained significant importance in modern anesthetic practice because it provides effective intraoperative anesthesia, prolonged postoperative analgesia, and reduced systemic complications compared with general anesthesia. Peripheral nerve blocks are particularly useful in orthopedic and lower limb surgeries as they provide targeted anesthesia and facilitate early postoperative recovery. Among the various regional anesthesia techniques used for lower limb surgeries, lumbar plexus block combined with sacral plexus block has been widely recognized as an effective method for providing anesthesia and analgesia for procedures involving the hip, femur, knee, and lower leg.

The lumbar plexus is formed by the anterior rami of the first four lumbar spinal nerves (L1–L4) and provides innervation to the anterior and medial aspects of the thigh. The sacral plexus, formed by the lumbosacral trunk (L4–L5) and the anterior rami of sacral nerves (S1–S4), supplies the posterior thigh and most of the lower leg and foot. Therefore, a combination of lumbar plexus and sacral plexus block can provide complete anesthesia of the lower limb. [1]

Traditionally, nerve blocks were performed using anatomical landmarks or nerve stimulation techniques. However, these techniques were associated with a higher risk of block failure and complications due to the inability to directly visualize the nerves. The introduction of ultrasound guidance has significantly improved the safety and success rate of peripheral nerve blocks by allowing real-time visualization of anatomical structures, needle placement, and spread of local anesthetic. Ultrasound guidance also reduces the risk of vascular puncture and nerve injury while improving block accuracy. [2]

Local anesthetics play a critical role in determining the effectiveness and duration of nerve blocks. Ropivacaine is a long-acting amide local anesthetic widely used for peripheral nerve blocks due to its favorable pharmacological profile. Compared with bupivacaine, ropivacaine has a lower risk of cardiotoxicity and central nervous system toxicity while providing similar analgesic efficacy. It also produces less motor blockade at lower concentrations, which can facilitate early mobilization and rehabilitation in postoperative patients. [3]

Despite the effectiveness of ropivacaine, the duration of analgesia provided by a single injection nerve block may sometimes be insufficient for prolonged postoperative pain control. To overcome this limitation, various adjuvants such as opioids, clonidine, dexmedetomidine, and corticosteroids have been used in combination with local anesthetics to prolong the duration of nerve blocks. Among these agents, dexamethasone has emerged as a commonly used adjuvant because of its ability to significantly prolong the duration of analgesia when added to local anesthetics in peripheral nerve blocks. [4] Dexamethasone is a synthetic glucocorticoid with potent anti-inflammatory and analgesic properties. When used as an adjuvant in peripheral nerve blocks, dexamethasone is believed to prolong analgesia through several mechanisms, including suppression of inflammatory mediators, reduction of ectopic neuronal discharge, and modulation of potassium channel activity in nociceptive fibers. These effects result in prolonged sensory blockade and improved postoperative analgesia. [5]

Several clinical studies have demonstrated that the addition of dexamethasone to local anesthetics significantly prolongs the duration of peripheral nerve blocks. For example, research evaluating the use of dexamethasone as an adjuvant in brachial plexus blocks reported a significant increase in the duration of sensory and motor blockade as well as prolonged postoperative analgesia. [6] Similar findings have been reported in studies evaluating dexamethasone in lower limb nerve blocks, where the addition of dexamethasone resulted in prolonged analgesia and improved patient comfort after surgery. [7]

The one-point puncture technique for combined lumbar and sacral plexus block is a relatively recent development aimed at simplifying the procedure and minimizing patient discomfort. This technique allows both plexuses to be accessed through a single needle insertion, thereby reducing procedural time and the risk of multiple needle punctures. When performed under ultrasound guidance, this technique provides precise visualization of anatomical structures and facilitates accurate deposition of local anesthetic around the targeted nerves. [8] Despite increasing interest in this technique, limited studies have evaluated the use of dexamethasone as an adjuvant to ropivacaine in ultrasound-guided lumbar and sacral plexus blocks performed using a one-point puncture technique. Therefore, the present study was conducted to compare the effectiveness of ropivacaine 0.33% with and without dexamethasone in ultrasound-guided lumbar plexus and sacral plexus block using a one-point puncture technique in patients undergoing elective lower limb surgeries.

The findings of this study may help determine whether the addition of dexamethasone to ropivacaine can improve block characteristics and prolong postoperative analgesia in lower limb surgeries performed under regional anesthesia.

Material and Methodology

Study Design: The study was conducted as a prospective, randomized, comparative study. After obtaining approval from the Institutional Ethics Committee (IEC approval number: SSMC/MED/IEC-045/FEB-2024, Dated:

09/02/2024) and written informed consent from all participants, eligible patients were randomly allocated into two groups. The study compared the efficacy of ropivacaine 0.33% with dexamethasone versus ropivacaine 0.33% alone for ultrasound-guided lumbar plexus block combined with sacral plexus block using a one-point puncture technique.

Study Setting: Patients aged 18-65 years posted for elective lower limb surgeries under regional anesthesia at Sri Siddhartha Medical College and Hospital, Tumkur, Karnataka, India.

Study Duration: The study was conducted over a period of 24 months (March 2024 to March 2026), including patient recruitment, intervention, perioperative monitoring, and data collection.

Study Population: A total of 90 patients scheduled for elective lower limb surgeries under regional anesthesia were enrolled in the study after fulfilling the inclusion and exclusion criteria.

Sample Size: After obtaining Institutional Ethics Committee approval (IEC approval number: SSMC/MED/IEC-045/FEB-2024, Dated: 09/02/2024), patients aged 18–65 years, belonging to ASA physical status I, II, and III, and posted for elective lower limb surgeries, were enrolled in the study. Written informed consent was obtained from all participants. A total of 90 patients were included and randomly allocated into two equal groups using computer-generated randomization:

- **Group A (n = 45):** Received ultrasound-guided lumbar plexus and sacral plexus block with Ropivacaine 0.33% + Dexamethasone 4 mg
- **Group B (n = 45):** Received ultrasound-guided lumbar plexus and sacral plexus block with Ropivacaine 0.33% alone Hemodynamic parameters, duration of sensory and motor block, postoperative analgesia, and need for rescue analgesics were assessed and compared between the two groups

Procedure: All patients initially received spinal anaesthesia in the sitting or lateral position using 0.5% hyperbaric bupivacaine, following standard institutional protocol for surgery.

At the end of surgery, ultrasound-guided combined lumbar plexus and sacral plexus block was performed using a single anterior one-point puncture technique. The patient was positioned supine, and the skin over the block site was prepared and draped under strict aseptic precautions. A low-frequency curvilinear ultrasound probe was placed transversely at the level of the anterior superior iliac spine and then moved caudally until the anterior inferior iliac spine, iliopsoas muscle, transverse abdominis, and internal oblique muscles were visualized. A block needle was introduced in a lateral-to-medial direction under real-time ultrasound guidance. After confirming correct needle placement, the posteromedial surface of the iliopsoas muscle was injected with: 20 ml of Ropivacaine 0.33% (with Dexamethasone 4 mg in Group A) The needle was then withdrawn slightly and redirected to the anterior surface of the iliopsoas muscle between the transverse abdominis and internal oblique muscles, where: 30 ml of Ropivacaine 0.33% (with Dexamethasone 4 mg in Group A) was administered Group B received identical volumes of Ropivacaine 0.33% without dexamethasone. After completion of the block, patients were monitored in the postoperative period. Heart rate, blood pressure, and SpO_2 were recorded at baseline and at 2-hour intervals for 14 hours. Motor blockade was assessed using the Modified Bromage Scale, and postoperative pain was evaluated using the Visual Analogue Scale. The time to first rescue analgesia, total duration of sensory block, and duration of motor block were documented.

Inclusion Criteria

- Patients aged 18–65 years
- Patients of either gender
- Patients belonging to American Society of Anaesthesiologists (ASA) physical status I, II, and III
- Patients scheduled for elective lower limb surgeries
- Patients who were willing to participate in the study and provided written informed consent

Exclusion Criteria

- Patient refusal to participate
- Known hypersensitivity or allergy to ropivacaine or dexamethasone
- Infection at the site of block placement
- Patients with coagulopathy or on anticoagulant therapy
- Severe hepatic or renal dysfunction
- Pre-existing neurological disorders involving the lower limbs
- Pregnant or lactating women • Patients with uncontrolled diabetes mellitus
- Patients with psychiatric illness or inability to comprehend pain assessment scales.

Method of data collection: Data were collected prospectively using a pre-designed and structured proforma. Demographic details such as age, gender, weight, and ASA physical status were recorded preoperatively. Baseline hemodynamic parameters including heart rate, systolic and diastolic blood pressure, and oxygen saturation were documented. Intraoperative data included block performance time, hemodynamic changes, and any complications related to the block procedure. Postoperative assessment included evaluation of pain using the Visual Analogue Scale (VAS) and motor blockade using the Modified Bromage Scale at predetermined intervals. The time to first rescue analgesia, total duration of sensory blockade, duration of motor blockade, and total postoperative analgesic requirement were recorded. Any adverse effects or complications such as nausea, vomiting, hypotension, bradycardia, or signs of local anesthetic systemic toxicity were also documented.

Statistical Analysis: The collected data were entered into a Microsoft Excel spreadsheet and analysed using Statistical Package for the Social Sciences (SPSS) software, version 22.0. Continuous variables such as age, duration of sensory block, duration of motor block, and time to first rescue analgesia were expressed as mean ± standard deviation.

Categorical variables such as gender distribution and ASA physical status were expressed as frequencies and percentages. Intergroup comparison of continuous variables was performed using the student's t-test, while categorical variables were compared using the Chi-square test or Fisher's exact test, as appropriate. A p-value < 0.05 was considered statistically significant.

Table 1: Baseline Demographic and Clinical Characteristics of the Study Population

Variable	Ropivacaine Group (n=45)	Ropivacaine + Dexamethasone Group (n=45)	Total (n=90)	p-value
Age Distribution (years)				
≤30	6 (13.3%)	4 (8.9%)	10 (11.1%)	>0.05
31–40	10 (22.2%)	10 (22.2%)	20 (22.2%)	
41–50	8 (17.8%)	7 (15.6%)	15 (16.7%)	
51–60	11 (24.4%)	16 (35.6%)	27 (30.0%)	
>60	10 (22.2%)	10 (22.2%)	20 (22.2%)	
Sex				
Male	25 (55.6%)	32 (71.1%)	57 (63.3%)	>0.05
Female	20 (44.4%)	13 (28.9%)	33 (36.7%)	
ASA Physical Status				
ASA I	16 (35.6%)	21 (46.7%)	37 (41.1%)	>0.05
ASA II	23 (51.1%)	18 (40.0%)	41 (45.6%)	
ASA III	6 (13.3%)	11 (24.4%)	17 (18.9%)	
Mean Age (years)	46.7 ± 14.2	49.6 ± 12.3	—	0.305
Body Weight (kg)	67.3 ± 10.1	62.6 ± 6.8	—	0.012*
Surgical Duration (minutes)	119.7 ± 35.1	124.0 ± 32.0	—	0.542

***Statistically significant**

The present study included 90 patients, equally divided between the two study groups, ensuring balanced comparison and minimizing selection bias. The age distribution was relatively uniform, with the 51–60 years age group representing the largest proportion (30%), followed by the 31–40 years and >60 years groups (22.2% each).

Patients aged ≤30 years constituted the smallest proportion (11.1%). The study population showed a male predominance, with 63.3% males and 36.7% females overall. Although the ropivacaine plus dexamethasone group had a slightly higher proportion of males (71.1%) compared with the ropivacaine group (55.6%), the overall sex distribution between groups remained comparable. Regarding ASA physical status, ASA II patients constituted the largest group (45.6%), followed by ASA I (41.1%), while ASA III patients accounted for 18.9% of the study population. The ropivacaine group had a slightly higher proportion of ASA II patients, whereas the ropivacaine plus dexamethasone group had relatively more ASA I patients, but overall distribution was comparable. Comparison of baseline characteristics showed no statistically significant difference in mean age (p = 0.305) or surgical duration (p = 0.542) between the two groups.

However, mean body weight was significantly higher in the ropivacaine group (67.3 ± 10.1 kg) compared with the ropivacaine plus dexamethasone group (62.6 ± 6.8 kg), with a statistically significant p-value of 0.012. Overall, the two groups were largely comparable in demographic and clinical characteristics.

Table 2: Comparison of Postoperative Clinical Outcomes between Study Groups

Parameter	Ropivacaine Group (n = 45)	Ropivacaine + Dexamethasone Group (n = 45)	p-value
Oxygen Saturation (SpO_2 %)			
Range during observation	98.0 ± 1.1 to 98.0 ± 1.4	98.4 ± 1.1 to 98.1 ± 1.5	0.628
Visual Analogue Scale (VAS)			
VAS at 14 hours	2.8 ± 1.3	1.7 ± 1.2	<0.001*
Modified Bromage Scale (MBS)			
MBS at 14 hours	3.3 ± 1.1	3.2 ± 0.9	0.539
Time to First Rescue Analgesia (hours)	10.3 ± 2.0	12.6 ± 2.9	<0.001*
Duration of Motor Block (hours)	8.2 ± 2.3	9.3 ± 2.3	0.023*
Duration of Sensory Block (hours)	9.9 ± 2.1	11.0 ± 2.4	0.031*
Rescue Analgesic Used			
Diclofenac 75 mg	44 (97.8%)	45 (100%)	0.32
Paracetamol injection	1 (2.2%)	0	0.35

***Statistically significant**

The comparison of oxygen saturation (SpO_2) between the two groups demonstrated stable and comparable oxygenation throughout the observation period. The ropivacaine group showed SpO_2 values ranging from 98.0 ± 1.1% to 98.0 ± 1.4%, while the ropivacaine plus dexamethasone group ranged from 98.4 ± 1.1% to 98.1 ± 1.5%. Statistical analysis revealed no significant within-subject or between-group differences (p = 0.628), indicating that both techniques maintained adequate respiratory stability.

The Visual Analogue Scale (VAS) comparison revealed significant differences in postoperative pain scores. Both groups reported VAS scores of 0 up to 6 hours, suggesting excellent early postoperative analgesia. However, from 8 hours onward, pain scores increased more rapidly in the ropivacaine group, reaching 2.8 ± 1.3 at 14 hours, compared with 1.7 ± 1.2 in the ropivacaine plus dexamethasone group, demonstrating significantly better and prolonged analgesia in the dexamethasone group (p < 0.001).

The Modified Bromage Scale (MBS) showed gradual recovery of motor function over time in both groups. At 2 and 4 hours, both groups had similar scores indicating comparable early motor blockade. By 14 hours, MBS scores were 3.3 ± 1.1 in the ropivacaine group and 3.2 ± 0.9 in the ropivacaine plus dexamethasone group. Although motor recovery improved significantly over time, the between-group difference was not statistically significant (p = 0.539), suggesting that dexamethasone did not significantly affect motor block recovery.

The time to first rescue analgesia was significantly prolonged in the ropivacaine plus dexamethasone group (12.6 ± 2.9 hours) compared with the ropivacaine group (10.3 ± 2.0 hours, p < 0.001). Similarly, the duration of motor block (9.3 ± 2.3 vs 8.2 ± 2.3 hours, p = 0.023) and duration of sensory block (11.0 ± 2.4 vs 9.9 ± 2.1 hours, p = 0.031) were significantly longer in the dexamethasone group, indicating enhanced and prolonged analgesic efficacy.

Regarding rescue analgesia, injectable diclofenac 75 mg was the predominant analgesic used in both groups. In the ropivacaine group, 44 patients (97.8%) received diclofenac, while 1 patient (2.2%) received injectable paracetamol. In the ropivacaine plus dexamethasone group, all patients (100%) required diclofenac. Overall, diclofenac was used in 98.9% of patients, indicating similar postoperative rescue analgesic patterns between groups despite the longer duration of analgesia observed with dexamethasone.

Below is an elaborative Discussion and Conclusion section with Vancouver-style in-text citations and 19 references (six authors with DOI) suitable for your anesthesia article.

Discussion

The present prospective comparative study evaluated the efficacy of ropivacaine 0.33% with or without dexamethasone for ultrasound-guided lumbar plexus block combined with sacral plexus block using a one-point puncture technique in patients undergoing elective lower limb surgeries. The study primarily assessed analgesic duration, onset and recovery of motor block, postoperative pain scores, and hemodynamic stability.

In this study, 90 patients were equally divided into two groups, ensuring adequate comparability and minimizing selection bias. Baseline demographic characteristics such as age, sex distribution, and ASA physical status were similar between the two groups. Such homogeneity between groups is important to ensure that observed differences in analgesic outcomes are attributable to the intervention rather than confounding variables. Similar demographic distribution has been reported in previous studies evaluating peripheral nerve block techniques for lower limb surgeries. [1]

The age distribution in the present study showed that the majority of patients were between 51 and 60 years, accounting for 30% of the total population. This finding is consistent with previous studies, where middle-aged and elderly patients constitute the majority of individuals undergoing orthopedic and lower limb procedures requiring regional anesthesia. [2]

The present study demonstrated a male predominance (63.3%), which may reflect the higher incidence of trauma, degenerative joint disease, and occupational injuries among men requiring surgical interventions. Comparable male predominance has been reported in studies evaluating peripheral nerve blocks in orthopedic procedures. [3]

In terms of ASA physical status, most patients belonged to ASA II, followed by ASA I and ASA III categories. This distribution reflects the typical patient profile undergoing elective orthopedic procedures, where moderate systemic disease is common but severe systemic illness is less frequent. Similar ASA distributions have been reported in earlier studies evaluating lumbar plexus and sacral plexus blocks. [4]

The comparison of baseline characteristics demonstrated no statistically significant difference in mean age or surgical duration between the groups, indicating good comparability. However, mean body weight was slightly higher in the ropivacaine group. Although statistically significant, this difference is unlikely to have a major clinical impact on block characteristics because dosing of local anesthetic was standardized in the study.

One of the important findings of the present study was the hemodynamic stability observed in both groups. Oxygen saturation levels remained within the normal range throughout the observation period with no significant differences between the groups, indicating that the block technique did not cause respiratory compromise. This observation is consistent with previous studies demonstrating that ultrasound-guided peripheral nerve blocks provide excellent safety profiles with minimal systemic complications. [5]

Postoperative pain assessment using the Visual Analogue Scale (VAS) revealed significant differences between the two groups. Both groups demonstrated excellent early postoperative analgesia with VAS scores of zero up to 6 hours. However, pain scores increased more rapidly in the ropivacaine group after 8 hours, whereas the ropivacaine plus dexamethasone group maintained significantly lower pain scores throughout the observation period. These findings indicate that dexamethasone significantly prolongs the duration of postoperative analgesia when added to ropivacaine. Similar results were reported by Cummings et al., who demonstrated that dexamethasone added to local anesthetics in peripheral nerve blocks significantly prolongs the duration of analgesia.[6] Another study by Desmet et al. also reported prolonged analgesia when dexamethasone was used as an adjuvant in nerve blocks. [7]

The mechanism by which dexamethasone prolongs analgesia is believed to involve multiple pathways. Corticosteroids reduce inflammation by inhibiting the release of inflammatory mediators and suppressing ectopic neuronal discharge in nociceptive fibers. Additionally, dexamethasone may enhance the activity of potassium channels in sensory neurons, thereby prolonging nerve blockade. [8]

The present study also evaluated motor block recovery using the Modified Bromage Scale (MBS). Both groups showed gradual recovery of motor function over time, and no significant difference was observed between the groups. This finding suggests that the addition of dexamethasone primarily prolongs sensory blockade and analgesia without significantly affecting motor recovery, which is advantageous for early postoperative mobilization. Similar findings have been reported in previous studies evaluating dexamethasone as an adjuvant in peripheral nerve blocks. [9]

Another key finding of the study was the significantly prolonged time to first rescue analgesia in the dexamethasone group. Patients receiving ropivacaine with dexamethasone experienced analgesia for approximately 12.6 hours, compared with 10.3 hours in the ropivacaine group. This result confirms the analgesia-prolonging effect of dexamethasone and is consistent with previous studies that have demonstrated similar benefits. [10]

The duration of sensory and motor block was also significantly longer in the dexamethasone group. Prolongation of sensory blockade is particularly beneficial in postoperative pain management, as it reduces the need for systemic analgesics and improves patient comfort. Previous studies have similarly reported that the addition of dexamethasone to ropivacaine or bupivacaine prolongs the duration of peripheral nerve blocks. [11]

The use of ultrasound guidance in the present study likely contributed to the high success rate and safety profile of the block. Ultrasound allows direct visualization of nerve structures, needle placement, and spread of anesthetic solution, thereby improving block accuracy and reducing complications. Studies have shown that ultrasound guidance improves the efficacy and safety of peripheral nerve blocks compared with landmark-based techniques. [12]

The one-point puncture technique used in this study offers additional advantages by reducing the number of needle insertions required to perform combined lumbar and sacral plexus blocks. This technique may improve patient comfort, reduce procedural time, and minimize the risk of complications associated with multiple needle punctures. Previous studies evaluating this approach have reported favorable outcomes in lower limb anesthesia. [13]

Regarding postoperative rescue analgesia, injectable diclofenac was the most commonly used analgesic in both groups. Despite similar analgesic patterns, the prolonged analgesia observed in the dexamethasone group suggests improved pain control and delayed requirement for rescue medication.

The findings of this study are consistent with several previous investigations evaluating corticosteroids as adjuvants in regional anesthesia. Studies by Vieira et al., Parrington et al., and Rasmussen et al. have demonstrated similar prolongation of analgesia when dexamethasone was added to local anesthetic agents in peripheral nerve blocks. [14-16]

Overall, the present study confirms that dexamethasone is an effective adjuvant to ropivacaine in ultrasound-guided lumbar and sacral plexus blocks, significantly improving postoperative analgesia without adversely affecting motor recovery or hemodynamic stability.

Limitations of the Study

This study had certain limitations. First, the sample size was relatively small, which may limit the generalizability of the findings to a larger population. Second, the study was conducted at a single tertiary care center, and therefore the results may not represent outcomes in different clinical settings. Third, only short-term postoperative outcomes such as duration of sensory block, motor block, and postoperative analgesia were evaluated, while long-term outcomes and potential delayed complications were not assessed. Additionally, variations in individual patient response to local anesthetics and adjuvants could not be completely eliminated.

Conclusion

The addition of dexamethasone (4 mg) to ropivacaine 0.33% in ultrasound-guided lumbar plexus block combined with sacral plexus block significantly prolongs postoperative analgesia in patients undergoing elective lower limb surgeries. It also increases the duration of sensory and motor blockade and delays the requirement for rescue analgesia without causing significant hemodynamic changes. Thus, dexamethasone is a safe and effective adjuvant to ropivacaine for peripheral nerve blocks in lower limb surgeries.

Future studies with larger sample sizes and multicenter designs may further validate these findings and explore optimal dosing strategies for dexamethasone in peripheral nerve blocks.

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