Original Article

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Levobupivacaine and Dexmedetomidine versus Ropivacaine and Dexmedetomidine for Ultrasound-guided Supraclavicular Brachial Plexus Block: A Randomised Controlled Trial

Anaesthesia Section

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ABSTRACT

Introduction: The Supraclavicular Brachial (SCB) plexus block is the preferred modality of anaesthesia for upper extremity surgeries. Technical and pharmacological advancements have made these blocks safer and more reliable. Ropivacaine and levobupivacaine are relatively newer drugs that are claimed to have better potency and less toxicity. Adjuvant drugs, like dexmedetomidine, are added to enhance the duration of the block and provide better postoperative analgesia.

Aim: To compare the effects of levobupivacaine (0.5%) with dexmedetomidine (50 µg) and ropivacaine (0.5%) with dexmedetomidine (50 µg) when used in the SCB plexus block for upper extremity surgeries.

Materials and Methods: A double-blinded randomised controlled trial was conducted from February 2024 to June 2024 at the Sikkim Manipal Institute of Medical Sciences, Gangtok, Sikkim, India. Patients undergoing upper extremity surgeries under SCB block were randomised into two groups (LD: 0.5% levobupivacaine + 50 µg dexmedetomidine and RD: 0.5% ropivacaine + 50 µg dexmedetomidine). The onset, completion and duration of the block (both sensory and motor), haemodynamic parameters, time to rescue analgesia and adverse effects (sedation, pruritus, respiratory distress, bradycardia, hypotension) were compared between the two groups using Statistical Package for the Social Sciences (SPSS) software version 25.0. Categorical data were analysed using the χ^2 test and continuous variables were analysed using Analysis of Variance (ANOVA). A p-value <0.05 or less was considered statistically significant.

Results: Thirty-three patients were analysed at the end of the study. Both groups were matched for age and sex, with a mean age of participants of 36.6±14.66 years and a male-to-female ratio of 3.1. The groups did not significantly differ concerning haemodynamic parameters, except for the heart rate at 180, 210, and 240 minutes. The onset (LD: 10.44±4.774; RD: 11.82±5.457 minutes) and completion (LD: 21.38±7.473; RD: 25.59±6.256 minutes) of sensory and the onset (LD: 10.88±5.965; RD: 12.18±5.659 minutes) and completion (LD: 19.63±8.374; RD: 22.35±7.365 minutes) of motor block were comparable for both groups. However, the duration of sensory (LD: 859.38±186.650; RD: 716.12±163.620 minutes; p-value=0.025) and motor block (LD: 865.13±160.404; RD: 730.59±197.227 minutes; p-value=0.040) was significantly longer in the LD group, resulting in a delayed requirement for rescue analgesia (LD: 982.88±215.634; RD: 820.41±183.232 minutes; p-value=0.026).

Conclusion: Levobupivacaine and dexmedetomidine have comparable onset times but provide a longer duration of sensory and motor blocks compared to ropivacaine and dexmedetomidine, thus reducing the postoperative requirement for rescue analgesia. The combination of levobupivacaine and dexmedetomidine may be a better alternative for longer-duration surgeries.

Keywords: Local anaesthetics, Nerve block, Regional block, Ultrasonography

INTRODUCTION

Regional blocks provide several benefits over general anaesthesia, such as avoidance of multiple drugs, airway manipulation and having an unconscious patient. They favour early mobilisation, enable faster rehabilitation and provide excellent postoperative pain relief [1,2]. Supraclavicular access blocks the brachial plexus at a level where the distal trunks are dividing to form the divisions and where the surface area of the brachial plexus is smallest, thus ensuring a fast and reliable brachial plexus block [3]. Regional blocks have become safer and more reliable as techniques (nerve stimulation, ultrasound-guidance) and drugs have evolved over the years. The most commonly used local anaesthetic drug in the last few decades has been bupivacaine, but it is increasingly being replaced by newer drugs like ropivacaine and levobupivacaine (the S (-) enantiomer of bupivacaine), as these drugs have a better potency and less toxic profile.

Adjuvants are routinely added to further enhance the duration of the block and provide postoperative analgesia following the SCB block. Tramadol, fentanyl and steroids have been commonly used as adjuvants, with dexmedetomidine being a recent addition [4-6]. Although many studies [1,7-11] have compared levobupivacaine and ropivacaine, there is hardly any literature available in which the two drugs have been compared in combination with dexmedetomidine in the SCB block [6,12,13]. Therefore, this study was conceived to compare the two drugs in combination with dexmedetomidine to determine which combination is better for the SCB plexus block in upper extremity surgeries.

MATERIALS AND METHODS

A double-blinded randomised controlled trial was conducted between February 1, 2024 and June 30, 2024, at the Sikkim Manipal Institute of Medical Sciences, Gangtok, Sikkim, India. The study was approved by the Institutional Ethics Committee (IEC) (Registration number EC/NEW/INST/2021/1877) of Sikkim Manipal Institute of Medical Sciences, Gangtok, with approval letter number SMIMS/IEC/2024-15. The trial was registered with the Clinical Trial Registry - India (ICMR/NIMS) under registry number CTRI/2024/03/064566. Patients undergoing upper limb surgeries under the SCB plexus block comprised the study population.

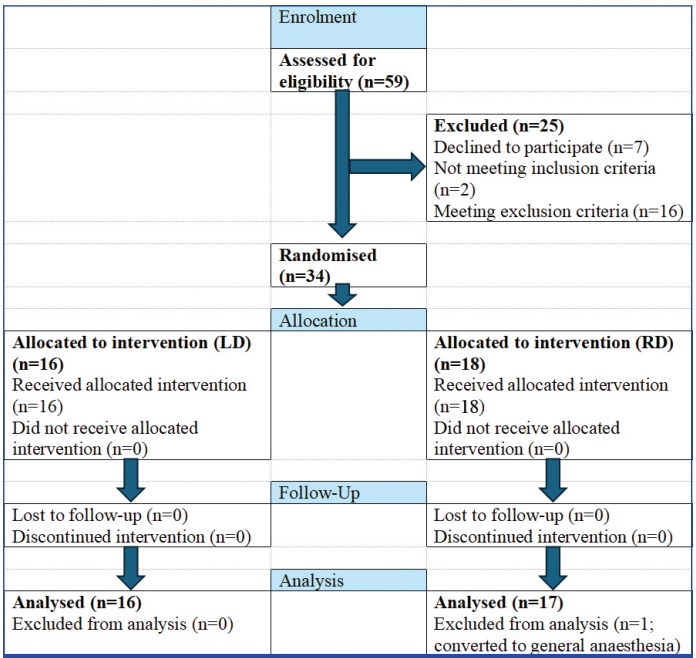
Inclusion criteria: Patients aged between 18 and 65 years with American Society of Anaesthesiologists (ASA) grades I and II were included in the study.

Exclusion criteria: Patients with a Body Mass Index (BMI) greater than 30, bradycardia (heart rate < 50 beats per minute), uncontrolled co-morbidities (including hypertension, diabetes, cardiac morbidity such as arrhythmias, renal and liver illnesses, seizure disorders, and peripheral neuropathy), coagulopathies, known hypersensitivity to the drugs being used, local site infection, pregnancy, and lactation were excluded from the study.

Sample size estimation: A sample size of 34 was calculated for a confidence interval of 95%, a type I error (α=0.05) and a power of the study (β) of 90%, with a moderate effect size and a possible attrition of 10%. This calculation was based on the assumption of means and expected standard deviations (12.4±3.1 and 15.9±2.7 minutes; n=30 in each group) for the onset of sensory block for levobupivacaine and ropivacaine, as derived from previous studies [14]. The pooled variance (σ^2) was calculated using the formula $\{S_1^2 (n_1-1)+S_2^2 (n_2-1)\}/(n_1+n_2-2)$. The formula used to calculate the sample size was $N=\{2 (Z\alpha/2+Z\beta)^2 \sigma^2\}/(\mu_1-\mu_2)^2$. The $Z\alpha/2$ and $Z\beta$ are the coefficients with values of 1.96 and 1.28, respectively and S, n and μ represent standard deviations, sample size and means from the previous study [14].

Study Procedure

Patients were randomised using the sealed envelope method and the process of randomisation, as well as blinding (for both investigators and patients), was explained to them by a team of experts in the department. A total of 34 patients were randomised into two groups: Group LD (for levobupivacaine + dexmedetomidine) and Group-RD (for ropivacaine + dexmedetomidine). The flow and progress of the study are presented in [Table/Fig-1] through a CONSORT flow diagram. Sealed envelopes were prepared by the Sequentially Numbered Opaque Sealed Envelopes (SNOSE) method. The allocation of random numbers, enrollment and assignment of participants to the intervention were conducted by three different postgraduate trainees. The counseling sessions were not limited by time or number. Patients who opted out of the study received standard care as per established protocols.



[Table/Fig-1]: CONSORT flowchart showing flow of process of the study.
LD: levobupivacaine + dexmedetomidine; RD: ropivacaine + dexmedetomidine

Both drug preparations were handled by an Operation Theatre (OT) technician who was not involved in the study. The final drug solution was transparent and had a total volume of 25 mL, consisting of either 0.5% levobupivacaine (24 mL) and dexmedetomidine (50 µg, 1 mL) or 0.5% ropivacaine (24 mL) and dexmedetomidine (50 µg, 1 mL) [6,12,13]. The block was administered by one of the researchers/authors. Data were entered into the datasheet by the on-duty postgraduate trainee doctors in the operating room and by the on-duty doctors of the respective wards once the patient was transferred. The authors were exposed to the results only after the final analysis was conducted by a separate team from the Department of Surgery.

Onset and duration of sensory and motor block, as well as the Duration of Analgesia (DOA) (demand for rescue analgesia), were the primary outcome measures. Secondary outcomes included sedation score, haemodynamic parameters (heart rate, blood pressure and SpO_2) and any adverse reactions. To facilitate data collection and calculation, various time points were defined. The time of completion of infusion of the drug mixture was labeled as baseline (T0). TS1 and TS2 were the time points when score 1 was achieved in any one of the major nerve distributions and when score 2 was achieved in all major nerve distributions, respectively. The duration from T0 to T1 was taken as onset (DS1) and from T0 to T2 as completion (DS2) of the sensory block. The duration from TS1 to the time when score 0 was achieved again (complete resolution of sensory anaesthesia from the distributions of the median, radial, ulnar and musculocutaneous nerves) was taken as the Duration of Sensory Block (DSB).

Similarly, for the motor block, TM1 and TM2 were defined as the time points when scores 1 and 3 were achieved, respectively. The duration from T0 to TM1 and TM2 was taken as the onset and completion of the motor block. The Duration of Motor Block (DMB) was calculated from TM1 to the time when score 0 was achieved again (recovery of complete motor function of the hand and fingers). DOA was calculated from TS1/TM1 (whichever occurred earlier) to the patient's demand for rescue analgesia. A scoring system-based assessment of the levels and quality of sensory and motor block is presented in [Table/Fig-2] [7,8].

Score	Assessment
Assessment of sensory block	
0	Normal sensation
1	Loss of pinprick sensation (analgesia)
2	Loss of touch sensation (anaesthesia)
Assessment of motor block	
0	Flexion and extension in both the hand and arm against resistance
1	Flexion and extension in both the hand and arm against gravity (not against resistance)
2	Flexion and extension movements in the hand but not in the arm
3	No movement in the entire upper limb
Assessment of quality of block	
0	Complete failure: inadequate anaesthesia in any of the major nerve distribution
1	Inadequate block: if the patient required supplemental analgesia with intravenous ketamine or propofol
2	Successful block: complete sensory and motor block in the territories of all four major nerves

[Table/Fig-2]: Assessment of levels and quality of sensory and motor block [7,8]. Patients with incomplete or failed block were excluded from the study.

Heart rate, oxygen saturation and blood pressure (systolic, diastolic and mean arterial) were recorded every five minutes for 30 minutes and then every 30 minutes for four hours, or until the patient was shifted out of the post-anaesthesia care unit.

Hypotension was defined as a decrease in mean blood pressure of more than 20% from baseline. If hypotension was noted, patients were given a bolus of 100 mL normal saline and in the absence of a response, an intravenous injection of 3 mg mephentermine was administered. A

pulse rate of ≤50 beats per minute was regarded as bradycardia and was treated with one ampoule (0.6 mg) of intravenous atropine.

The Ramsay sedation score was used to monitor the degree of sedation at all intervals [Table/Fig-3] [15]. Pain in the postoperative period was assessed using the Numeric Rating Scale (NRS), which ranges from 0 to 10, every hour until the patient requested pain relief. However, the pain-related data have not been presented in this article, as its value in data collection was primarily to assess either the onset of sensory block or the demand for rescue analgesia, thereby contributing to the DOA. The critical aspect was the time when patients reported that they did not feel pain during the sensory block assessment (onset and completion of sensory block) and later, when they indicated that they felt pain and demanded rescue analgesia during the postoperative period.

Score	Assessment
1	Anxious, agitated, restless
2	Cooperative, oriented, tranquil
3	Responds to command only
4	Brisk response to light glabellar tap or loud noise
5	Sluggish response to light glabellar tap or loud noise
6	No response

[Table/Fig-3]: Ramsay Sedation Score [15].

Postoperative vital signs were recorded hourly until the resolution of the block. Any side-effects (hypotension, sedation, respiratory distress, bradycardia and pruritus) in the postoperative period were documented.

STATISTICAL ANALYSIS

The data were tabulated and analysed using IBM© SPSS© version 25.0. Categorical data were analysed using the Chi-square (χ^2) test, while continuous data were analysed using ANOVA. A p-value <0.05 was considered significant. The data collection, tabulation and analysis were performed by an independent team of observers and the anaesthesiologists were exposed to the data only after the analysis was completed.

RESULTS

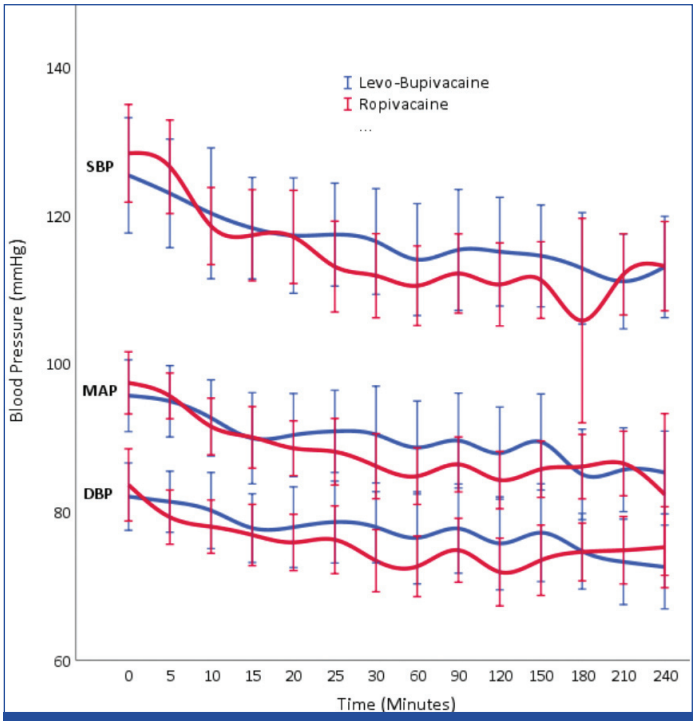
Both groups were matched for age, sex, BMI and ASA grades, as no statistically significant difference was found between the two groups [Table/Fig-4].

Variables		LD	RD	Overall	Sig (p)
Sex (n)	Male	12	13	25	0.619*
	Female	4	4	8	
Age (years)		33.8±13.45	39.2±15.65	36.6±14.66	0.290**
BMI (Kg/m^2)		24.0±3.62	24.8±4.82	24.4±4.23	0.585**
ASA grade (n)	I	13	12	25	0.381*
	II	3	5	8	

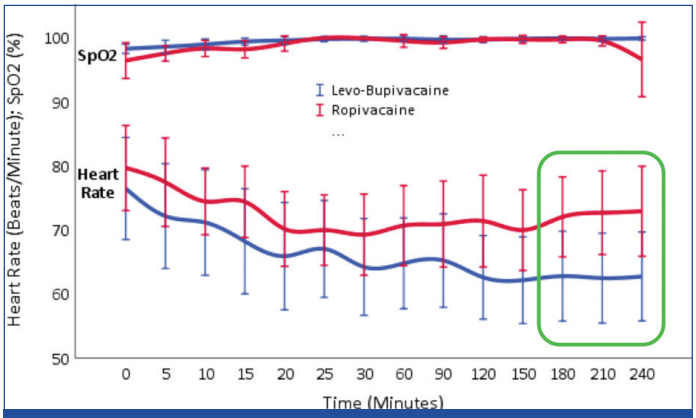
[Table/Fig-4]: Demographic and preoperative characteristics. A non-significant p-value denotes that both groups were matched for these parameters.
*χ^2 analysis; **t-test

Haemodynamic parameters: The changes in blood pressure (systolic, diastolic, and mean), heart rate, and SpO_2 between the two groups were compared using repeated measures ANOVA. No significant differences were found between the two groups for blood pressure and SpO_2 [Table/Fig-5,6]. However, the heart rate differed significantly between the two groups at 180, 210, and 240 minutes (p-values of 0.044, 0.031, and 0.036, respectively), despite the fact that both groups showed a consistent decline in heart rate over a duration of four hours following the block and during the surgery {[Table/Fig-6]: green inset}.

Sensory and motor block, rescue analgesia: The onset and completion of sensory and motor block in both groups were



[Table/Fig-5]: Systolic, diastolic and mean blood pressure in the first 4 hours following block.
At the end of 4 hours, blood pressure recordings in both the groups were lower compared to baseline but at any point of time, the difference between the two groups remained statistically insignificant.



[Table/Fig-6]: SpO_2 and heart rate in first 4 hours following block.
No significant difference was found in SpO2 between the two groups. The heart rate was significantly different in the last hour of observation (p-value 0.044, 0.031 and 0.036 for 180, 210 and 240 minutes, respectively; see the green box) but remained below the baseline heart rate in both the groups.

comparable, as no statistically significant differences were found. However, the mean duration of sensory and motor block was longer in the LD group compared to the RD group, and this finding was statistically significant. A post-hoc analysis showed that the onset, completion, and duration of sensory and motor block within each group were comparable, with no significant differences among them. The mean DOA (demand for rescue analgesia) was also significantly longer in the LD group compared to the RD group [Table/Fig-7].

Sedation: The number of patients who experienced sedation was 13 (81.25%) in the LD group and 11 (64.7%) in the RD group, respectively. The data regarding the degree of sedation were not statistically different between the two groups [Table/Fig-8].

Adverse effects: No patient experienced respiratory distress or pruritus. Hypotension was reported in only two patients in the LD group. The incidence of bradycardia was significantly higher (p-value=0.021) in the LD group [Table/Fig-9].

DISCUSSION

The SCB plexus block has a better safety profile and provides a longer DOA compared to general anaesthesia for upper extremity surgeries. The use of ultrasound has not only improved the success

Group	Sensory block			Motor block			Duration of Analgesia (DOA)
	Onset	Complete	Duration	Onset	Complete	Duration	
LD (n=16)	10.44±4.774	21.38±7.473	859.38±186.650	10.88±5.965	19.63±8.374	865.13±160.404	982.88±215.634
RD (n=17)	11.82±5.457	25.59±6.256	716.12±163.620	12.18±5.659	22.35±7.365	730.59±197.227	820.41±183.232
Total (n=33)	11.15±5.106	23.55±7.094	785.58±187.089	11.55±5.756	21.55±7.973	795.82±190.190	899.18±213.030
p-value	0.760	0.098	0.025	0.554	0.152	0.040	0.026

[Table/Fig-7]: The sensory and motor block and Duration Of Analgesia (DOA) (demand of rescue analgesia) between two groups.
All timings are in minutes

Sedation		LD (n=16)	RD (n=17)	Total (n=33)	p-value
No		3	6	9	0.556
Yes	Total	13	11	24	
	2	9	8	17	
	3	4	3	7	

[Table/Fig-8]: Ramsay sedation score. No patients in any group had a score of 1, 4 or 5.

Adverse effects	LD (n=16)	RD (n=17)	Total (n=33)	p-value
Pruritus	0	0	0	--
Respiratory distress	0	0	0	--
Bradycardia	8	2	10	0.021
Hypotension	2	0	2	0.227

[Table/Fig-9]: Adverse effects.

rate of the SCB plexus block due to better localisation but has also increased the safety margin, as less volume of drug is required. Newer generation drugs like levobupivacaine and ropivacaine have superior pharmacokinetic profiles and exhibit less cardio- and neurotoxicity, making them preferred choices for regional blocks. These drugs are often combined with other adjuvant medications, such as dexmedetomidine, tramadol, and fentanyl, to enhance postoperative analgesia [16].

The authors reviewed the literature to compare the findings of this study to those of other studies and concluded that there is a paucity of articles comparing the two drug combinations (LD and RD) in the SCB plexus block. The available studies do not lead to any firm conclusions regarding the onset of sensory and motor block, as all possible findings have been reported, including early, comparable, and delayed onset. However, with or without the adjuvant dexmedetomidine, all studies have found that levobupivacaine provides a longer duration of postoperative analgesia, with an even longer duration when combined with adjuvants, thus reducing the requirement for analgesics.

The present study showed that the combination of levobupivacaine (0.5%) and dexmedetomidine (50 µg) has a comparable onset but a longer duration of sensory and motor block when compared to the ropivacaine (0.5%) and dexmedetomidine (50 µg) combination for the SCB plexus block. Additionally, the difference was significant for the duration of the request for rescue analgesia. Changes in haemodynamic parameters were comparable in both groups throughout the observation period. The only exception was the heart rate at 180, 210, and 240 minutes and was significant. The authors find it difficult to attribute this to anything of clinical importance, as the heart rate remained below the baseline in both groups. A 'relatively' falling graph for levobupivacaine [Table/Fig-6] was also consistent with the significant finding of a higher incidence of bradycardia in the levobupivacaine group [Table/Fig-9]. Another plausible explanation for the 'relatively' rising graph for ropivacaine at 180-240 minutes may be weaning from the effect of the block, but this was not consistent with the longer duration of block (730.59 minutes) and the demand for rescue analgesia (820.41 minutes).

Moolagani RV et al., compared LD, RD, and BD (bupivacaine and dexmedetomidine) against a control group (Group B, bupivacaine alone). Since the comparison was made against a control group in which no dexmedetomidine was used, the onset, completion, and duration of sensory and motor block, as well as the demand for rescue analgesia, were significantly different in the intervention group. However, the study did not provide the comparative data between the intervention groups alone [12].

Dhawan G, compared LD and RD and showed that the onset of sensory block was delayed in the LD group (comparable to the present study). The onset of motor block was comparable, and the duration of sensory and motor block was longer in the LD group in both studies [6]. Deepa T and Tejaswi C, compared LD and RD in upper extremity blocks and found that the onset of sensory and motor block was quicker in the LD group (also comparable in the present study), but the duration of both sensory and motor block was longer in the LD group, as was the case in the present study [13].

Chauhan AP et al., Vasani P et al., Sarma R et al., Shahid R et al., Thalamati D et al., and Kulkarni SB et al., compared the two agents (levobupivacaine and ropivacaine) without adding dexmedetomidine in the brachial plexus block [1,7-11]. The findings were variable regarding the onset of the block, as some studies (Chauhan AP et al., Vasani P et al., Shahid R et al., Kulkarni SB et al.,) reported an early onset of both sensory and motor block with levobupivacaine (L), while Sarma R et al., indicated that the onset of both sensory and motor block was delayed [1,7-9,11]. In Thalamati D et al., [10], the onset of sensory block was delayed, but the motor block was comparable. The duration of both types of blocks was longer in the levobupivacaine group across all studies compared to the ropivacaine group.

In the present study, when dexmedetomidine was added, it showed a comparable onset, which was not seen in any of these studies (where it was either early or delayed); however, the duration of both sensory and motor block was longer in the LD group, consistent with the levobupivacaine group when dexmedetomidine was not included in these studies.

The combination of these drugs with dexmedetomidine has also been tried in other blocks, such as spinal anaesthesia by Kame BS et al., and in the fascia iliaca block by Sriramka B et al., [17,18]. Kame BS et al., found the onset of both sensory and motor block to be early in the LD group (comparable to the present study) [17]. The duration of the block was longer in the LD group in both studies as well as in the present study.

In summary, all these studies consistently demonstrate that the duration of sensory and motor block was longer in the levobupivacaine group compared to the ropivacaine group. Adding dexmedetomidine increases this duration in both groups, but significantly more so in the levobupivacaine group. However, there is no consensus on the onset of the block.

The authors have compiled all the studies into three groups: levobupivacaine and ropivacaine with the adjuvant dexmedetomidine (LD and RD) in the brachial plexus block; without adjuvant (L and R) in the brachial plexus block; and with adjuvant (LD and RD) in other blocks (spinal anaesthesia and fascia iliaca block), which are tabulated in [Table/Fig-10] [1,6-11,13,17,18].

A meta-analysis was performed by Li A et al., which included 12 randomised controlled trials comparing levobupivacaine and

Studies (publication year)	Parameters						
	Sensory block			Motor block			
	Onset	Completion	Duration	Onset	Completion	Duration	Duration of Analgesia (DOA)
Levobupivacaine + Dexmedetomidine and Ropivacaine + Dexmedetomidine in Supraclavicular Brachial (SCB) Plexus block							
This study (2025)	Comparable	Comparable	Longer in LD	Comparable	Comparable	Longer in LD	Longer in LD
Dhawan G (2020) [6]	Delayed in LD	--	Longer in LD	Comparable	--	Longer in LD	Longer in LD
Deepa T and Tejaswi C (2018) [13]	Early in LD	--	--	Early in LD	--	--	Longer in LD
Levobupivacaine and Ropivacaine in Supraclavicular Brachial (SCB) Plexus block (Without Dexmedetomidine)							
Chauhan AP et al., (2020) [1]	Early in L	Early in L	Longer in L	Early in L	Early in L	Longer in L	--
Vasani P et al., (2023) [7]	Early in L	--	--	Early in L	--	--	Longer in L
Sarma R et al., (2023) [8]	Delayed in L	Delayed in L	Longer in L	Delayed in L	Delayed in L	Longer in L	--
Shahid R et al., (2021) [9]	Early in L	--	--	Early in L	--	--	Longer in L
Thalamati D et al., (2021) [10]	Delayed in L	--	Longer in L	Comparable	--	Longer in L	Longer in L
Kulkarni SB et al., (2016) [11]	Early in L	--	Longer in L	Early in L	--	Longer in L	Longer in L
Levobupivacaine + Dexmedetomidine and Ropivacaine + Dexmedetomidine in other blocks							
Kame BS et al., (2023) [17]*	Early in LD	Early in LD	Longer in LD	Early in LD	--	Longer in LD	--
Sriramka B et al., (2019) [18]†	--	--	--	--	--	--	Longer in LD

[Table/Fig-10]: Comparative compilation of relevant studies [1,6-11,13,17,18].
L: levobupivacaine; LD: levobupivacaine plus dexmedetomidine; *Spinal anaesthesia; †fascia iliaca block

ropivacaine (without any adjuvant drug) in peripheral nerve blocks. The analysis concluded that levobupivacaine was better than ropivacaine for peripheral nerve blocks in achieving a longer duration of sensory and motor block [19].

A recently published systematic review and meta-analysis by Alharran AM et al., examined 16 randomised controlled trials involving 939 patients and found that levobupivacaine was associated with a longer duration of sensory and motor block in patients undergoing brachial plexus block for upper extremities compared to ropivacaine. The meta-analysis did not find any differences regarding the onset of sensory and motor block, the rate of rescue analgesia (DOA), or complications. However, this review article did not take into consideration the addition of dexmedetomidine as an adjuvant [20].

In the present study, the authors did not find any differences in other variables, such as haemodynamic parameters, which were comparable to the findings of the aforementioned studies. There was no significant difference in adverse effects, except that the incidence of bradycardia was significantly higher in the LD group in the present study. Data regarding bradycardia was missing in most of these studies, except in Sarma R et al., in which, contrary to the findings of the present study, three (10%) patients in the ropivacaine group experienced bradycardia, although this finding was insignificant [8].

Limitation(s)

The cases in which the wearing off of sensory and motor block occurred during the night may have involved unreliable or late reporting from the patients, as they might have been sleeping during late-night hours.

CONCLUSION(S)

The authors concluded that the combination of levobupivacaine (0.5%) and dexmedetomidine (50 µg) had a comparable onset but a longer duration of both sensory and motor block compared to ropivacaine (0.5%) and dexmedetomidine (50 µg). There was no difference in haemodynamic parameters or adverse effects. However, a significant number of patients who received levobupivacaine and dexmedetomidine reported bradycardia. The combination of levobupivacaine and dexmedetomidine can be used reliably for relatively longer procedures involving the upper extremities under the SCB plexus block.

Recommendation

The authors recommend good quality randomised clinical trial with larger sample size to add more level I evidence for use of levobupivacaine and dexmedetomidine combination over ropivacaine and dexmedetomidine.

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REFERENCES

[1] Chauhan AP, Pandya J, Jain A. Comparison of block characteristics and postoperative analgesia of 0.5% levobupivacaine with 0.5% ropivacaine in ultrasound guided supraclavicular block for orthopaedic forearm surgery – A prospective, comparative, randomized, clinical study. Indian J Clin Anaesth. 2020;7(3):399-404. Doi: 10.18231/j.ijca.2020.073.

[2] Abhinaya RJ, Venkatraman R, Matheswaran P, Sivarajan G. A randomised comparative evaluation of supraclavicular and infraclavicular approaches to brachial plexus block for upper limb surgeries using both ultrasound and nerve stimulator. Indian J Anaesth. 2017;61:581-86. Doi: 10.4103/ija.IJA_402_16.

[3] Kaur M, Kaur R, Kaur S, Baghla N, Bansal A, Kalia A, et al. A study to compare the analgesic efficacy of dexmedetomidine and fentanyl as adjuvants to levobupivacaine in ultrasound-guided supraclavicular brachial plexus block. Anaesth Essays Res. 2018;12(3): 669-73. Doi: 10.4103/aer.AER_64_18.

[4] Honnannavar KA, Mudakanagoudar MS. Comparison between conventional and ultrasound-guided supraclavicular brachial plexus block in upper limb surgeries. Anaesth Essays Res. 2017;11(2):467-71. Doi: 10.4103/aer.AER_43_17.

[5] Klein SM, Greengrass RA, Steela SM, Speer KP, Gleason DH. A comparison of 0.5% bupivacaine, 0.5% ropivacaine and 0.75% ropivacaine for interscalene brachial plexus block. Anaesth Analg. 1998;87:1316-19. Doi: 10.1097/00000539-199812000-00019.

[6] Dhawan G. A comparative study between dexmedetomidine-levobupivacaine combination with dexmedetomidine-ropivacaine used in supraclavicular brachial plexus block in upper limb orthopaedic surgeries. IOSR Journal of Dental and Medical Sciences (IOSR-JDMS). 2020;19(5):08-11. Doi: 10.9790/0853-1905140811.

[7] Vasani P, Patel K, Sonawane H, Makwana JC, Shah H, Popatiya S. A randomised controlled trial to compare the efficacy of levobupivacaine 0.5% and ropivacaine 0.5% in USG guided supraclavicular brachial plexus block for upper limb orthopedic surgery at tertiary care center. Int J Pharma Clin Res. 2023;15(4):52-59.

[8] Sarma R, Gohain M, Tayung RP, Das KK. Levobupivacaine vs ropivacaine for supraclavicular brachial plexus blocks in patients undergoing upper limb surgeries in a tertiary care centre. Paripex- Indian J Res. 2023;12(02):44-47. Doi: 10.36106/paripex.

[9] Shahid R, Prasad MK, Alam MA, Jain P, Reddy MN, Jheetay GS. A prospective randomized study to compare levobupivacaine and ropivacaine in ultrasound-guided supraclavicular brachial plexus block for forearm orthopedic surgery. Anaesthesia Pain and Intensive Care. 2021;25(5):613-19. Doi: 10.35975/apic.v25i5.1629.

[10] Thalamati D, Sambandam KG, Kodali VRK, Karthekeyan RB, Vakamudi M. Comparison of ropivacaine and levobupivacaine in supraclavicular brachial plexus blocks – A double blinded randomized control study. Turk J Anaesthesiol Reanim. 2021;49(4):278-83. Doi: 10.5152/TJAR.2021.266.

[11] Kulkarni SB, Pimpare M, Govardhane BT. Comparison of levobupivacaine with ropivacaine for supraclavicular brachial plexus block. Int J Res Med Sci. 2016;4:3789-96. Doi: 10.18203/2320-6012.ijrms20162878.
[12] Moolagani RV, Annabhaktula A, Vigrahala P, Pilla PE. A comparative study of the effects of dexmedetomidine added as an adjuvant to bupivacaine, levobupivacaine, and ropivacaine in the brachial plexus blocks: A prospective randomized triple-blind study. Int J Adv Med Health Res. 2022;9:42-48.
[13] Deepa T, Tejaswi C. Comparison of dexmedetomidine with 0.5% levobupivacaine and 0.5% ropivacaine in supraclavicular brachial plexus block. Indian J Anaesth Analg. 2018;5(4):554-59. Doi: 10.21088/ijaa.2349.8471.5418.8.
[14] Sachdev S, Sharma V, Malawat A, Jethava D, Moin K. Comparison of levobupivacaine alone and levobupivacaine with dexmedetomidine in supraclavicular brachial plexus block: A prospective randomized clinical trial. Indian J Clin Anaesth. 2020;7(1):16-22. Doi: 10.18231/j.ijca.2020.005.
[15] Ramsay MAE, Saveage TM, Simpson BRJ, Goodwin R. Controlled sedation with alphaxalone – alphadolone. Br Med J.1974;2(5920):656-59. Doi:10.1136/bmj.2.5920.656.
[16] Allene MD, Alimawu AA, Awate SM, Alemnew EF. The effectiveness of adding tramadol versus fentanyl as an adjuvant to bupivacaine on brachial plexus block: A double blind, randomized controlled trial. Int J Surg Open. 2020;24:85-90. Doi: 10.1016/j.ijso.2020.04.006.
[17] Kame BS, Kumar VU, Subramaniam A. Spinal anaesthesia for urological surgery: A comparison of isobaric solutions of levobupivacaine and ropivacaine with dexmedetomidine. Ethiop J Health Sci. 2023;33(1):65. Doi: 10.4314/ejhs.v33i1.9.
[18] Sriramka B, Panigrahi SK, Acharya R, Singh J. Effect of dexmedetomidine on levobupivacaine and ropivacaine in fascia iliaca block for trochanteric fractures treated by proximal femoral nail- A randomized trial. Cureus. 2019;11(8):e5352. DOI 10.7759/cureus.5352.
[19] Li A, Wei Z, Liu Y, Shi J, Ding H, Tang H, et al. Ropivacaine versus levobupivacaine in peripheral nerve block, A PRISMA-compliant meta-analysis of randomized controlled trials. Medicine. 2017;96:14(e6551). Doi: 10.1097/MD.000000000000655.
[20] Alharran AM, Alotaibi MN, Alenezi YY, Alharran YM, Alahmad AA, Alquallaf A, et al. Levobupivacaine versus ropivacaine for brachial plexus block: A systematic review and meta-analysis of randomised controlled trials. Indian J Anaesth. 2025;69(2):179-90. Doi: 10.4103/ija.ija_1156_24.

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