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Comparative Evaluation of Nalbuphine–Bupivacaine Versus Bupivacaine Alone in Ultrasound-Guided Axillary Brachial Plexus Block for Upper-Limb Surgery: A Cross-sectional Study

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Abstract

Background:

Nalbuphine has been investigated as an adjuvant to local anaesthetics to prolong regional blockade and postoperative analgesia. This study compared nalbuphine plus bupivacaine with bupivacaine alone for ultrasound-guided axillary brachial plexus block.

Methods:

This prospective randomized controlled study was conducted at Pandit Bhagwat Dayal Sharma Post Graduate Institute of Medical Sciences, Rohtak, Haryana, India, from April 2025 to March 2026. It included 122 patients undergoing upper-limb surgery who met the eligibility criteria and provided informed consent. Patients received bupivacaine alone (Group I, n = 61) or bupivacaine with nalbuphine 20 mg (Group II, n = 61). Continuous variables were compared using the independent-samples t-test and categorical variables using the chi-square or Fisher's exact test, as appropriate.

Results:

Mean age was 33.42 ± 9.86 years in Group I and 35.18 ± 10.72 years in Group II (P = .341). Sensory and motor block onset did not differ significantly (P = .156 and P = .298, respectively). Nalbuphine significantly prolonged sensory block duration (472.38 ± 55.62 vs. 335.46 ± 48.73 minutes), motor block duration (371.52 ± 49.18 vs. 278.64 ± 43.25 minutes), and analgesia duration (489.37 ± 61.42 vs. 361.84 ± 54.26 minutes; all P < .001). VAS scores were significantly lower at 6, 8, and 10 hours (P < .001).

Conclusion:

Nalbuphine prolonged regional blockade and postoperative analgesia without major reported adverse events.

Recommendation:

Larger multicentre trials should further evaluate its efficacy and safety.

Keywords: *Nalbuphine; Bupivacaine; Axillary block; Brachial plexus; Ultrasound guidance; Postoperative analgesia.*
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Introduction

Brachial plexus block is an established regional anaesthetic technique that provides effective anaesthesia and postoperative analgesia for surgical procedures involving the upper extremity. It can be used for procedures involving the arm, forearm, wrist, and hand, thereby reducing the need for general anaesthesia and systemic analgesics. Among the various approaches to brachial plexus blockade, including interscalene, supraclavicular, infraclavicular, and axillary approaches, the axillary approach is particularly useful for procedures involving the distal upper limb [1, 2]. The axillary brachial plexus block targets the terminal branches of the brachial plexus around the axillary artery and offers a relatively safe approach with a low risk of complications involving the pleura and major central structures [1-3].

The use of ultrasound guidance has significantly improved the accuracy and safety of peripheral nerve blocks. Ultrasound allows real-time visualization of the axillary artery, surrounding nerves, needle advancement, and spread of local anaesthetic, thereby facilitating precise drug deposition while potentially reducing the volume of local anaesthetic required. Compared with landmark-based or nerve-stimulator techniques, ultrasound-guided axillary brachial plexus block enables better identification of individual nerve structures and may improve block success while minimizing complications. However, despite its effectiveness, the duration of analgesia provided by local anaesthetics alone may be limited, necessitating the use of additional analgesic medication during the postoperative period [4-7].

Various adjuvants have therefore been investigated to enhance the quality and prolong the duration of peripheral nerve blockade. Drugs such as opioids, α2-adrenergic agonists, dexamethasone, magnesium, and other agents have been studied in combination with local anaesthetics with the aim of accelerating block onset, prolonging sensory and motor blockade, extending postoperative analgesia, and reducing postoperative analgesic requirements [8-10]. Among opioid adjuvants, nalbuphine, a synthetic opioid with mixed κ-opioid receptor agonist and μ-opioid receptor antagonist properties, has attracted interest because of its analgesic efficacy and relatively favourable safety profile. Its use as an adjuvant in neuraxial and peripheral regional anaesthesia has been explored, although its mechanism and effectiveness when administered around peripheral nerves remain incompletely established [11, 12].

Bupivacaine is a long-acting local anaesthetic commonly used for brachial plexus blockade; however, the duration of postoperative analgesia following a single-injection block may still be insufficient for prolonged postoperative pain control. The addition of nalbuphine to bupivacaine may potentially enhance the duration and quality of analgesia while reducing the requirement for rescue analgesics [12, 13]. However, evidence regarding its effectiveness as an adjuvant in ultrasound-guided axillary brachial plexus block remains limited and warrants further evaluation. Therefore, the present study was undertaken to compare nalbuphine with bupivacaine versus bupivacaine alone in ultrasound-guided axillary brachial plexus block, with respect to the onset and duration of sensory and motor blockade, duration of postoperative analgesia, postoperative analgesic requirements, haemodynamic parameters, and adverse effects.

Methods

Study Design and Participants

This prospective comparative cross-sectional study was conducted from April 2025 to March 2026 among 122 patients undergoing hand and forearm surgeries under ultrasound-guided axillary brachial plexus block.

Study Participants and Eligibility Criteria

Patients scheduled for elective hand and forearm surgeries under ultrasound-guided axillary brachial plexus block were assessed for eligibility.

Inclusion criteria

Patients aged [specify age range], of either sex, belonging to American Society of Anesthesiologists (ASA) physical status [specify eligible classes], undergoing elective hand or forearm surgery under ultrasound-guided axillary brachial plexus block, and providing written informed consent were included.

Exclusion criteria

Patients with contraindications to peripheral nerve block, including coagulopathy, local or systemic infection, previous brachial plexus injury, pre-existing peripheral neuropathy, chronic analgesic use, allergy to the study drugs, pregnancy or lactation, or peripheral vascular disease were excluded.

Measures to Minimize Bias

Random allocation was used to minimize selection bias and distribute potential confounding factors between the groups. Both groups underwent the same ultrasound-guided block procedure and received the same concentration and volume

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of bupivacaine, with the study drug being the principal difference between the interventions. Standardized definitions and assessment methods were used to evaluate sensory blockade, motor blockade, postoperative pain, and rescue analgesia requirements. Pain scores were recorded at predetermined postoperative intervals.

Eligibility and Randomisation

Patients with contraindications to peripheral nerve block, including coagulopathy, local or systemic infection, previous brachial plexus injury, pre-existing peripheral neuropathy, chronic analgesic use, allergy to study drugs, pregnancy or lactation, and peripheral vascular disease were excluded. Participants were randomly assigned using a sealed-envelope technique into two equal groups: Group I (n=61) received bupivacaine alone, while Group II (n=61) received bupivacaine with nalbuphine.

Anaesthetic Technique

Standard preoperative assessment and monitoring were performed. After intravenous access, patients received midazolam (0.05 mg/kg) and supplemental oxygen. Under ultrasound guidance, the axillary brachial plexus was identified using a high-frequency linear probe. Following local infiltration with 2% lidocaine, an in-plane technique was used for block administration. Group I received 35 mL of 0.25% bupivacaine + 1 mL of normal saline, whereas Group II received 35 mL of 0.25% bupivacaine + 20 mg nalbuphine in 1 mL. The spread of the injectate was confirmed in real time.

Outcome Measures

Demographic characteristics and duration of surgery were recorded. Heart rate and mean arterial pressure were assessed at baseline and following block administration. Sensory block onset and duration were evaluated using the pinprick method, while motor block onset and duration were assessed using the modified Bromage scale. The duration of analgesia was defined as the interval from complete sensory blockade to the first requirement for rescue analgesia (VAS ≥4). Postoperative pain was assessed using a 10-point VAS at 1, 2, 3, 4, 6, 8, 10, and 12 h. Patients were also monitored for adverse events and block-related complications.

Statistical Analysis

Data were analysed using Statistical Package for the Social Sciences (SPSS) software. Continuous variables were expressed as mean ± standard deviation (SD), while categorical variables were presented as frequencies and percentages. Continuous variables, including demographic characteristics, duration of surgery, sensory and motor block onset and duration, duration of analgesia, and postoperative visual analogue scale (VAS) scores at individual time points, were compared between the two independent groups using the independent-samples Student's *t*-test. Categorical variables, including sex distribution and the incidence of adverse events, were compared using the chi-square test or Fisher's exact test, as appropriate. All statistical tests were two-tailed, and a *P*-value of less than 0.05 was considered statistically significant.

Ethical Consideration

Ethical approval was obtained from the Institutional Ethics Committee, and written informed consent was obtained from all participants.

Results

Participant Flow

A total of 122 patients undergoing hand and forearm surgeries under ultrasound-guided axillary brachial plexus block were enrolled in the study and randomly allocated equally to two groups. Group I received bupivacaine alone (n = 61), whereas Group II received bupivacaine with nalbuphine (n = 61). The numbers of patients screened for eligibility, excluded before randomization, and the reasons for non-participation were not available. Both groups were represented by 61 participants in the reported results.

Baseline Demographic Characteristics

The baseline demographic characteristics and duration of surgery are presented in Table 1. The mean age was 33.42 ± 9.86 years in Group I and 35.18 ± 10.72 years in Group II. The mean body weight was 72.84 ± 7.12 kg in Group I and 73.91 ± 6.48 kg in Group II. Group I included 38 male (62.3%) and 23 female (37.7%) participants, whereas Group II included 40 male (65.6%) and 21 female (34.4%) participants. The mean duration of surgery was 84.67 ± 18.52 minutes in Group I and 86.21 ± 19.34 minutes in Group II. No statistically significant differences were observed in age, body weight, sex distribution, or duration of surgery between the groups ($P > .05$).

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Table 1 *Demographic Characteristics and Duration of Surgery in the Two Study Groups*

Characteristic	Group I: Bupivacaine (n = 61)	Group II: Bupivacaine + Nalbuphine (n = 61)	*p*
Age (years), *M* ± *SD*	33.42 ± 9.86	35.18 ± 10.72	.341
Weight (kg), *M* ± *SD*	72.84 ± 7.12	73.91 ± 6.48	.389
Female, *n* (%)	23 (37.7)	21 (34.4)	.701
Male, *n* (%)	38 (62.3)	40 (65.6)	.701
Duration of surgery (min), *M* ± *SD*	84.67 ± 18.52	86.21 ± 19.34	.648

Note. Values are presented as mean (*M*) ± standard deviation (*SD*) or number (*n*) and percentage, as appropriate.

Sensory and Motor Block Characteristics and Duration of Analgesia

The onset and duration of sensory and motor blockade and the duration of postoperative analgesia are presented in Table 2. The mean onset of sensory blockade was 10.82 ± 2.41 minutes in Group I and 10.21 ± 2.18 minutes in Group II, with no statistically significant difference (p = .156). Similarly, the mean onset of motor blockade was 17.26 ± 3.12 minutes in Group I and 16.71 ± 2.86 minutes in Group II (p = .298).

In contrast, the duration of both sensory and motor blockade was significantly longer in Group II. Sensory block duration was 472.38 ± 55.62 minutes in Group II compared with 335.46 ± 48.73 minutes in Group I (p < .001). Motor block duration was also longer in Group II (371.52 ± 49.18 minutes) than in Group I (278.64 ± 43.25 minutes; p < .001). The mean duration of postoperative analgesia was 489.37 ± 61.42 minutes in Group II and 361.84 ± 54.26 minutes in Group I (p < .001).

Table 2 *Sensory and Motor Block Characteristics and Duration of Postoperative Analgesia*

Parameter	Group I: Bupivacaine (n = 61)	Group II: Bupivacaine + Nalbuphine (n = 61)	*p*
Sensory block onset (min), *M* ± *SD*	10.82 ± 2.41	10.21 ± 2.18	.156
Sensory block duration (min), *M* ± *SD*	335.46 ± 48.73	472.38 ± 55.62	< .001
Motor block onset (min), *M* ± *SD*	17.26 ± 3.12	16.71 ± 2.86	.298
Motor block duration (min), *M* ± *SD*	278.64 ± 43.25	371.52 ± 49.18	< .001
Duration of analgesia (min), *M* ± *SD*	361.84 ± 54.26	489.37 ± 61.42	< .001

Note. Values are presented as mean (*M*) ± standard deviation (*SD*). Group I received bupivacaine alone; Group II received bupivacaine with nalbuphine.

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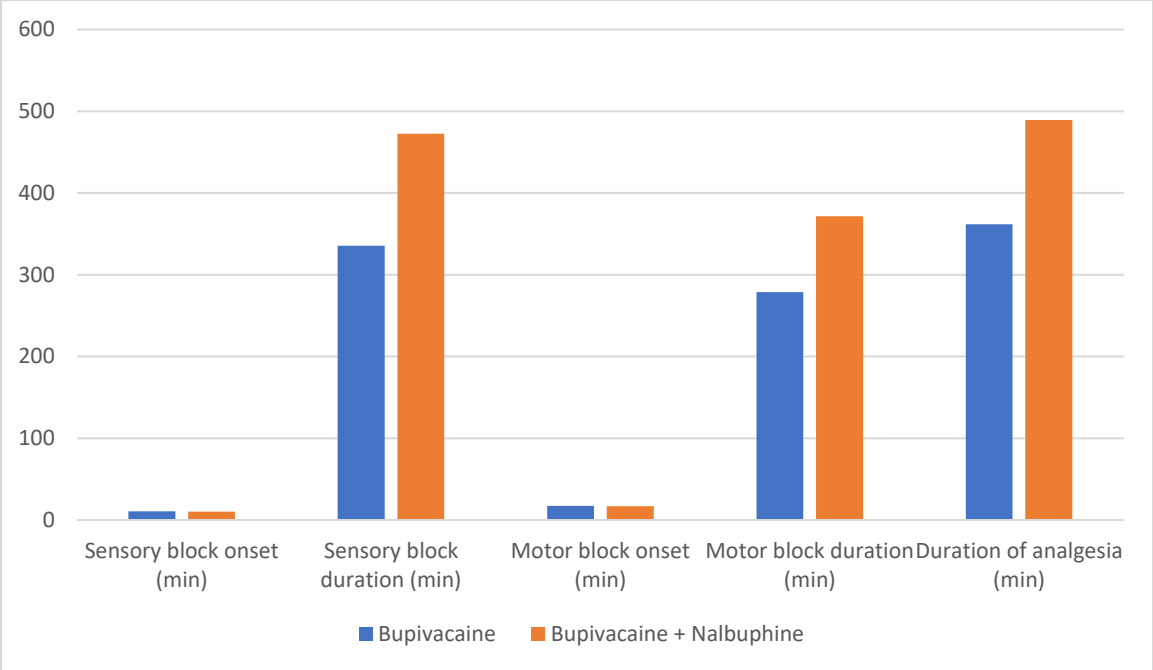

Fig. 1: Comparison of sensory and motor block characteristics and duration of analgesia between the study groups

Postoperative Pain Scores and Adverse Events

Postoperative VAS scores and adverse events are presented in Table 3. Pain scores were comparable between the groups at 1, 2, 3, and 4 hours after surgery, with no statistically significant differences ($p > .05$). At 6 hours, the mean VAS score was 3.62 ± 1.12 in Group I and 2.48 ± 0.96 in Group II ($p < .001$). At 8 hours, the corresponding scores were 4.21 ± 1.18 and 2.91 ± 1.02, respectively ($p < .001$). At 10 hours, the mean VAS score was 4.76 ± 1.24 in Group I and 3.36 ± 1.11 in Group II ($p < .001$). At 12 hours, the difference was not statistically significant ($p = .191$).

Adverse events were infrequent in both groups. One participant in Group I developed transient Horner syndrome (1.6%), whereas one participant in Group II experienced self-limiting nausea (1.6%). No cases of hypotension, arrhythmia, dyspnoea, or local anaesthetic systemic toxicity were reported in either group.

Table 3 *Postoperative Visual Analogue Scale Scores and Adverse Events*

Parameter	Group I: Bupivacaine (n = 61)	Group II: Bupivacaine + Nalbuphine (n = 61)	*p*
VAS at 1 hour, *M* ± *SD*	1.12 ± 0.74	1.05 ± 0.68	.584
VAS at 2 hours, *M* ± *SD*	1.34 ± 0.82	1.27 ± 0.76	.621
VAS at 3 hours, *M* ± *SD*	1.68 ± 0.91	1.49 ± 0.83	.219
VAS at 4 hours, *M* ± *SD*	2.14 ± 0.97	1.86 ± 0.89	.104
VAS at 6 hours, *M* ± *SD*	3.62 ± 1.12	2.48 ± 0.96	< .001
VAS at 8 hours, *M* ± *SD*	4.21 ± 1.18	2.91 ± 1.02	< .001
VAS at 10 hours, *M* ± *SD*	4.76 ± 1.24	3.36 ± 1.11	< .001

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VAS at 12 hours, *M* ± *SD*	3.48 ± 1.16	3.21 ± 1.08	.191
Horner syndrome, *n* (%)	1 (1.6)	0 (0.0)	1.000
Nausea, *n* (%)	0 (0.0)	1 (1.6)	1.000
Hypotension, *n* (%)	0 (0.0)	0 (0.0)	—
Arrhythmia, *n* (%)	0 (0.0)	0 (0.0)	—
Dyspnoea, *n* (%)	0 (0.0)	0 (0.0)	—
Local anaesthetic systemic toxicity, *n* (%)	0 (0.0)	0 (0.0)	—

Note. VAS = visual analogue scale; *M* = mean; *SD* = standard deviation; *n* = number of participants. VAS scores ranged from 0 to 10, with higher scores indicating greater pain. Dashes indicate that a statistical comparison was not reported for events absent in both groups.

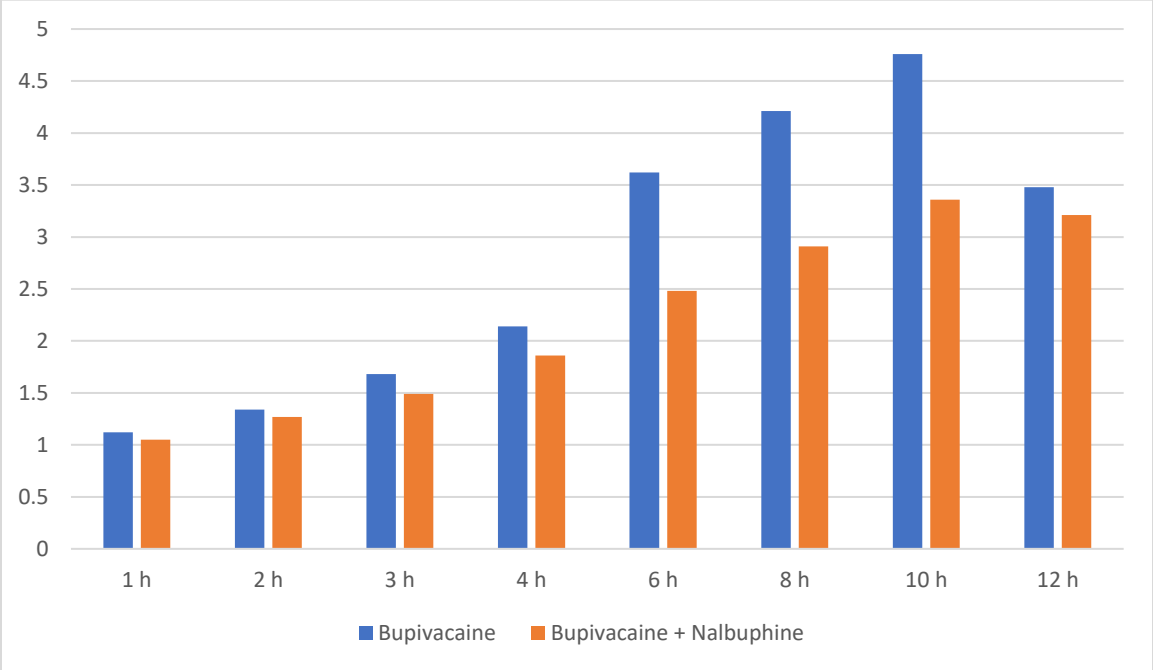

Fig. 2: Comparison of mean postoperative VAS scores between the study groups

Discussion

The present study evaluated 122 patients undergoing upper-limb surgery under ultrasound-guided axillary brachial plexus block and compared bupivacaine alone with bupivacaine combined with nalbuphine. Both groups were comparable in terms of demographic characteristics and duration of surgery. No significant intergroup differences were observed in heart rate or mean arterial pressure throughout the observation period, indicating that the addition of nalbuphine did not produce significant haemodynamic alterations. Similar findings have been reported in previous studies evaluating nalbuphine as an adjuvant to local anaesthetics for ultrasound-guided brachial plexus blockade [14, 15].

In the present study, nalbuphine did not significantly influence the onset of sensory or motor blockade; however, it significantly prolonged the duration of both sensory and motor block. This observation is consistent with earlier studies in which the addition of 20 mg nalbuphine to bupivacaine prolonged sensory and motor blockade without

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significantly affecting block onset [12]. Similar findings have been reported with nalbuphine combined with levobupivacaine [16] and ropivacaine under ultrasound guidance [17]. The prolongation of blockade may be attributed to an additive or synergistic interaction between nalbuphine and the local anaesthetic, although the exact mechanism responsible for its peripheral action remains incompletely established.

A significant prolongation of postoperative analgesia was also observed following the addition of nalbuphine. Although postoperative visual analogue scale (VAS) scores were comparable between the groups during the first 4 hours, significantly lower pain scores were observed in the nalbuphine group at 6, 8, and 10 hours, with no significant difference at 12 hours. These findings suggest that nalbuphine extended postoperative analgesia during the later postoperative period. Previous studies have similarly demonstrated prolonged analgesia with nalbuphine–bupivacaine combinations [12, 14], while other investigations using nalbuphine with different local anaesthetics have reported improved postoperative pain control and reduced analgesic requirements [18, 19]. Thus, adding nalbuphine may provide a clinically useful extension of analgesia following peripheral nerve blockade.

The overall safety profile of the intervention was favourable, with only isolated minor adverse events observed. Transient Horner syndrome occurred in one patient receiving bupivacaine alone, while one patient receiving nalbuphine experienced self-limiting nausea. No cases of hypotension, arrhythmia, dyspnoea, or local anaesthetic systemic toxicity were recorded. These findings are consistent with previous reports describing a favourable safety profile for nalbuphine as an adjuvant in brachial plexus blocks [12, 14]. However, nausea has been reported with nalbuphine administration, and its incidence may vary with the dose used [20, 21]. Given the limited number of adverse events in the present study, the findings should be interpreted cautiously and do not establish the absence of uncommon adverse effects.

Overall, the findings suggest that nalbuphine as an adjuvant to bupivacaine in ultrasound-guided axillary brachial plexus block prolonged sensory and motor blockade and postoperative analgesia without significant differences in the measured haemodynamic parameters. Further studies involving larger populations and different clinical settings are warranted to confirm these findings and evaluate the safety and applicability of this combination.

Conclusion

The addition of nalbuphine to bupivacaine in ultrasound-guided axillary brachial plexus block significantly prolonged the duration of sensory and motor blockade and postoperative analgesia compared with bupivacaine alone, without significantly affecting the onset of block or perioperative haemodynamic parameters. The nalbuphine group also demonstrated lower postoperative pain scores during the later postoperative period, with no increase in major adverse effects. Therefore, nalbuphine appears to be a safe and effective adjuvant to bupivacaine for improving the duration and quality of postoperative analgesia following ultrasound-guided axillary brachial plexus block.

Limitations

This study was limited by its relatively small sample size and single-centre setting, which may restrict the generalizability of the findings. The follow-up period was limited to the first 12 postoperative hours, and the low incidence of adverse events limited the assessment of uncommon complications. Further studies with larger sample sizes and longer follow-up periods are warranted.

Recommendations

The addition of nalbuphine to bupivacaine may be considered as an adjuvant in ultrasound-guided axillary brachial plexus block to prolong sensory and motor blockade and postoperative analgesia in patients undergoing upper-limb surgery. Future multicentre randomized controlled trials with larger sample sizes should evaluate different nalbuphine doses, opioid-related adverse effects, rescue analgesic consumption, patient satisfaction, and the duration of postoperative pain relief.

Acknowledgement

[To be completed by the authors.]

List of Abbreviations

- ASA – American Society of Anesthesiologists
- MAP – Mean Arterial Pressure
- SD – Standard Deviation
- SPSS – Statistical Package for the Social Sciences
- VAS – Visual Analogue Scale

Conflict of Interest

The authors declare no conflict of interest.

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Author Contributions
[To be completed for each author according to the CRediT (Contributor Roles Taxonomy) framework, specifying contributions to conceptualization, methodology, investigation, data curation, formal analysis, writing—original draft, writing—review and editing, supervision, and project administration, as applicable.]

Data Availability
The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to applicable institutional and ethical requirements.

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The authors received no specific funding for this study.

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References
1. Mian A, Chaudhry I, Huang R, Rizk E, Tubbs RS, Loukas M. Brachial plexus anesthesia: a review of the relevant anatomy, complications, and anatomical variations. Clin Anat. 2014;27(2):210-21. https://doi.org/10.1002/ca.22254
2. Neal MJ, Hebl MJ, Gerancher MD, Hogan MQ. Brachial plexus anesthesia: essentials of our current understanding. Reg Anesth Pain Med. 2002;27(4):402-28. https://doi.org/10.1053/rapm.2002.34377 https://doi.org/10.1097/00115550-200207000-00010
3. Kaye AD, Allampalli V, Fisher P, Kaye AJ, Tran A, Cornett EM, et al. Supraclavicular vs. infraclavicular brachial plexus nerve blocks: clinical, pharmacological, and anatomical considerations. Anesth Pain Med. 2021;11(5):e120658. https://doi.org/10.5812/aapm.120658
4. Bowness J, Taylor A. Ultrasound-guided regional anaesthesia: visualising the nerve and needle. In: Biomedical Visualisation. 2020;6:19-34. https://doi.org/10.1007/978-3-030-37639-0_2
5. Wu Z, Wang Y. Development of guidance techniques for regional anesthesia: past, present and future. J Pain Res. 2021;14:1631-41. https://doi.org/10.2147/JPR.S316743
6. Soeding PF, Sha S, Royse CF, Marks P, Hoy G, Royse AG. A randomized trial of ultrasound-guided brachial plexus anaesthesia in upper limb surgery. Anaesth Intensive Care. 2005;33(6):719-25. https://doi.org/10.1177/0310057X0503300603
7. Casati A, Danelli G, Baciarello M, Corradi M, Leone S, Di Cianni S, et al. A prospective, randomized comparison between ultrasound and nerve stimulation guidance for multiple injection axillary brachial plexus block. Anesthesiology. 2007;106(5):992-6. https://doi.org/10.1097/01.anes.0000265159.55179.e1
8. Xuan C, Yan W, Wang D, Li C, Ma H, Mueller A, et al. The facilitatory effects of adjuvant pharmaceutics to prolong the duration of local anesthetic for peripheral nerve block: a systematic review and network meta-analysis. Anesth Analg. 2021;133(3):620-9. https://doi.org/10.1213/ANE.0000000000005640
9. Luo J, Duan G, Huang H, Chen G. Research status of different adjuvants on nerve block's effect. Pain Physician. 2024;27(8):507. https://doi.org/10.36076/ppj.2024.7.507
10. Harbour Beach FL, Jha SS, Solutions SJ. Prolonging peripheral nerve blocks in adults: a narrative review of adjunct medications for single-injection techniques. Pain Physician. 2026;29:307-15.
11. Theodorou-Kanakari A, Karathanasi S, Lykoudis PM, Rekatsina M, Lelekaki E, Gavriilaki M, et al. Intrathecal nalbuphine versus other opioids as an adjuvant to 0.5% hyperbaric bupivacaine in caesarean section: a systematic review and meta-analysis. J Clin Med. 2026;15(11):4108. https://doi.org/10.3390/jcm15114108
12. Abdelhaq MM, Elramely MA. Effect of nalbuphine as an adjuvant to bupivacaine for ultrasound-guided supraclavicular brachial plexus block. Open J Anesthesiol. 2016;6(3):20-6. https://doi.org/10.4236/ojanes.2016.63004
13. Patel MA, Gadsden JC, Nedeljkovic SS, Bao X, Zeballos JL, Yu V, et al. Brachial plexus block with liposomal bupivacaine for shoulder surgery improves

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Original Article

analgesia and reduces opioid consumption: results from a multicenter, randomized, double-blind, controlled trial. Pain Med. 2020;21(2):387-400. https://doi.org/10.1093/pm/pnz103
14. Gupta K, Jain M, Gupta PK, Rastogi B, Zuberi A, Pandey MN. Nalbuphine as an adjuvant to 0.5% bupivacaine for ultrasound-guided supraclavicular brachial plexus blockade. Indian J Pain. 2016;30:176. https://doi.org/10.4103/0970-5333.198024
15. Ankita M, Manisha M, Meenaxi S. Nalbuphine as an adjuvant to 0.75% ropivacaine for supraclavicular brachial plexus blockade. Int J Curr Med Appl Sci. 2017;16:66-70.
16. Das A, Roy Basunia S, Mukherjee A, Biswas H, Biswas R, Mitra T, et al. Perineural nalbuphine in ambulatory upper limb surgery: a comparison of levobupivacaine with and without nalbuphine as adjuvant in supraclavicular brachial plexus block: a prospective, double-blinded, randomized controlled study. Anesth Essays Res. 2017;11:40.https://doi.org/10.4103/0259-1162.200225
17. Kalika P, Xue R, Zheng J, Xiao Y, Zhen M, Ran R. Efficacy of nalbuphine as an adjuvant to ropivacaine in ultrasound-guided supraclavicular brachial block: a prospective randomized controlled study. Chin J Pain. 2020;36:267-72. https://doi.org/10.1097/AJP.0000000000000803
18. Nazir N, Jain S. Randomized controlled trial for evaluating the analgesic effect of nalbuphine as an adjuvant to bupivacaine in supraclavicular block under ultrasound guidance. Anesth Essays Res. 2017;11:326. https://doi.org/10.4103/0259-1162.194590
19. Kalika P, Xue R, Zheng J, Xiao Y, Zhen M, Ran R. Efficacy of nalbuphine as an adjuvant to ropivacaine in ultrasound-guided supraclavicular brachial block: a prospective randomized controlled study. Chin J Pain. 2020;36:267-72. https://doi.org/10.1097/AJP.0000000000000803
20. Kumar R, Chaudhary AK, Verma R, Shyam R, Singh V, Research D. Comparison of fentanyl and nalbuphine as an adjuvant to 0.5% bupivacaine for ultrasound-guided supraclavicular brachial plexus block. Anesthesia. 2019;13:3.https://doi.org/10.7860/JCDR/2019/40042.12699
21. Chiruvella S, Konkyana SK, Nallam SR, Sateesh G. Supraclavicular brachial plexus block: comparison of varying doses of nalbuphine combined with levobupivacaine: a prospective, double-blind, randomized trial. Anesth Essays Res. 2018;12:135. https://doi.org/10.4103/aer.AER_197_17

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