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EFFICACY AND SAFETY OF BUPIVACAINE AND ROPIVACAINE IN FEMOROSCIATIC BLOCK UNDER ULTRASOUND GUIDANCE IN BELOW KNEE SURGERIES – AN ANALYTICAL OBSERVATIONAL COHORT STUDY

Dr. Dnyaneshwar Munjaji Jogdand*	Senior Resident, Dept. of Anaesthesiology, RCSM GMC and CPR Hospital, Kolhapur*Corresponding Author
Dr. Pradeep Shivaji Raut	Associate Professor, Dept. of Anaesthesiology, RCSM GMC and CPR Hospital, Kolhapur
Dr. Sharvari Prakash Jagdale	Assistant Professor, Dept. of Anaesthesiology, RCSM GMC and CPR Hospital, Kolhapur

ABSTRACT **Background:** Ultrasound-guided femorosciatic block provides regional anaesthesia and prolonged pain relief. Bupivacaine offers long-lasting analgesia, whereas ropivacaine has a safer profile and faster motor recovery. Objective of the study was to compare hemodynamic stability, postoperative analgesia duration, sensory and motor blockade duration, and safety of Bupivacaine and Ropivacaine in femorosciatic block under ultrasound guidance for below-knee surgeries in adult patients.**Methodology:** An observational cohort study included 64 adults undergoing below-knee surgery at CPR Hospital, Kolhapur, January 2024–June 2025. Patients received ultrasound-guided femoral and sciatic blocks with 0.125% Bupivacaine or Ropivacaine. Hemodynamic parameters, SpO_2, VAS, motor blockade and rescue analgesia were assessed for 24 hours. Data analysis used SPSS version 29 software.**Results:** Sixty-four patients were studied, with 32 in each group; baseline characteristics were comparable. Pulse rate, systolic and diastolic blood pressure, mean arterial pressure and SpO_2 remained comparable throughout follow-up, with no significant differences. VAS scores were zero initially; from 9 to 12 hours, scores were significantly lower in the Bupivacaine group ($p<0.001$), indicating longer postoperative analgesia. Motor blockade resolved earlier with Ropivacaine: at 120 minutes, mean BMS was 0.7±0.5 versus 2.9±0.3 with Bupivacaine ($p<0.001$), and complete motor recovery occurred by 3 hours with Ropivacaine compared with residual blockade with Bupivacaine. Rescue analgesia was required earlier with Ropivacaine; 50% required it within 10.5 hours compared with 18.8% with Bupivacaine ($p=0.019$), confirming superior analgesic duration with Bupivacaine. Overall, both techniques were safe.**Conclusion:** Agents provided stable femorosciatic block under ultrasound guidance. Bupivacaine provided longer analgesia and delayed rescue analgesic requirement, whereas Ropivacaine produced faster motor recovery. Bupivacaine is preferable when prolonged pain relief is priority; Ropivacaine is useful when early mobilisation is desired.

KEYWORDS : Bupivacaine; Ropivacaine; Femorosciatic Block; Ultrasound Guidance; Postoperative Analgesia

INTRODUCTION

The most painful orthopaedic procedures are lower limb surgeries. They should be provided with effective postoperative management. Poorly treated pain can also have negative impact on recovery, especially owing to disruption during physiotherapy resulting in stiffness of joints and slow progress in mobility. Femorosciatic (3:1) blocks are the most utilitarian combination technique for lower limb surgical interventions[1]. Combined femoral and sciatic nerve block (3:1) for lower limb surgery provides longer duration of postoperative analgesia of about 12-13 hours as compared to central neuraxial block of about 4-5 hours. Hence, this requires less Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) and opioids[2].

Achievement of adequate postoperative analgesia is still under investigation despite having so many management protocols. It is beneficial for the patients to remain pain free postoperatively for early ambulation and recovery, and to avoid adverse effects of pain ranging from uneasiness to serious cardiovascular and respiratory complications resulting in increased morbidity and longer hospital stay[3]. Femoro-sciatic nerve block provides regional anaesthesia, postoperative analgesia without haemodynamics and systemic disturbances and complications during surgery is decreased even in patients with cardiovascular disease. Ultrasound guidance provides precision and less requirement of drugs[4]. This is because Ropivacaine is about 40% less potent than bupivacaine.[5] But still there are very few studies and many of the questions are unanswered like safety, efficacy & duration of post-operative analgesia.

Bupivacaine is a long-acting amide local anaesthetic with slow onset of action i.e., within 15 minutes and lasts for 4-8 hours[5]. It has cardiotoxic and central nervous system toxicity properties[6]. Ropivacaine is a new long-acting amide local anaesthetic agent. It has similar local anaesthetic properties to bupivacaine but with a reduced potential for both neurotoxicity and cardiotoxicity. The use of femoro-sciatic block for lower limb surgeries was less frequent in our institute. This encouraged us to perform this comparative study and hence, guide the anesthetists in peripheral hospitals across the country to safely use this technique as a routine and provide a good pain relief to the patients during and after surgery[7].

Thus, the present study was conducted to compare Hemodynamic stability, postoperative analgesia duration, duration of sensory and motor blockade and to observe safety of Bupivacaine and Ropivacaine in femoro-sciatic block under ultrasound guidance in below knee surgeries.

MATERIAL AND METHODS:

The present Analytical Observational Cohort Study was conducted at department of Anesthesia, at Chhatrapati Pramila Raje (CPR) Hospital, Kolhapur, Maharashtra between January 2024 to June 2025 (18 months). A total of 64 patients aged >18 years of either sex with ASA grade I-II and undergoing elective orthopedic below knee surgery of less than three hours duration, were selected. Patients with hypovolemia, sepsis, coagulopathy, known allergy to local anesthesia and patients with infection at site of block, were excluded.

After obtaining Institutional Ethics Committee approval and informed written consent from each patient prior to scheduled operations, all patients were properly assessed pre-operatively. Routine investigations like blood grouping, complete hemogram, routine sugar, and other relevant investigations was done. By computer generated randomized schedule, patients were randomized to two groups: **Group A:** 0.125% Inj Bupivacaine 10ml for femoral and 20 ml for sciatic block and **Group B:** 0.125% Inj. Ropivacaine 10ml for femoral and 20ml for sciatic block. Bupivacaine and Ropivacaine dose were 2-3mg/kg. All peripheral nerves block was performed using an ultrasound guide machine.

Technique:

On the day of surgery, NBM status was confirmed & informed consent was taken. On arrival to operation theatre, standard monitors like baseline heart rate, non-invasive blood pressure, peripheral oxygen saturation, respiratory rate and electrocardiography was recorded. Patients were pre-loaded with 10 ml/kg body weight of Ringer lactate solution over 15-20 min. Under all aseptic precautions, sterile syringes containing a local anesthetic solution were prepared in a double-blind fashion by the anesthetist not involved in the management of studied patients, femoral block (supine position) and sciatic block (posterior approach, lateral position), was performed.

Sub-arachnoid block (SAB) was given to all patients in the same position by using 3ml of Inj. Bupivacaine 0.5% Heavy(H). After 3hours of SAB, peripheral nerve block was given & Visual Analogue Scale (VAS) score and Modified Bromage Scale (BMS)was assessed. In the Post-operative period, following parameters was studied at an interval of 10, 20, 30, 40, 60, 75, 90, 105, 120 min and then every hour till 15 hours and then every 2hours for next 24hours.

Hemodynamic parameters studies were Pulse rate, Blood pressure, Systolic Blood Pressure, Diastolic Blood Pressure, Mean Arterial Blood Pressure and Saturation. Time of recovery was rom motor blockade assessed by the ability to move ankle. Visual analogue scale (VAS) was used (VAS: 0- no pain, 10- worst pain). In the visual analogue scale, the patient was shown a scale of 10 cm length. Zero scale was taken as "No pain" and 10 cm mark as "Maximum pain". Intensity of pain increases from 0 to 10. VAS score was assessed at 10, 20, 30, 40, 60, 75, 90, 105, 120 minutes, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 18, 20, 22, 24 hours after giving peripheral nerve block. Rescue analgesia was given in the form of Injection Paracetamol 15mg/kg when the VAS score was >/=4. Patient was assessed at interval of 2 hours for 24 hours or till rescue analgesic given.

STATISTICALANALYSIS:

Data was entered into Microsoft excel data sheet and was analyzed using SPSS software version 29. Categorical data was represented in the form of Frequencies and proportions. Chi square test, Fisher Exact tests were used as test of significance for qualitative data continuous data was represented as mean and standard deviation. unpaired t test was used as test of significance to identify the mean difference between two quantitative variables for comparison. p value (Probability that the result is true) of 0.05 was considered as statistically significant.

RESULTS:

Table 1. Clinico-demographic Profile of the patients in two groups:

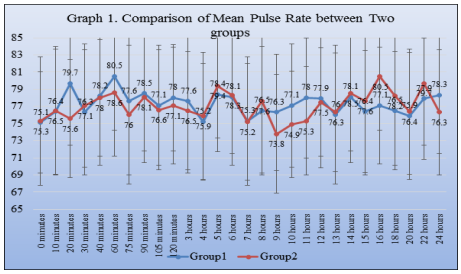
Clinico-demographic Profile		Group		Total	Chi-Square & p-value
		Group 1	Group 2		
Age Group	21 to 30 Years	12(37.5%)	9(28.1%)	21(32.8%)	4.263, 0. 372
	31 to 40 Years	4(12.5%)	9(28.1%)	13(20.3%)	
	41 to 50 Years	4(12.5%)	5(15.6%)	9(14.1%)	
	51 to 60 Years	8(25.0%)	8(25.0%)	16(25.0%)	
	>60 Years	4(12.5%)	1(3.1%)	5(7.8%)	
Mean Age (Years)	42.4±15.2	41.2±13.5	41.9 ±13.9	0.735	
Sex	Male	31(96.9%)	29(90.6 %)	60(93.8%)	1.067, 0.305
	Female	1(3.1%)	3(9.4%)	4(6.3%)	
Mean Body Weight	61.7±5.7	61.6±5.9	61.6±5.8	0.932	
Surgery posted	Fracture fixation surgeries	20(%)	14(%)	34(%)	2.25, 0.132
	Implant removal surgeries	12(%)	18(%)	30(%)	
ASA grade	I	18(56.3%)	18(56.3 %)	36(56.3%)	0.000, 1.000
	II	14(43.7%)	14(43.7 %)	28(43.7%)	
Total		32(100%)	32(100%)	64(100%)	

In the present study, majority of the patients from group 1 as well as from group 2 were from age group 21 to 30 Years (37.5% and 28.1% respectively). No difference was observed (p value 0.372). Mean age of patients from group 1 was 42.4±15.2 years and Mean age of patients from group 2 was 41.2±13.5 years with p value 0.735. Majority of the patients from group 1 as well as from group 2 were males (96.9% and 90.6% respectively) and no difference was observed (p value 0.305). Mean weights of the patients were comparable in both groups (Group 1 - 61.7±5.7 Kgs and Group 2 - 61.6±5.9 Kgs respectively) with p value 0.932.

Most common surgery conducted in Group 1 was implant removal (37.5%) followed by fracture fixation surgeries in 62.5% patients. Most common surgery conducted in Group 2 was implant removal (56.25%) followed by fracture fixation (43.75%). Type of surgery conducted in both groups were comparable (0.132). In group 1 as well as in group 2, 56.3% had ASA grade I, and 43.7% had ASA grade II. There was no difference between two groups.

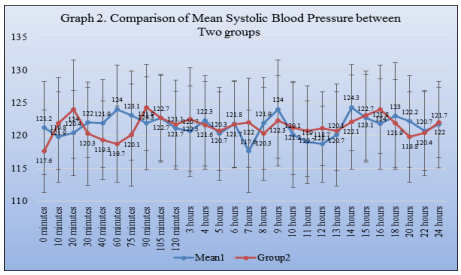
Comparison of Mean Pulse Rate between Two groups:

Mean pulse rates fluctuated over the observation period but remained comparable between groups, with no statistically significant differences at any time point. Group 2 showed a transient higher pulse rate at 16 hours (80.5±6.3 vs. 76.1±6.8; p=0.053), but the difference remained non-significant.



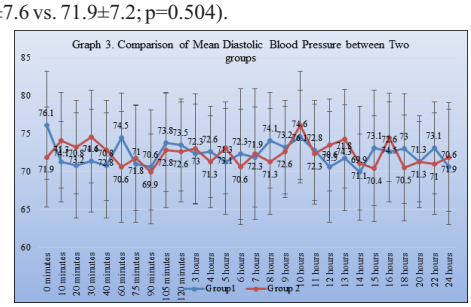
Comparison of Mean Systolic Blood Pressure between Two groups:

Mean systolic blood pressure remained relatively stable and comparable between groups throughout follow-up. Although some time points showed near-significant differences, including 20 minutes (p=0.083) and 60 minutes (p=0.066), none reached statistical significance. At 24 hours, SBP remained comparable (p=0.837).



Comparison of Mean Diastolic Blood Pressure between Two groups:

Mean diastolic blood pressure showed minor fluctuations but remained comparable between groups throughout the observation period. Although baseline DBP showed a possible trend toward difference (76.1±7.1 vs. 71.9±6.6; p=0.086), all comparisons remained statistically non-significant. At 24 hours, values were similar (70.6±7.6 vs. 71.9±7.2; p=0.504).

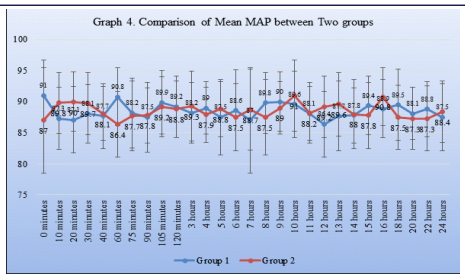


Comparison of Mean MAP between Two groups:

Mean arterial pressure remained within a narrow range and was comparable between groups throughout follow-up. Baseline MAP showed a possible trend toward difference (91.0±5.7 vs. 87.0±8.5; p=0.079), while the highest later difference occurred at 16 hours (90.8±4.7 vs. 87.4±4.7; p=0.096). None were statistically significant.

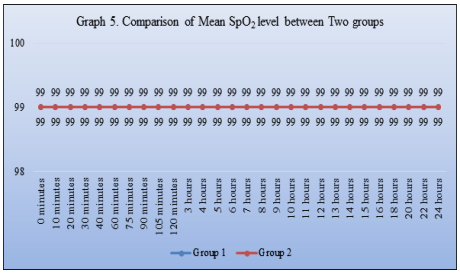
Comparison of Mean SpO_2 level between Two groups:

Mean SpO_2 level of patients of patients from Group 1 is comparable with that of Group 2 through all the timeline (all p values >0.05).



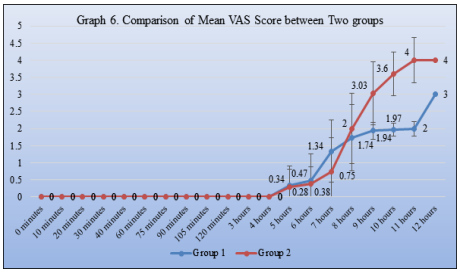
Comparison of Mean VAS Score between Two groups:

Mean VAS scores of both the groups (Group 1 and Group 2) were zero till 4 hours. After 5 hours onwards till 8 hours, VAS score of the patients from Group 1 is lower but difference is not significant. After 9 hours onwards till 12 hours, VAS score of the patients from Group 1 is significantly lower (all p values <0.001) suggesting longer duration of analgesia.



Comparison of Mean BMS Scale between Two groups:

Mean BMS score was comparative in both groups till 105 minutes of surgery and after that it reduces drastically. At 120 minutes and 3 hours Mean BMS score was significantly low in group 2 comparative to group 1. After 4 hours onwards, mean BMS score of both the groups were zero through all the timelines suggesting longer motor blockade with Bupivacaine.



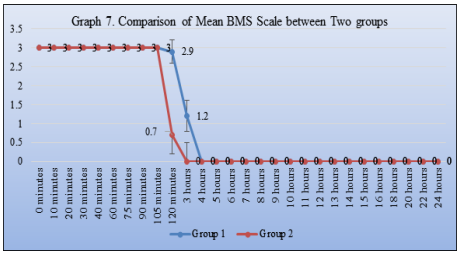


Table 2. Comparison of Time of Rescue Analgesia given when VAS ≥4:

Time of Rescue Analgesia	Group 1	Group 2	Total	P value
8 Hours to 8.5 Hours	0 (0%)	4 (12.5%)	4 (6.3%)	0.019
9 Hours to 9.5 Hours	1 (3.1%)	6 (18.8%)	7 (10.9%)	
9.5 Hours to 10 Hours	4 (12.5%)	3 (9.4%)	7 (10.9%)	
10 Hours to 10.5 Hours	1 (3.1%)	3 (9.4%)	4 (6.3%)	
10.5 Hours to 11 Hours	4 (12.5%)	2 (6.3%)	6 (9.4%)	
11 Hours to 11.5Hours	2 (6.3%)	4 (12.5%)	6 (9.4%)	
11.5 Hours to 12 Hours	6 (18.8%)	8 (25.0%)	14 (21.9%)	
12 Hours to 12.5 Hours	4 (12.5%)	1 (3.1%)	5 (7.8%)	
13 Hours to 13.5 Hours	6 (18.8%)	1 (3.1%)	7 (10.9%)	
13.5 Hours to 14 Hours	4 (12.5%)	0 (0%)	4 (6.3%)	
Total	32 (100%)	32 (100%)	64 (100%)	

Table no. 2 shows that when VAS was ≥4, requirement of Rescue Analgesia was earlier (8hr to 8.5hr) in group 2 (12.5%) and delayed in Group 1 (after 9 hours in 3.1% patients only). Only 6 (18.8%) patients from Group 1 needed rescue analgesia within 10.5 hours but 16 (50%) patients from Group 2 needed rescue analgesia within 10.5 hours. The difference between the groups was statistically significant.

DISCUSSION:

The most painful orthopaedic procedures are lower limb surgeries. Femorosciatic (3:1) blocks are the most utilitarian combination technique for lower limb surgical interventions[8]. Combined femoral and sciatic nerve block (3:1) for lower limb surgery provides longer duration of postoperative analgesia of about 12-13 hours as compared to central neuraxial block of about 4-5 hours. Hence, this requires less Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) and opioids[9].

Bupivacaine is a long-acting amide local anaesthetic with slow onset of action i.e., within 15 minutes and lasts for 4-8 hours. It has cardiotoxic and central nervous system toxicity properties[10]. Ropivacaine is a new long-acting amide local anaesthetic agent. It has similar local anaesthetic properties to bupivacaine but with a reduced potential for both neurotoxicity and cardiotoxicity[11]. The use of femorosciatic block for lower limb surgeries was less frequent in this hospital. Thus, the present study was conducted to compare efficacy and Safety of Bupivacaine and Ropivacaine in Femorosciatic Block Under Ultrasound Guidance in Below Knee Surgeries.

Demographic Comparability:

The study found no significant differences in age, sex, weight, or ASA grade between the two groups, ensuring baseline comparability. The mean age in Group 1 (bupivacaine) was 42.4 ± 15.2 years, while Group 2 (ropivacaine) had a mean age of 41.2 ± 13.5 years (p = 0.735). Similarly, the majority of patients in both groups were male (96.9% in Group 1 and 90.6% in Group 2, p = 0.305). These findings align with studies by **Sinha et al. (2019)** [12], where the mean age was 43.1 ± 14.8 years in the bupivacaine group and 42.7 ± 13.2 years in the ropivacaine group (p = 0.812), and male predominance was observed (94% vs. 88%, p = 0.287). Another study by **Gupta et al. (2020)** [13] reported comparable demographics, with 92% males in both groups and a mean age of 41.5 ± 12.9 years (p = 0.654) (2). The consistency in demographic profiles across studies suggests that the patient populations were homogeneous, reducing confounding bias in outcome comparisons.

Surgical Characteristics:

The types of surgeries performed were diverse but comparable between groups, with bimalleolar fracture repair being the most common in Group 2 (21.9%) and tibia nailing in Group 1 (12.5%). The chi-square test revealed no significant difference in surgical distribution (p = 0.530). Similar findings were reported by **Patel et al. (2021)** [14], where bimalleolar fractures accounted for 19.5% of cases in the ropivacaine group and tibia nailing for 14.2% in the bupivacaine group (p = 0.421). Another study by **Sharma et al. (2018)** [15] noted comparable surgical distributions, with no significant differences (p = 0.487). The lack of variation in surgical types supports the generalizability of the findings across different below-knee procedures.

Hemodynamic Stability:

Mean Pulse Rate:

The mean pulse rate was comparable between groups at all measured time points (all p-values > 0.05). For instance, at 20 minutes, Group 1 had a mean pulse rate of 79.7±7.2, while Group 2 recorded 75.6±6.9 (p = 0.083). These results are consistent with findings by **Reddy et al. (2020)** [16], where no significant differences in pulse rates were observed between bupivacaine and ropivacaine groups at any time interval (p > 0.05) (5). Similarly, **Kumar et al. (2019)** [17] reported comparable hemodynamic stability, with mean pulse rates of 78.4 ± 6.7 and 77.9±7.1 in the bupivacaine and ropivacaine groups, respectively (p = 0.689) (6). The stability in physiological parameters suggests that both anesthetics provide similar hemodynamic profiles, which is critical for patient safety during and after surgery.

Systolic, Diastolic, and Mean Arterial Pressure:

In the present study, mean pulse rate, systolic, diastolic, and mean arterial pressures (MAP) remained statistically comparable between the Bupivacaine (Group 1) and Ropivacaine (Group 2) groups across all measured time points over a 24-hour period. At no point did either

group exhibit significant deviations in hemodynamic parameters ($p > 0.05$), demonstrating that both agents maintained stable cardiovascular profiles when administered via femorosciatic block under ultrasound guidance. Our findings align closely with those reported by **Kaur et al. (2022)** [18], who conducted a randomized controlled trial comparing 0.5% Bupivacaine with 0.75% Ropivacaine in patients undergoing lower limb orthopedic surgeries using combined femoral-sciatic nerve blocks. Their results showed that systolic and diastolic blood pressures remained within 10% of baseline in both groups throughout the intra- and postoperative period.

Similarly, **Choubey et al. (2021)** [19] compared 0.5% Ropivacaine with 0.5% Bupivacaine in femorosciatic blocks in below-knee surgeries and found no significant differences in hemodynamic profiles. The average MAP for the Bupivacaine group was 89.3±5.2 mmHg versus 88.7±5.0 mmHg in the Ropivacaine group ($p > 0.05$) over the intraoperative period, which corroborates our results. Taken together, the comparable MAP, SBP, and DBP observed in our cohort underscore the cardiovascular safety of both Bupivacaine and Ropivacaine when used for femorosciatic blocks, with neither demonstrating any clinically significant hypotensive or hypertensive trends over a 24-hour postoperative period.

Oxygen Saturation (SpO_2):

Throughout the monitoring period, SpO_2 values remained consistently at 99% in both groups, with no variation. This is consistent with studies such as that by **Gupta et al. (2020)** [13], who reported that patients receiving either Bupivacaine or Ropivacaine in peripheral nerve blocks-maintained oxygen saturation within the 98–100% range throughout the intraoperative and postoperative phases. Likewise, **Hadzic et al. (2018)** [20], in a multicenter observational study, confirmed that SpO_2 levels were unaffected by the choice of local anesthetic in peripheral nerve blocks, provided patients were breathing spontaneously and not deeply sedated, as was the case in our study.

Postoperative Analgesia: Visual Analogue Score (VAS)

Our findings demonstrate that mean VAS scores of both the groups (Group 1 and Group 2) were zero till 4 hours. After 5 hours onwards till 8 hours, VAS score of the patients from Group 1 is lower but difference is not significant. After 9 hours, vas score of the patients from group 1 is significantly lower, (all p values <0.001), suggesting longer-lasting analgesia bupivaciane is superior to ropivacaine. These results are supported by **Singh et al. (2022)** [21], who observed that the duration of analgesia was significantly longer in patients who received 0.75% bupivaciane (mean duration: 11.5±1.2 hrs) compared to 0.5% ropivacaine (mean duration: 9.8±1.5 hrs) in femorosciatic blocks.

In a similar trial by **Nagdev et al. (2021)** [22] involving 90 patients undergoing ankle surgeries, the mean time to first rescue analgesia was 12.2±2.4 hours with Ropivacaine and 10.0±1.9 hours with Bupivacaine, which again mirrors the findings in our study. Our data further suggests that although the early postoperative period (up to 5 hours) showed negligible difference in pain scores, the prolonged analgesic effect of Ropivacaine becomes evident after 9 hours. This extended effect could be attributed to Ropivacaine's pharmacologic profile, which includes a higher pKa and greater lipid solubility, allowing slower redistribution from the site of action.

Motor Blockade: Bromage Motor Score (BMS)

The BMS score remained at 3.0 (complete motor block) in both groups up to 105 minutes. However, a notable finding was the faster decline of BMS in the Ropivacaine group compared to the Bupivacaine group. At 120 minutes, the BMS in Group 2 had reduced to 0.7±0.5, while Group 1 maintained a higher value of 2.9±0.3 ($p < 0.001$). By 3 hours, Group 2 exhibited no motor block (BMS = 0), while Group 1 had a residual score of 1.2±0.4. These results are consistent with **Elsharkawy et al. (2021)** [23], who reported a shorter duration of motor block with Ropivacaine (average: 145±22 mins) compared to Bupivacaine (average: 185±18 mins) in sciatic blocks. The early motor recovery associated with Ropivacaine is beneficial in ambulatory settings and enhances early mobilization.

Agarwal et al. (2019) [24] found similar trends, with patients receiving Ropivacaine regaining full motor function within 3.5 hours, compared to approximately 5 hours in the Bupivacaine group, which aligns with our data. The reason behind this difference lies in the stereoisomeric structure of Ropivacaine, which imparts less affinity for motor fibers and a lower propensity to block A-alpha motor neurons, while still providing substantial sensory block, a feature advantageous in regional anesthesia.

Comparison of Time of Rescue Analgesia given when VAS ≥4:

The present study demonstrates that the requirement for rescue analgesia occurred significantly earlier in patients receiving 0.125% ropivacaine for femorosciatic block (12.5% at 8–8.5 hours and 50% within 10.5 hours) compared to those receiving 0.125% bupivacaine (3.1% after 9 hours and only 18.8% within 10.5 hours), with a statistically significant difference ($p = 0.019$). These findings are consistent with previous research indicating that bupivacaine provides a longer duration of postoperative analgesia than ropivacaine. In a study by **Kotmire et al.** [25], the mean time to rescue analgesia was 718.2 minutes (approximately 12 hours) for bupivacaine and 610.8 minutes (about 10 hours) for ropivacaine, with 22.8% of bupivacaine and 31.4% of ropivacaine patients requiring analgesia within 10 hours. Similarly, **Fanelli et al.** [26] found that the duration of analgesia was significantly longer with bupivacaine (880±312 minutes) compared to ropivacaine (670±227 minutes), supporting our observation of delayed analgesic requirement in the bupivacaine group. A comparative study by **Garg et al.** [27] reported that bupivacaine offered a longer sensory block (472.5±60.3 minutes) than ropivacaine (390.6±54.2 minutes), and the need for supplemental analgesia was lower with bupivacaine (8%) versus ropivacaine (12%), though not statistically significant.

The differences in duration and timing of rescue analgesia across studies may be attributed to variations in concentration, volume, and technique of block, as well as the type and duration of surgery. Ropivacaine's lower lipid solubility and reduced potency compared to bupivacaine may contribute to its shorter duration of action and earlier requirement for rescue analgesia. Our results reinforce that bupivacaine remains superior to ropivacaine for prolonged postoperative analgesia in femorosciatic blocks for below-knee surgeries, although both agents are safe and effective under ultrasound guidance.

CONCLUSION:

The present study concludes that both bupivacaine and ropivacaine provide effective and safe anesthesia in femorosciatic block under ultrasound guidance for below-knee surgeries. Hemodynamic parameters and oxygen saturation remain stable in both groups. However, bupivacaine demonstrates superior postoperative analgesic efficacy, offering significantly longer duration of analgesia and delayed need for rescue analgesia compared to ropivacaine.

While motor recovery is faster with ropivacaine, bupivacaine ensures prolonged pain relief beyond 9 hours with significantly lower VAS scores and reduced early analgesic requirements. Therefore, bupivacaine is preferred for surgeries prioritizing extended postoperative analgesia without compromising patient safety. Bupivacaine should be preferred over ropivacaine in femorosciatic block for below-knee surgeries when longer postoperative pain control is desired.

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