Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/sjhrafrica.v7i2.2763
Original Article

Comparison of dexamethasone and dexmedetomidine as adjuvants to 0.5% bupivacaine in ultrasound-guided infraclavicular brachial plexus block for elective upper limb surgeries: a randomized double-blind comparative study.

Dr. Kammali Akhil[1], *Dr.Sirisha Mutchi*[2], *Dr. Vaddi Preethi*[2*]

[1]*Consultant Anaesthesiologist, DVC Hospital & Research Center, Vadlamudi, Guntur, Andhra Pradesh, India*
[2]*Assistant Professor, Department of Anaesthesiology, Andhra Medical College, Visakhapatnam, Andhra Pradesh, India*

Abstract

Background

Ultrasound-guided infraclavicular brachial plexus block is an effective regional anesthetic technique for upper limb surgery. The addition of adjuvants to long-acting local anesthetics improves block quality and extends postoperative analgesia. Dexamethasone and dexmedetomidine are frequently used, but their comparative clinical profile remains relevant for routine practice.

Objectives

To compare dexamethasone and dexmedetomidine as adjuvants to 0.5% bupivacaine for ultrasound-guided infraclavicular brachial plexus block in elective upper limb surgeries.

Methods: This prospective, randomized, double-blind, parallel-group comparative study was conducted from 1 May 2024 to 30 April 2025 and included 60 adult patients aged 18-60 years with ASA physical status I-II. A computer-generated variable-block sequence with sequentially numbered, opaque, sealed envelopes allocated participants in a 1:1 ratio. Group Dex received 25 mL of 0.5% bupivacaine with 75 mcg dexmedetomidine, while Group D received 25 mL of 0.5% bupivacaine with 6 mg dexamethasone. Sensory and motor onset, block duration, postoperative analgesia, pain scores, hemodynamics, and adverse events were assessed.

Results

Both groups were comparable for age, sex, body mass index, ASA grade, and baseline hemodynamic profile. Group Dex had faster sensory onset (4.27 +/- 1.07 versus 4.82 +/- 0.93 minutes) and motor onset (6.18 +/- 0.95 versus 6.74 +/- 1.05 minutes). Sensory block duration was longer in Group Dex (774.75 +/- 58.01 versus 545.34 +/- 66.43 minutes), as was motor block duration (505.34 +/- 66.43 versus 451.17 +/- 47.02 minutes). Postoperative analgesia was also longer in Group Dex (14.71 +/- 1.85 versus 13.54 +/- 0.75 hours). Early postoperative VAS scores were lower in Group Dex, with similar 24-hour scores.

Conclusion

Dexmedetomidine provided faster onset, longer sensory and motor blockade, longer postoperative analgesia, and better early pain control compared with dexamethasone.

Recommendations

Dexmedetomidine can be considered when prolonged analgesia is preferred, with careful monitoring for bradycardia and sedation.

Keywords: *Brachial plexus block; bupivacaine; dexamethasone; dexmedetomidine; infraclavicular block; postoperative analgesia; ultrasound-guided regional anesthesia.*
Submitted: *April 01, 2026* ***Accepted:*** *May 30, 2026* ***Published:*** *June 27, 2026*

Corresponding Author: ***Dr Vaddi Preethi***
Email id: ***dr.preethi.mbbs@gmail.com***
Assistant Professor, Department of Anaesthesiology, Andhra Medical College, Visakhapatnam, Andhra Pradesh, India

Introduction

Upper limb procedures require an anesthetic plan that provides reliable surgical anesthesia, stable perioperative physiology, and sustained postoperative analgesia. Brachial plexus block is widely used for hand, forearm, elbow, and selected arm surgeries because it limits the need for systemic opioids and supports early recovery. Local anesthetics such as bupivacaine provide dense neural blockade by inhibiting voltage-gated sodium channels, but the duration of a single-injection block is finite and often inadequate for prolonged postoperative comfort [1]. For this reason, adjuvants are commonly combined with local anesthetics to enhance onset, prolong sensory and motor block, and reduce analgesic requirement after surgery [2].

Ultrasound guidance has strengthened the safety and reliability of peripheral nerve blocks by allowing real-time visualization of

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/sjhrafrica.v7i2.2763
Original Article

the axillary artery, surrounding cords, needle tip, and spread of local anesthetic. Compared with landmark or nerve-stimulation techniques, ultrasound guidance improves block success and procedural precision, particularly in upper limb regional anesthesia [3,4]. The infraclavicular approach is clinically attractive because it targets the cords of the brachial plexus below the clavicle and gives consistent anesthesia for distal upper limb surgery with a lower risk of phrenic nerve involvement than proximal approaches.

Dexamethasone is a corticosteroid with anti-inflammatory and membrane-stabilizing properties. Evidence from systematic reviews indicates that perineural dexamethasone prolongs analgesia after peripheral nerve blockade and improves the duration of brachial plexus block when used as a local anesthetic adjunct [5,6]. Dexmedetomidine, a highly selective alpha-2 adrenergic agonist, has also been studied extensively as a perineural adjuvant. Meta-analyses show that it can accelerate sensory and motor onset, extend analgesia, and improve block quality, although dose-dependent bradycardia, hypotension, and sedation remain important considerations [7-9].

Direct comparison between these two adjuvants is clinically important because the preferred agent differs across settings. Some trials and reviews favour dexamethasone for prolonged analgesia and fewer systemic effects, whereas others report superior block duration and early pain relief with dexmedetomidine [10-13]. Variations in local anesthetic choice, adjuvant dose, block approach, outcome definition, and surgical population contribute to this difference. Therefore, institution-specific evidence remains useful for selecting a practical adjuvant in elective upper limb surgery.

The objective of the present study was to compare the efficacy of dexamethasone and dexmedetomidine as adjuvants to 0.5% bupivacaine in ultrasound-guided infraclavicular brachial plexus block among patients undergoing elective upper limb surgeries. The study specifically assessed sensory and motor onset, sensory and motor block duration, postoperative analgesia, postoperative pain scores, intraoperative and postoperative hemodynamic variables, and adverse effects.

Methodology

Study design and setting

This prospective, randomized, double-blind, parallel-group comparative study was conducted in the Departments of Anaesthesiology and Orthopaedics at Andhra Medical College, Visakhapatnam, a tertiary care teaching hospital, from 1 May 2024 to 30 April 2025. Recruitment, intervention delivery, 24-hour follow-up, and outcome assessment were completed during this one-year period. Patients scheduled for elective upper limb procedures under ultrasound-guided infraclavicular brachial plexus block were screened for participation.

Study population and eligibility criteria

Adult patients aged 18-60 years of either sex, belonging to American Society of Anesthesiologists physical status I or II, and scheduled for elective upper limb surgery were eligible. Written informed consent was obtained before enrolment. Patients with known coagulopathy, contraindication to regional anesthesia, allergy to bupivacaine, dexamethasone, or dexmedetomidine, significant chronic systemic disease, psychiatric illness, pre-existing neurological deficit in the operative limb, local infection at the injection site, or chronic opioid use were excluded.

Study size

The study size was calculated for the primary outcome, duration of postoperative analgesia, using G*Power version 3.1.9.7. Based on prior comparative research on dexamethasone and dexmedetomidine in ultrasound-guided infraclavicular brachial plexus block [12], a conservative standardized mean difference (Cohen's d) of 0.75 was assumed. With a two-sided alpha level of 0.05, 80% statistical power, and equal allocation, the minimum required sample was 29 participants per group. This number was rounded upward to 30 participants per group, giving a total study size of 60.

Randomization

Sequence generation and type of randomization

An independent biostatistician who had no role in recruitment, intervention delivery, or outcome assessment generated the random allocation sequence using a computer-based random-number program. Participants were assigned in a 1:1 ratio by permuted block randomization with randomly varying block sizes of four and six. The sequence remained inaccessible to the investigators involved in patient care and data collection.

Allocation concealment mechanism

Allocation concealment was maintained using sequentially numbered, opaque, sealed envelopes. Each envelope contained the treatment code for one participant and was opened only after eligibility had been confirmed, written informed consent had been obtained, and the participant had entered the operating room. The envelopes were prepared in advance, kept in numerical order, and secured with a signature across the seal to prevent premature opening or substitution.

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/sjhrafrica.v7i2.2763
Original Article

Implementation

The independent biostatistician generated the sequence and prepared the coded allocation list. The designated study investigator screened and enrolled eligible participants and assigned the next sequential study number. A study nurse who was not involved in block performance, perioperative care, outcome assessment, or statistical analysis opened the corresponding envelope and prepared the allocated study solution. The coded syringe was then handed to the anaesthesiologist performing the block.

Blinding

Participants, the anaesthesiologist performing the block, perioperative care providers, and the investigator assessing sensory block, motor block, pain scores, hemodynamic variables, rescue analgesia, and adverse events were unaware of group assignment. Both study solutions were prepared to an identical total volume of 26.5 mL in identical syringes labelled only with the participant code. The allocation code was retained by the independent study nurse and was not released until completion of data entry and analysis, except when emergency unblinding was considered necessary for patient safety.

Interventions

Group Dex received 25 mL of 0.5% bupivacaine with 75 mcg dexmedetomidine (0.75 mL) and 0.75 mL of 0.9% normal saline, producing a total volume of 26.5 mL. Group D received 25 mL of 0.5% bupivacaine with 6 mg dexamethasone (1.5 mL), also producing a total volume of 26.5 mL. Standard monitoring included electrocardiography, non-invasive blood pressure, and pulse oximetry. With the patient supine and the head turned away from the operative side, the infraclavicular region was prepared aseptically. A high-frequency linear ultrasound transducer was placed parasagittally below the clavicle and medial to the coracoid process to identify the axillary artery and brachial plexus cords. A 22-gauge insulated needle was advanced using an in-plane technique. After negative aspiration, the assigned solution was injected incrementally with repeated aspiration and real-time visualization of local anesthetic spread.

Outcome measures

Sensory block was assessed every 5 minutes for 30 minutes using pinprick testing in the median, ulnar, radial, and musculocutaneous nerve distributions. It was graded as 0 for normal sensation, 1 for decreased sensation, and 2 for complete loss of sensation. Motor block was assessed with a modified Bromage scale for upper limb movement. The primary outcome was duration of postoperative analgesia, defined as the interval from completion of block to first request for rescue analgesia. Secondary outcomes were sensory onset, motor onset, sensory and motor block duration, visual analogue scale scores at 2, 4, 6, 12, and 24 hours, hemodynamic changes, and adverse events including nausea, vomiting, hypotension, and bradycardia.

Statistical analysis

Data were entered in Microsoft Excel and analysed using IBM SPSS version 27. Continuous variables were expressed as mean +/- standard deviation. Categorical variables were summarized as frequency and percentage. Between-group comparison of continuous variables was performed using the unpaired t-test after checking distributional suitability. Categorical variables were compared using the chi-square test. A p value below 0.05 was considered statistically significant.

Ethical considerations

Institutional Ethics Committee approval was obtained from Andhra Medical College, Visakhapatnam, before initiation of the study (IEC approval number: 103/IEC AMC/APR2024). All participants were informed about the study purpose, procedure, expected benefits, and possible risks. Written informed consent was obtained from each participant before enrolment. Data were coded before analysis to preserve confidentiality. The study was conducted in accordance with standard ethical principles for clinical research.

Results

Participant flow

Between 1 May 2024 and 30 April 2025, 60 patients were assessed for eligibility. All 60 satisfied the eligibility criteria, provided written informed consent, and underwent randomization. Thirty participants were assigned to Group Dex and 30 to Group D. Every randomized participant received the intended intervention and completed the 24-hour follow-up. There were no post-randomization exclusions, treatment discontinuations, withdrawals, protocol-related losses, or missing primary-outcome data. Consequently, 30 participants in each group were included in the primary and secondary outcome analyses (Figure 1).

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/sjhrafrica.v7i2.2763
Original Article

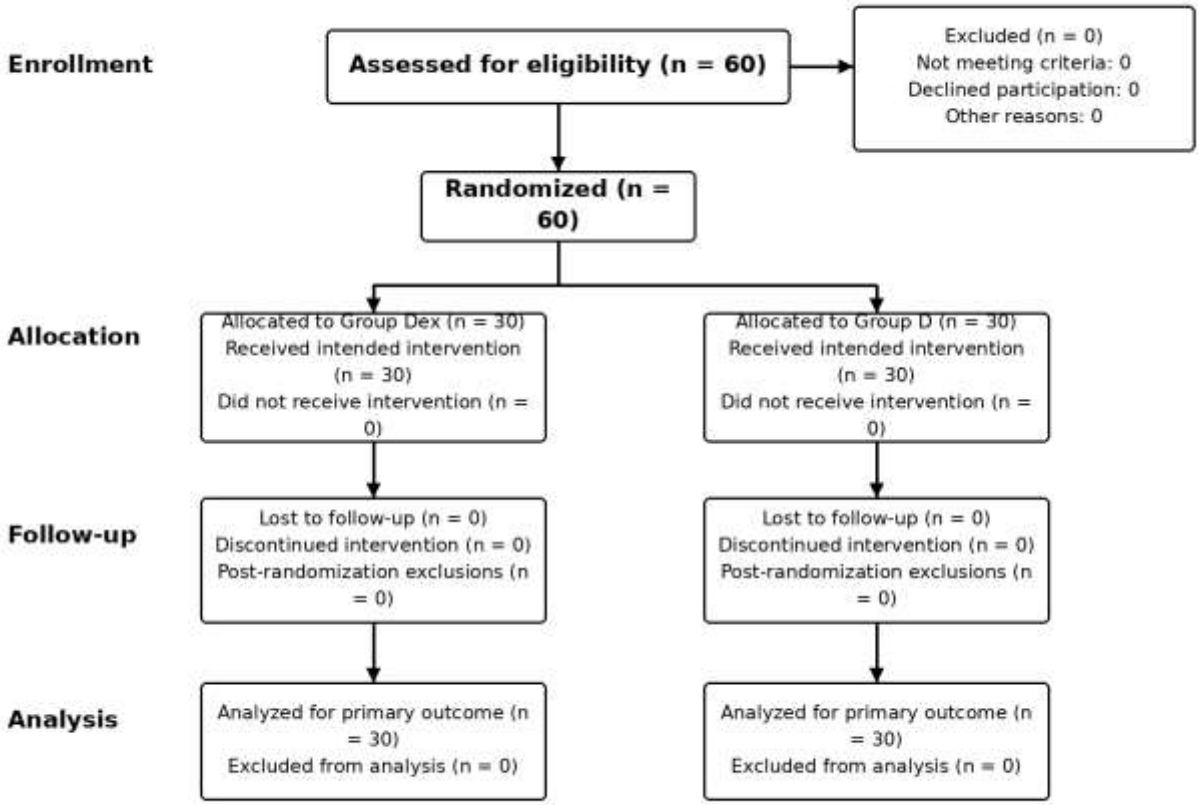

Figure 1: *Participant flow through the randomized trial*

The mean age of the overall study population was 35.51 ± 5.85 years. Both groups were comparable with respect to age, sex distribution, body mass index, ASA physical status, and baseline hemodynamic variables, indicating adequate baseline similarity before intervention (Table 1).

Table 1: *Baseline Demographic and Clinical Characteristics of the Study Participants*

Variable	Group Dex (n=30)	Group D (n=30)	*p*
Age (years), mean ± SD	35.40 ± 5.84	35.63 ± 5.95	.881
Male, n (%)	22 (73.33)	27 (90.00)	.182
Female, n (%)	8 (26.67)	3 (10.00)	.182
BMI (kg/m2), mean ± SD	22.51 ± 1.82	22.30 ± 1.80	.654
ASA I, n (%)	26 (86.67)	22 (73.33)	.332
ASA II, n (%)	4 (13.33)	8 (26.67)	.332
Baseline HR (beats/min), mean ± SD	84.83 ± 8.23	80.67 ± 7.81	.290
Baseline SBP (mmHg), mean ± SD	123.33 ± 9.30	121.70 ± 9.45	.690

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/sjhrafrica.v7i2.2763
Original Article

Variable	Group Dex (n=30)	Group D (n=30)	*p*
Baseline DBP (mmHg), mean ± SD	78.00 ± 8.51	75.87 ± 6.64	.520
Baseline SpO2 (%), mean ± SD	98.90 ± 0.30	98.87 ± 0.34	.800

Note. Values are presented as mean ± SD or n (%). ASA = American Society of Anesthesiologists; BMI = body mass index; DBP = diastolic blood pressure; HR = heart rate; SBP = systolic blood pressure; SpO2 = peripheral oxygen saturation.

The onset of both sensory and motor blockade was significantly faster in Group Dex than in Group D. Group Dex also demonstrated a clearly longer duration of sensory block, motor block, and postoperative analgesia. The mean duration of sensory block was 774.75 ± 58.01 minutes in Group Dex compared with 545.34 ± 66.43 minutes in Group D. The time to rescue analgesia was 14.71 ± 1.85 hours in Group Dex and 13.54 ± 0.75 hours in Group D (Table 2).

Table 2: *Block Characteristics and Postoperative Analgesia*

Outcome	Group Dex (n=30)	Group D (n=30)	*p*
Sensory onset time (min), mean ± SD	4.27 ± 1.07	4.82 ± 0.93	.030
Motor onset time (min), mean ± SD	6.18 ± 0.95	6.74 ± 1.05	.034
Sensory block duration (min), mean ± SD	774.75 ± 58.01	545.34 ± 66.43	< .001
Motor block duration (min), mean ± SD	505.34 ± 66.43	451.17 ± 47.02	< .001
Postoperative analgesia (hours), mean ± SD	14.71 ± 1.85	13.54 ± 0.75	.002

Note. Values are presented as mean ± SD. Group Dex = dexmedetomidine group; Group D = dexamethasone group.

Postoperative VAS scores were lower in Group Dex at 2, 4, 6, and 12 hours, suggesting better early postoperative pain control with dexmedetomidine. At 24 hours, pain scores were nearly identical between the groups, and the difference was not statistically significant (Table 3).

Table 3: *Postoperative Visual Analogue Scale Scores at Different Time Points*

Time point	Group Dex (n=30)	Group D (n=30)	*p*
2 hours	0.77 ± 0.16	1.23 ± 0.16	.036
4 hours	0.97 ± 0.17	1.45 ± 0.18	.031
6 hours	1.26 ± 0.18	1.86 ± 0.20	.042
12 hours	2.01 ± 0.35	2.58 ± 0.28	.015
24 hours	3.39 ± 0.43	3.38 ± 0.45	.635

Note. Values are presented as mean ± SD. VAS = visual analogue scale.

Serial heart rate and systolic blood pressure values remained clinically stable in both groups during the postoperative observation period. None of the between-group comparisons for heart rate or systolic blood pressure reached statistical significance at the assessed time points (Table 4).

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/sjhrafrica.v7i2.2763
Original Article

Table 4: *Heart Rate and Systolic Blood Pressure Trends*

Time	HR Group Dex	HR Group D	*p*	SBP Group Dex	SBP Group D	*p*
15 min	87.37 ± 7.15	86.53 ± 6.07	.546	125.28 ± 10.39	126.24 ± 9.84	.458
30 min	86.23 ± 7.19	84.90 ± 6.13	.366	120.31 ± 7.73	121.12 ± 12.55	.832
45 min	84.80 ± 7.15	83.40 ± 6.20	.313	118.64 ± 7.15	117.94 ± 10.67	.416
60 min	83.57 ± 7.14	82.10 ± 6.13	.276	119.87 ± 6.76	118.40 ± 7.09	.642
2 hrs	82.07 ± 7.09	80.70 ± 6.11	.308	120.14 ± 6.42	118.98 ± 11.21	.235
4 hrs	80.80 ± 7.55	79.53 ± 6.14	.476	119.65 ± 7.73	118.78 ± 7.54	.078
8 hrs	79.53 ± 7.59	78.43 ± 6.20	.554	120.68 ± 7.96	119.58 ± 8.32	.523
16 hrs	78.33 ± 7.71	77.33 ± 6.13	.621	120.94 ± 7.32	118.12 ± 8.28	.184
24 hrs	77.27 ± 7.62	76.07 ± 6.16	.562	120.12 ± 6.82	119.70 ± 6.55	.591

Note. Values are presented as mean ± SD. HR = heart rate; SBP = systolic blood pressure.

Diastolic blood pressure and mean arterial pressure also remained stable across the assessment period. Although Group Dex showed numerically higher diastolic pressure at several time points, the differences were not statistically significant.

Mean arterial pressure showed no significant between-group variation throughout follow-up (Table 5).

Table 5: *Diastolic Blood Pressure and Mean Arterial Pressure Trends*

Time	DBP Group Dex	DBP Group D	*p*	MAP Group Dex	MAP Group D	*p*
15 min	75.18 ± 6.82	69.52 ± 3.85	.087	92.52 ± 5.48	91.75 ± 5.65	.487
30 min	74.87 ± 6.82	68.64 ± 5.41	.321	91.94 ± 5.97	89.68 ± 6.21	.192
45 min	74.52 ± 6.29	70.21 ± 5.12	.436	90.86 ± 5.56	88.75 ± 6.15	.083
60 min	74.56 ± 6.16	70.75 ± 4.83	.825	90.86 ± 5.42	88.56 ± 5.87	.078
2 hrs	74.11 ± 7.24	70.92 ± 3.42	.205	89.86 ± 5.95	87.94 ± 5.32	.062
4 hrs	74.03 ± 6.82	71.18 ± 3.82	.378	88.86 ± 5.18	87.25 ± 5.96	.053
8 hrs	73.93 ± 5.86	71.36 ± 7.65	.523	87.86 ± 4.93	86.72 ± 5.48	.523
16 hrs	73.82 ± 6.82	71.64 ± 3.85	.096	85.86 ± 4.68	84.18 ± 6.31	.192
24 hrs	73.66 ± 6.82	71.95 ± 5.67	.591	84.69 ± 4.73	82.15 ± 5.04	.214

Note. Values are presented as mean ± SD. DBP = diastolic blood pressure; MAP = mean arterial pressure.

Adverse events were infrequent. Nausea occurred in one patient in each group. Bradycardia was observed in one patient in Group Dex, while no patient in either group developed hypotension. Most patients had no documented adverse effect during the observation period (Table 6).

Table 6: *Adverse Effects Among the Study Participants*

Adverse effect	Group Dex (n=30)	Group D (n=30)	Total (n=60)
None	28	29	57
Nausea	1	1	2
Hypotension	0	0	0
Bradycardia	1	0	1
Total	30	30	60

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/sjhrafrica.v7i2.2763
Original Article

Note. Values are presented as frequencies. Group Dex = dexmedetomidine group; Group D = dexamethasone group

Discussion

The present randomized double-blind comparative study found that dexmedetomidine, when added to 0.5% bupivacaine for ultrasound-guided infraclavicular brachial plexus block, produced faster sensory and motor onset, longer block duration, and longer postoperative analgesia than dexamethasone. The difference was clinically meaningful for sensory blockade, with an average extension of more than three hours in Group Dex. Early postoperative VAS scores were also lower in the dexmedetomidine group, supporting improved analgesic quality during the period when rebound pain frequently begins after single-injection regional anesthesia.

The faster onset observed with dexmedetomidine is biologically plausible. Alpha-2 agonists enhance local anesthetic action through hyperpolarization-activated cation current inhibition, reduced neuronal firing, and local vasoconstrictive effects that delay systemic absorption [7,9]. These mechanisms explain the earlier onset of sensory and motor block seen in this study. Dai et al. reported that dexmedetomidine added to ropivacaine shortened onset time and prolonged analgesia in brachial plexus block, which is consistent with the present findings [8]. The current data also align with evidence that perineural dexmedetomidine improves block quality, although hemodynamic surveillance remains essential [7,9].

The results differ from some reports favouring dexamethasone. Albrecht et al. suggested that dexamethasone could be superior

to dexmedetomidine as a perineural adjunct in supraclavicular brachial plexus block, and Aliste et al. reported longer sensorimotor block with dexamethasone compared with dexmedetomidine in ultrasound-guided infraclavicular block [10,11]. Iyengar et al. also reported favourable analgesic duration with dexamethasone in an infraclavicular block population [12]. Differences in adjuvant dose, local anesthetic concentration, block site, surgical case mix, outcome definitions, and analgesic protocols probably account for these variations across studies.

Pain scores in this study were significantly lower in the dexmedetomidine group up to 12 hours, but not at 24 hours. This pattern suggests that dexmedetomidine mainly improves the early postoperative analgesic window rather than pain after complete block resolution. Singh et al. and Venkatraman et al. also observed clinically important differences between dexmedetomidine and dexamethasone in onset, analgesic duration, and postoperative pain parameters in ultrasound-guided brachial plexus blocks [13,14]. Hemodynamic stability was acceptable in both groups. Only one patient in the dexmedetomidine group developed bradycardia, and hypotension was not recorded, indicating that the selected dose was generally well tolerated.

Generalizability

The findings are applicable to adult ASA I-II patients undergoing elective upper limb surgery in tertiary care settings where ultrasound-guided infraclavicular block is routinely performed by trained anesthesiologists. The results are most relevant when 25 mL of 0.5% bupivacaine is used with either 75 mcg dexmedetomidine or 6 mg dexamethasone. Extrapolation to emergency trauma, elderly high-risk patients, paediatric patients, different local anesthetic volumes, or catheter-based blocks requires separate validation.

Conclusion

In this randomized double-blind comparative study, dexmedetomidine was more effective than dexamethasone as an adjuvant to 0.5% bupivacaine for ultrasound-guided infraclavicular brachial plexus block in elective upper limb surgeries. Dexmedetomidine produced faster sensory and motor onset, substantially longer sensory block, longer motor block, prolonged postoperative analgesia, and lower early postoperative VAS scores. Hemodynamic parameters remained stable in both groups, and adverse events were uncommon. One episode of bradycardia occurred in the dexmedetomidine group, emphasizing the need for monitoring. Overall, dexmedetomidine appears to be a useful adjuvant when prolonged analgesia and improved early postoperative comfort are desired.

Limitations

This study was conducted at a single tertiary care centre with a modest sample size of 60 patients. The follow-up period was limited to 24 hours, so delayed neurological symptoms, rebound pain, and longer analgesic outcomes were not evaluated. Plasma drug concentrations and sedation scores were not assessed. Surgical procedure heterogeneity also influenced pain intensity and analgesic requirement.

Recommendations

Dexmedetomidine can be considered as an adjuvant to 0.5% bupivacaine for ultrasound-guided infraclavicular brachial plexus block when prolonged postoperative analgesia is the clinical priority. Continuous monitoring of heart rate, blood pressure, and sedation is recommended, especially in patients with conduction abnormalities, beta-blocker use, or low baseline heart rate. Future multicentre randomized studies with larger

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/sjhrafrica.v7i2.2763
Original Article

samples should compare different dexmedetomidine doses, intravenous versus perineural routes, rebound pain, patient satisfaction, opioid consumption, and functional recovery. Standardized rescue analgesic protocols should be used to strengthen comparability across studies.

Acknowledgement

The authors thank the Department of Anaesthesiology, Department of Orthopaedics, operation theatre staff, nursing personnel, and study participants for their cooperation. The authors also acknowledge institutional support during patient recruitment, monitoring, data collection, and completion of this clinical research work.

Abbreviations

ASA - American Society of Anesthesiologists
BMI - Body mass index
DBP - Diastolic blood pressure
ECG - Electrocardiography
HR - Heart rate
ICBPB - Infraclavicular brachial plexus block
IEC - Institutional Ethics Committee
IV - Intravenous
MAP - Mean arterial pressure
NIBP - Non-invasive blood pressure
PCA - Patient-controlled analgesia
PNB - Peripheral nerve block
SBP - Systolic blood pressure
SD - Standard deviation
SpO2 - Peripheral oxygen saturation
VAS - Visual analogue scale

Source of funding

The study had no funding.

Conflict of interest

The authors declare no conflict of interest.

Author contributions

KA-Concept and design of the study, results interpretation, review of literature and preparing first draft of manuscript. Statistical analysis and interpretation, revision of manuscript. **SM**-results interpretation, review of literature and preparing first draft of manuscript, revision of manuscript.**VP**-review of literature and preparing first draft of manuscript, revision of manuscript.

Data availability

Data available on request

Author Biography

Dr. Kammali Akhil is a Consultant Anaesthesiologist at DVC Hospital & Research Center, Vadlamudi, Guntur, Andhra Pradesh, India. He is involved in perioperative patient care, regional anaesthesia, airway management, and anaesthetic support for surgical procedures. His areas of clinical interest include safe anaesthetic practice, perioperative monitoring, and pain management.

Dr. Sirisha Mutchi is an Assistant Professor in the Department of Anaesthesiology at Andhra Medical College, Visakhapatnam, Andhra Pradesh, India. She is involved in undergraduate and postgraduate teaching, clinical anaesthesia services, perioperative care, and academic activities. Her areas of interest include regional anaesthesia, perioperative medicine, postoperative analgesia, airway management, and patient safety in anaesthesia practice.

Dr. Vaddi Preethi completed her MBBS from GSL Medical College, Rajahmundry, Andhra Pradesh, and obtained her MD in Anaesthesia from Great Eastern Medical School and Hospital, Srikakulam. She subsequently worked as a Senior Resident in the Department of Anaesthesia at Great Eastern Medical School and Hospital, Srikakulam, where she gained clinical and academic experience in perioperative anaesthesia care, airway management, regional anaesthesia, and critical care support. She is currently working as an Assistant Professor in the Department of Anaesthesia at Andhra Medical College, Visakhapatnam. Her areas of academic interest include clinical anaesthesia, perioperative medicine, regional anaesthesia, and patient safety. **ORCID iD**: https://orcid.org/0009-0008-5694-8817

References

1. Taylor A, McLeod G. Basic pharmacology of local anaesthetics. BJA Educ. 2020;20(2):34-41. doi:10.1016/j.bjae.2019.10.002. PMID:33456928. https://doi.org/10.1016/j.bjae.2019.10.002

2. Swain A, Nag DS, Sahu S, Samaddar DP. Adjuvants to local anesthetics: Current understanding and future trends. World J Clin Cases. 2017;5(8):307-323. doi:10.12998/wjcc.v5.i8.307. PMID:28868303. https://doi.org/10.12998/wjcc.v5.i8.307

3. Lewis SR, Price A, Walker KJ, McGrattan K, Smith AF. Ultrasound guidance for upper and lower limb blocks. Cochrane Database Syst Rev. 2015;(9):CD006459.

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/sjhrafrica.v7i2.2763
Original Article

doi:10.1002/14651858.CD006459.pub3. PMID:26361135. https://doi.org/10.1002/14651858.CD006459.pub3

4. Neal JM, Brull R, Chan VW, Grant SA, Horn JL, Liu SS, et al. The ASRA evidence-based medicine assessment of ultrasound-guided regional anesthesia and pain medicine: Executive summary. Reg Anesth Pain Med. 2010;35(2 Suppl):S1-S9. doi:10.1097/AAP.0b013e3181d22fe0. PMID:20216019. https://doi.org/10.1097/AAP.0b013e3181d22fe0

5. Albrecht E, Kern C, Kirkham KR. A systematic review and meta-analysis of perineural dexamethasone for peripheral nerve blocks. Anaesthesia. 2015;70(1):71-83. doi:10.1111/anae.12823. PMID:25123271. https://doi.org/10.1111/anae.12823

6. Choi S, Rodseth R, McCartney CJL. Effects of dexamethasone as a local anaesthetic adjuvant for brachial plexus block: A systematic review and meta-analysis of randomized trials. Br J Anaesth. 2014;112(3):427-439. doi:10.1093/bja/aet417. PMID:24413428. https://doi.org/10.1093/bja/aet417

7. Vorobeichik L, Brull R, Abdallah FW. Evidence basis for using perineural dexmedetomidine to enhance the quality of brachial plexus nerve blocks: A systematic review and meta-analysis of randomized controlled trials. Br J Anaesth. 2017;118(2):167-181. doi:10.1093/bja/aew411. PMID:28100520.https://doi.org/10.1093/bja/aew411

8. Dai W, Tang M, He K. The effect and safety of dexmedetomidine added to ropivacaine in brachial plexus block: A meta-analysis of randomized controlled trials. Medicine (Baltimore). 2018;97(41):e12573. doi:10.1097/MD.0000000000012573. PMID:30313043. https://doi.org/10.1097/MD.0000000000012573

9. Cai H, Fan X, Feng P, Wang X, Xie Y. Optimal dose of perineural dexmedetomidine to prolong analgesia after brachial plexus blockade: A systematic review and meta-analysis of 57 randomized clinical trials. BMC Anesthesiol. 2021;21(1):233. doi:10.1186/s12871-021-01452-0. PMID:34583650. https://doi.org/10.1186/s12871-021-01452-0

10. Albrecht E, Vorobeichik L, Jacot-Guillarmod A, Fournier N, Abdallah FW. Dexamethasone is superior to dexmedetomidine as a perineural adjunct for supraclavicular brachial plexus block: Systematic review and indirect meta-analysis. Anesth Analg. 2019;128(3):543-554. doi:10.1213/ANE.0000000000003860. PMID:30303864. https://doi.org/10.1213/ANE.0000000000003860

11. Aliste J, Layera S, Bravo D, Fernandez D, Jara A, Garcia A, et al. Randomized comparison between perineural dexamethasone and dexmedetomidine for ultrasound-guided infraclavicular block. Reg Anesth Pain Med. 2019;44(10):rapm-2019-100680. doi:10.1136/rapm-2019-100680. PMID:31300595. https://doi.org/10.1136/rapm-2019-100680

12. Iyengar SS, Pangotra A, Abhishek K, Sinha N, Rao NS, Singh VK, et al. The comparison of dexmedetomidine to dexamethasone as adjuvants to bupivacaine in ultrasound-guided infraclavicular brachial plexus block in upper limb surgeries. Cureus. 2023;15(7):e41668. doi:10.7759/cureus.41668. PMID:37575723. https://doi.org/10.7759/cureus.41668

13. Singh N, Gupta S, Kathuria S. Dexmedetomidine vs dexamethasone as an adjuvant to 0.5% ropivacaine in ultrasound-guided supraclavicular brachial plexus block. J Anaesthesiol Clin Pharmacol. 2020;36(2):238-243. doi:10.4103/joacp.JOACP_176_19. PMID:33013041. https://doi.org/10.4103/joacp.JOACP_176_19

14. Venkatraman R, Pushparani A, Karthik K, Nandhini P. Comparison of morphine, dexmedetomidine and dexamethasone as an adjuvant to ropivacaine in ultrasound-guided supraclavicular brachial plexus block for postoperative analgesia: A randomized controlled trial. J Anaesthesiol Clin Pharmacol. 2021;37(1):102-107. doi:10.4103/joacp.JOACP_350_18. PMID:34103832. https://doi.org/10.4103/joacp.JOACP_70_19

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.7 No. 2 (2026): June 2026 Issue
https://doi.org/10.51168/sjhrafrica.v7i2.2763
Original Article

PUBLISHER DETAILS

Student's Journal of Health Research (SJHR)
(ISSN 2709-9997) Online
(ISSN 3006-1059) Print
Category: Non-Governmental & Non-profit Organization
Email: studentsjournal2020@gmail.com
WhatsApp: +256 775 434 261
Location: Scholar's Summit Nakigalala, P. O. Box 701432, Entebbe Uganda, East Africa