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Original Article

Anaesthesia Section

Comparison of Postoperative Analgesic Efficacy of 0.25% Ropivacaine with Dexmedetomidine versus Dexamethasone as an Adjuvant in Bilateral Superficial Cervical Plexus Block for Midline Neck Surgery under General Anaesthesia: A Randomised Clinical Study

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ABSTRACT

Introduction: Effective postoperative pain management following midline neck surgeries remains challenging. Regional anaesthetic techniques such as Bilateral Superficial Cervical Plexus Block (BSCPB) with adjuvants have emerged as valuable components of multimodal analgesia.

Aim: To compare the postoperative analgesic efficacy of 0.25% ropivacaine with dexmedetomidine versus dexamethasone as adjuvants in BSCPB for midline neck surgery under general anaesthesia.

Materials and Methods: The present randomised clinical study was conducted at Dhiraj Hospital, vadodara, Gujarat, India, from October 2023 to April 2025. Sixty patients aged 18-65 years undergoing elective midline neck surgery under general anaesthesia were randomly allocated into two groups: Group A (dexmedetomidine) received 19 mL of 0.25% ropivacaine with 50 mcg 0.5 mL dexmedetomidine plus 0.5 mL of 0.9% normal saline, while group B (dexamethasone) received 19 mL of 0.25% ropivacaine with 4 mg dexamethasone in 1 mL. Parameters assessed included intraoperative haemodynamics, Visual Analogue Scale (VAS) pain scores, Ramsay sedation scores, time to first rescue analgesia, duration of analgesia and total analgesic consumption in 24 hours. Data were analysed using unpaired student's t-test for numerical variables and Chi-square test for categorical variables. Statistical significance was set at $p<0.05$.

Results: The demographic data was comparable in both groups. From five minutes onwards throughout the intraoperative period, heart rate and blood pressure values were significantly lower in group A than group B, ($p<0.0001$). Postoperative VAS scores were consistently lower at 4 and higher at 22 and 24 hours with group A (1.57±0.5, 2.23±0.68 and 2.37±0.81) than group B (1.87±0.35, 1.73±0.52 and 1.77±0.43), respectively, ($p<0.001$). Duration of analgesia was 1417.93±116.07 minutes and 1131.97±78.13 minutes, time to rescue analgesia (1424.27±116.07 vs. 1134.07±79.39 minutes, and Number of analgesic doses in 24 hours was 1.64±0.70 vs. 2.48±0.77 in group A and group B, respectively, $p<0.0001$. Ramsay sedation scores at 0 hour were 2.97±0.18 and 2.77±0.43 in group A and group B, respectively, $p=0.0222$.

Conclusion: Both dexmedetomidine and dexamethasone are effective adjuvants to ropivacaine in BSCPB for midline neck surgery. Dexmedetomidine provide significantly longer overall duration of analgesia but is associated with more pronounced haemodynamic effects. The choice should be individualised based on patient characteristics and clinical priorities.

Keywords: α_2-agonist, Amide, Patient satisfaction, Postoperative pain relief, Regional anaesthesia, Steroid, Thyroid surgery

INTRODUCTION

Postoperative pain following midline neck surgeries remains a significant clinical challenge that affects patient comfort, recovery, and satisfaction [1]. These procedures, including thyroidectomy, thyroglossal cyst excision, and other midline neck masses removal, are typically performed under general anaesthesia but are associated with considerable postoperative pain due to extensive tissue manipulation in a region rich in sensory innervation [2]. The cervical region's complex anatomy, with its dense network of neurovascular structures, presents unique challenges for perioperative pain management [3]. Regional anaesthesia techniques, particularly BSCPB, have gained acceptance as valuable components of multimodal analgesic regimens for neck surgeries [4]. The superficial cervical plexus, formed by the anterior rami of the first four cervical spinal nerves, provides sensory innervation to the skin and fascia of the neck through its cutaneous branches [5]. Ropivacaine, a long-acting amide local anaesthetic, has emerged as the preferred agent for regional blocks due to its favourable pharmacological profile and reduced cardiotoxicity compared to bupivacaine [6]. However, the duration of analgesia provided by ropivacaine alone may be insufficient for optimal postoperative pain management, leading to increased interest in adjuvant agents [7]. Dexmedetomidine, a highly selective α_2-adrenoceptor agonist, has shown promise as an adjuvant in regional anaesthesia. Its mechanism of action includes reduction in neuronal firing through central α_2-receptor activation, resulting in sedation, anxiolysis, and potent analgesic effects [8]. When used as an adjuvant in peripheral nerve blocks, dexmedetomidine has been associated with prolonged duration of sensory and motor blockade, decreased requirement for rescue analgesia, and improved overall patient comfort [9]. Dexamethasone, a synthetic

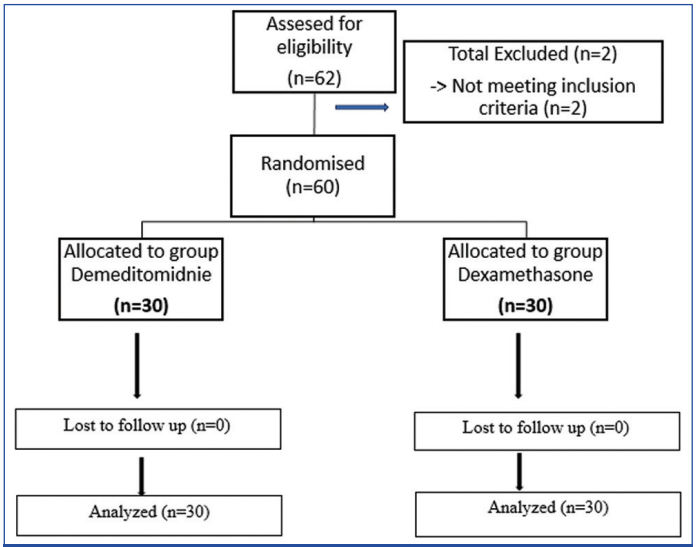
glucocorticoid, represents another class of adjuvants for regional blocks. Its anti-inflammatory properties, including suppression of neutrophil migration, inhibition of lymphocyte proliferation, and stabilisation of lysosomal membranes, contribute to its analgesic effects [10]. Dexamethasone has been shown to prolong the duration of nerve blocks, reduce postoperative nausea and vomiting, and enhance overall block quality [11]. Despite growing research on these adjuvants individually, direct comparative studies between dexmedetomidine and dexamethasone as adjuvants in BSCPB for midline neck surgeries are limited [12].

The present study aimed to address this knowledge gap by providing a head-to-head comparison of these two adjuvants in terms of analgesic efficacy, haemodynamic stability, and safety profile. The primary outcome was to evaluate the duration of postoperative analgesia i.e., the requirement for analgesic doses during the first 24 hours, while secondary outcomes were to determine the duration of rescue analgesia, intraoperative and postoperative haemodynamics, to assess the Ramsay sedation score, any side effects or complications associated with the interventions.

MATERIALS AND METHODS

The present randomised, double-blinded clinical study was conducted at the Department of Anaesthesiology, Dhiraj Hospital, SBKS Medical Institute and Research Centre, Sumandeep Vidyapeeth Deemed to be University, Piparia, Vadodara, Gujarat, India during October 2023 to April 2025. The study was approved by the Institutional Ethics Committee (SVIEC/ON/Medi/BNPG22/Oct/23/70) and registered with Clinical Trials Registry- India (CTRI/2024/10/074748).

Based on previous study and using appropriate statistical formula for primary outcome as patients requiring rescue analgesia in first 24 hours with 80% power and 95% confidence level, a minimum sample size of 30 patients per group was calculated [13]. A total of 60 patients were enrolled [Table/Fig-1].



[Table/Fig-1]: Consolidated standards of reporting trials flow diagram.

Sample size calculation: Using the proportion comparison formula:

$$n_A = kn_B \text{ and } n_B = \frac{PA(1-PZ)}{K} + PB(1-PB)\left(\frac{z1\text{-}a/2 + z1\text{-}B}{PA-PB}\right)$$

Study parameters: α (Type I error): 0.05 (two-sided), Power (1-β): 80%, κ (matching ratio): 1 (equal allocation). Expected difference: |pA-p_B|=|0.30-0.64|=0.34

$$n = \rightarrow 0.4404 \times \rightarrow \frac{7.84}{0.1156} = 0.4404 \times 67.82 \approx 29.87 \text{ per group}$$

Refined expected proportions based on recent literature: Group A (Dexmedetomidine+Ropivacaine)-Expected proportion requiring rescue analgesia: pA=0.30 (30%).

Group B (Dexamethasone+Ropivacaine)-Expected proportion requiring rescue analgesia: p_B=0.64 (64%).

Justification for these proportions: Dexmedetomidine (30%): Recent study [2] consistently show superior prolonged analgesia.

Dexamethasone (64%): More conservative estimate reflecting moderate anti-inflammatory effects. Clinical Significance: 34% absolute difference is clinically meaningful and represents substantial improvement in patient care.

Inclusion and Exclusion criteria: Patients aged 18-65 years of both genders, classified as American Society of Anaesthesiologists (ASA) Grade-I and II, undergoing elective midline neck surgery under general anaesthesia with written informed consent were included. While patient those refuse the procedure, patients not nil by mouth, uncontrolled systemic diseases (heart, liver, or kidney disease), bleeding or coagulation disorders, infection at injection site, history of upper mediastinal irradiation, inability to tolerate general anaesthesia, neck metastasis, history of prior head and neck surgery, and presence of hoarseness or weak voice were excluded.

Study Procedure

Patients were randomly allocated using computer-generated block randomisation in 1:1 ratio into two groups of 30 each [Table/Fig-1]. Blinding was achieved by enveloping the loaded syringe in opaque paper. Patient and observer were not aware of the intervention. Group A (Dexmedetomidine): 19 mL of 0.25% ropivacaine+50 µg (0.5 mL) dexmedetomidine plus 0.5 mL of 0.9% normal saline. Group B (Dexamethasone): 19 mL of 0.25% ropivacaine+4 mg dexamethasone in 1 mL [2]. All patients underwent comprehensive preoperative evaluation including complete blood count, liver and renal function tests, Electrocardiogram (ECG), chest X-ray, and thyroid profile. Patients were kept nil per orally for two and six hours for clear water and solid, respectively. Baseline vital signs including heart rate, blood pressure, respiratory rate, and oxygen saturation were recorded. Patients were premedicated intravenously with inj. glycopyrrolate 0.004mg/kg, inj. ondansetron 0.1 mg/kg, inj. midazolam 1 mg, and inj. pantoprazole 40 mg. Patients were preoxygenated with 100% oxygen via facemask for three minutes. Anaesthesia was then induced with inj. propofol (2.5 mg/kg) and after checked ventilation inj. succinylcholine (2 mg/kg) was given. Patients were intubated with an appropriately sized cuffed endotracheal tube, secured after confirmation of adequate bilateral air entry. Anaesthesia maintained will performed using a 50% oxygen-nitrous oxide mixture combined with Isoflurane and Atracurium (0.5 mg/kg intravenous loading dose followed by 0.1 mg/kg/hour as a maintenance dose).

BSCPB technique: Following aseptic precautions, BSCPB was performed by consultant anaesthesiologist not related to study. The patient's head was positioned away from the side to be blocked. Landmarks included midpoint between mastoid process and C6 transverse process along posterior border of sternocleidomastoid. A 24-gauge, 1.5-inch needle was inserted along the posterior border of the sternocleidomastoid muscle. Five mL of study drug was administered subcutaneously, with the remaining 5 mL injected in a 'fan' pattern cephalad and caudad. The procedure was repeated on the contralateral side by consultant anaesthesiologist. Intraoperative haemodynamic parameters were recorded at baseline, 0,1, 5, 10, 15, 30 and every 15 minutes till end of surgery. Postoperative assessment included Visual Analogue Score (VAS) [14] pain scores, Ramsay sedation scores [15], time to first rescue analgesia at VAS ≥3 as inj. tramadol 50 mg, and total analgesic consumption at 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, and 24 hours.

STATISTICAL ANALYSIS

Data were analysed using Microsoft Excel software version 12.5. Numerical variables were presented as mean±standard deviation and compared using unpaired Student's t-test. Categorical variables were expressed as frequency and percentage and compared using Chi-square test. Statistical significance was set at p<0.05.

RESULTS

A total of 60 patients were enrolled and completed the study. The demographic characteristics were comparable between both groups [Table/Fig-2].

Parameters	Group A (n=30)	Group B (n=30)	p-value
Age in years (Mean±SD)	42.3±13.05	41.43±10.96	0.7808
Male {n (%)}	3 (10%)	6 (20%)	0.2821
Female {n (%)}	27 (90%)	24 (80%)	
ASA Grade II {n (%)}	30 (100%)	30 (100%)	N.A.
Weight in kg (Mean±SD)	62.8±8.4	64.2±9.1	0.5234

[Table/Fig-2]: Demographic profile was comparable. Chi-square test; Used for categorical variables (Gender and ASA Grade). Student's t-test: Used for a continuous variable (Age). Statistically *p>0.05 (NS) Not significant.

Intraoperative haemodynamic parameters: The dexmedetomidine group demonstrated significantly lower heart rates from five minutes onwards to 135 minutes compared to the dexamethasone group (p<0.05). At five minutes, mean heart rate was 83.9±5.0 beats/min in group A versus 95.57±5.32 beats/min in group B. It was useful in procedure those were less than 135 minutes (p<0.05) [Table/Fig-3].

Time (minutes)	Group A HR (bpm) Mean±SD	Group B HR (bpm) Mean±SD	p-value
0	102.13±6.31	103.13±6.86	0.5591
1	98.1±5.24	98.77±5.65	0.6357
5	83.9±5	95.57±5.32	0.0001
10	75.73±6.49	85.8±9.55	0.0001
15	71.23±5.86	85±9.96	0.0001
30	69.27±5.74	84.73±8.54	0.0001
45	65.43±5.25	84.27±11.36	0.0001
60	62.47±5.72	85.83±12.17	0.0001
75	63.24±8.75	86.42±13.4	0.0001
90	61.89±8.8	87.1±9.68	0.0001
105	61.31±8.66	88±10.55	0.0001
120	65.4±10.23	87.67±11.27	0.0012
135	68.43±7.74	90.5±16.84	0.0141
150	66±10.58	100.67±7.02	0.0816

[Table/Fig-3]: Intraoperative heart rate (beats/min) comparison at 5 to 150 mins, p-value <0.05 considered significant.

Systolic blood pressure showed similar patterns, with significantly lower values in the dexmedetomidine group from five minutes onwards to 120 minutes. It was useful in procedure those were less than 120 minutes (p<0.01) [Table/Fig-4]. Diastolic blood pressure and mean arterial pressure followed similar trends, with these dexmedetomidine group showing significantly lower values throughout the intraoperative period from 5 minute onward to 120 minutes. It was useful in procedure those were less than 120 minutes. (p<0.05) [Table/Fig-5]. Mean Arterial Pressure (MAP) at five minute was 95.8±6.07 mmHg in the dexmedetomidine group versus 103.47±5.99 mmHg in the dexamethasone group (p<0.0001). The difference in MAP became even more substantial at 15 minutes (82.23±4.38 mmHg versus 95.03±4.01 mmHg, p<0.0001) and remained highly significant throughout most of the intraoperative period. It was useful in procedure those were less than 120 minutes (p<0.05) [Table/Fig-6]. SpO_2 (%) between both groups was comparable under general anaesthesia [Table/Fig-7].

Time (minutes)	Group A SBP (mmHg) Mean±SD	Group B SBP (mmHg) Mean±SD	p-value
0	131.67±7.83	132.6±8.57	0.6624
1	127.67±6.6	127.4±7.13	0.8795
5	114.7±7.03	126.17±7.48	0.0001
10	108.07±4.1	117.17±5.1	0.0001
15	102.27±3.82	112.13±4.7	0.0001
30	95.47±3.89	104.77±3.86	0.0001
45	90.27±3.26	99.1±4.47	0.0001
60	89.33±6.23	100.87±11.73	0.0001
75	90.04±5.75	109.37±13.76	0.0001
90	92.5±6.54	117.65±17.85	0.0001
105	90.69±7.25	118.42±19.59	0.0001
120	90.6±7.37	108.33±15.87	0.0083
135	98.14±6.94	109±20.17	0.2138
150	100.33±5.69	112±15.1	0.2786

[Table/Fig-4]: Intraoperative systolic blood pressure (mmHg) comparison at 5 to 150 minutes, p-value <0.05 considered significant.
SBP: Systolic blood pressure

Time (minutes)	Group A DBP (mmHg) Mean±SD	Group B DBP (mmHg) Mean±SD	p-value
0	91.8±7.96	91.47±8.47	0.8770
1	85.93±6.35	86.27±7.42	0.8494
5	75.07±5.72	83.77±5.86	0.0001
10	62.53±9.38	76.63±6.83	0.0001
15	63.87±6.72	71.6±3.87	0.0001
30	56.23±5.65	66.1±3.75	0.0001
45	52.9±4.1	60.33±4.99	0.0001
60	51.3±5.66	67.6±11.68	0.0001
75	51.56±5.77	73.96±13.72	0.0001
90	52.17±5.73	78.05±17.52	0.0001
105	50.15±5.97	81.58±17.04	0.0001
120	51±5.98	72.33±15.49	0.0014
135	57.86±6.89	73.5±21	0.0948
150	58.33±7.64	73.67±16.74	0.2223

[Table/Fig-5]: Intraoperative diastolic blood pressure (mmHg) comparison at 5 to 150 minutes, p<0.05 considered significant.
DBP: Diastolic blood pressure

Time (minutes)	Group A MAP (mmHg) Mean±SD	Group B MAP (mmHg) Mean±SD	p-value
0	112.47±7.88	111.87±8.27	0.7746
1	107.1±6.94	107.13±7.37	0.9871
5	95.8±6.07	103.47±5.99	0.0001
10	82.4±11.49	97±4.83	0.0001
15	82.23±4.38	95.03±4.01	0.0001
30	74.9±4.87	84.1±4.6	0.0001
45	71.57±3.69	77.97±4.85	0.0001
60	67.8±6.22	84.1±11.84	0.0001
75	68.92±5.47	90.93±13.75	0.0001
90	69.83±6.99	95.5±18.1	0.0001
105	69.08±7.45	99.5±17.87	0.0001
120	69.8±7.44	90.67±16.39	0.0001
135	78.86±9.03	90.25±21.45	0.2391
150	80±8	90.67±16.77	0.3762

[Table/Fig-6]: Intraoperative mean arterial pressure (mmHg) comparison at 5 to 150 minutes, p<0.05 considered significant.

Time	Group A Mean±SD (%)	Group B Mean±SD (%)	p-value
0 min	99.37±0.56	99.17±0.46	0.1361
1 min	99.4±0.56	99.13±0.51	0.0646
5 min	99.4±0.5	99.2±0.41	0.0956
10 min	99.43±0.5	99.17±0.53	0.0555
15 min	99.47±0.51	99.23±0.57	0.091
30 min	99.5±0.51	99.27±0.58	0.1083
45 min	99.53±0.51	99.3±0.53	0.0921
60 min	99.57±0.5	99.33±0.55	0.0822
75 min	99.56±0.51	99.37±0.56	0.2079
90 min	99.61±0.5	99.3±0.66	0.1145
105 min	99.62±0.51	99.17±0.72	0.0826
120 min	99.6±0.52	99.29±0.76	0.3317
135 min	99.71±0.49	99±0.82	0.1009
150 min	99.67±0.58	99.33±0.58	0.5125

[Table/Fig-7]: Intraoperative SpO_2 were comparable, p>0.05 was considered statistically not significant.

Postoperative Respiratory Rate between Group A and Group B

Respiratory rates were comparable intraoperatively amongst the both groups [Table/Fig-8].

Time (Hours)	Group A Mean±SD	Group B Mean±SD	p-value
2	17.03±1.16	17±1.17	0.9209
4	15.9±0.31	15.97±0.67	0.6055
6	15.57±0.68	15.87±0.63	0.0815
8	15.73±0.64	15.83±0.46	0.4899
10	15.4±0.89	15.73±0.52	0.0848
12	15.47±0.73	15.8±0.61	0.0624
14	15.77±0.5	15.9±0.31	0.2311
16	15.83±0.53	15.67±0.71	0.3267
20	15.73±0.52	15.93±0.37	0.0914
22	15.53±0.68	15.7±0.6	0.3088
24	15.57±0.68	15.63±0.61	0.7203

[Table/Fig-8]: Postoperative RR were comparable, p>0.05 was considered statistically not significant.

Postoperative pain assessment: The VAS scores showed significant differences between groups at specific time points. At four hours, the dexmedetomidine group had lower VAS scores (1.57±0.5) compared to the dexamethasone group (1.87±0.35), p=0.0093. However, at 22 and 24 hours, the dexamethasone group showed significantly lower pain scores (p<0.01) [Table/Fig-9].

Analgesic efficacy parameters: The dexmedetomidine group demonstrated significantly longer duration of analgesia and time to first rescue analgesia compared to the dexamethasone group [Table/Fig-10].

Number and percentage of patient's received rescue analgesia and top-up doses at VAS >3 as 50 mg tramadol at different time intervals and total analgesic consumption within 24 hours in both groups.

Number of analgesic doses in 24 hours was 1.64±0.70 vs. 2.48±0.77 in group A and group B, respectively, p<0.0001. In group A majority of rescue analgesia was given during 22 and 24 hours, while in group B it was earlier during 18 and 20 hours, showing prolonged analgesic efficacy of group A. Similarly Top-up doses during 24 hours postoperatively were more in group B compare to group A. Thus total analgesic requirement was higher in group B compared to group A [Table/Fig-11].

Time (Hours)	Group A Mean±SD	Group B Mean±SD	p-value
0	1±0	1±0	N.S.
2	1.2±0.41	1.13±0.35	0.4798
4	1.57±0.5	1.87±0.35	0.0093
6	1.67±0.48	2±0	N.S.
8	2±0	2±0	N.S.
10	2±0	2±0	N.S.
12	2±0	2±0	N.S.
14	2±0	2±0	N.S.
16	2±0	2.13±0.43	N.S.
18	2.03±0.18	2.4±0.77	0.1557
20	1.97±0.32	2.17±0.79	0.2038
22	2.23±0.68	1.73±0.52	0.0022
24	2.37±0.81	1.77±0.43	0.0007

[Table/Fig-9]: Visual Analogue Scale (VAS) scores, p<0.05 at 4, 22 and 24 hrs was considered statistically significant, NS: Not significant.

Parameters	Group A Mean±SD (min)	Group B Mean±SD (min)	p-value
Duration of analgesia (minute)	1417.93±116.07	1131.97±78.13	<0.0001
Time to rescue analgesia (minute)	1424.27±116.07	1134.07±79.39	<0.0001

[Table/Fig-10]: Analgesic efficacy parameters p< 0.05 was considered as statistically significant.

Time	Rescue analgesia Group A n (%)	Rescue analgesia Group B n (%)	p-value	Top-up dose Group A n (%)	Top-up dose Group B n (%)	p-value
16 h	0	5 (16.6)	0.0208 (S)	0	0	NA
18 h	1 (3.33)	13 (43.33)	0.0001 (S)	0	3 (9.99)	0.0833
20 h	1 (3.33)	11 (36.66)	0.0005 (S)	1 (3.33)	3 (9.99)	0.3173
22 h	7 (23.33)	1 (3.33)	0.0238 (S)	2 (6.66)	1 (3.33)	0.5637
24 h	13 (43.33)	0	0.0001 (S)	0	0	N.A.
Total analgesic consumption within 24 h						
	Group A		Group B			<0.0001
	1250 mg		1850 mg			

[Table/Fig-11]: Number of patients received rescue analgesia and top-up doses at VAS >3, One-way Chi-squared test, p>0.05 was statistically not significant. Total analgesic consumption within 24 hours, One-way Chi-squared test, p<0.05 was statistically significant.

Ramsay sedation scale: Immediately after surgery (0 hours), the dexmedetomidine group showed slightly higher sedation scores (2.97±0.18) compared to the dexamethasone group (2.77±0.43) statistically insignificant, p=0.0222. By two hours, both groups had identical sedation scores (2.23±0.43), and from four hours onwards, both groups maintained consistent sedation scores around two.

DISCUSSION

The present study compared the analgesic efficacy of dexmedetomidine versus dexamethasone as adjuvants to 0.25% ropivacaine in BSCPB for midline neck surgery. Both adjuvants proved effective in enhancing postoperative analgesia, but with distinct advantages and limitations. The comparable demographic characteristics between groups ensured that differences in outcomes could be attributed to the interventions rather than patient-related factors. The predominance of female patients reflects the typical epidemiological pattern for thyroid disorders and midline neck pathologies [16]. SpO_2 and respiratory rate, were stable and comparable in both groups intraoperatively [Table/Fig-7,8]. There were no incidence of nausea vomiting in either group.

Haemodynamic effects: The significant reduction in heart rate and blood pressure observed with dexmedetomidine was consistent

with its known pharmacological properties as an α_2-adrenoceptor agonist [Table/Fig-3-6]. These effects, while potentially beneficial for cardiovascular stability during surgery, necessitate careful monitoring, especially in patients with pre-existing cardiovascular conditions [17]. These findings align with Bhale PV and Dasmohapatra PB who reported significantly lower mean arterial pressure and heart rate with dexmedetomidine in unilateral superficial cervical plexus block [18]. Similarly, Raiger LK et al., observed enhanced haemodynamic stability with dexmedetomidine as an adjuvant in thyroid surgeries [19].

Analgesic efficacy: The significantly longer duration of analgesia with dexmedetomidine (approximately 4.7 hours longer than dexamethasone) represents a clinically meaningful difference [Table/Fig-10]. This finding was consistent with Mir SA et al., who reported substantially longer analgesia duration with dexmedetomidine in cervical plexus blocks [20]. This suggests different mechanisms of action: dexmedetomidine's direct neuronal effects versus dexamethasone's anti-inflammatory properties [13]. Present study results partially contrast with Jain N et al., who found no significant difference in analgesia duration between dexmedetomidine and dexamethasone [2]. This discrepancy may reflect differences in methodology, drug concentrations, or patient populations.

Number of analgesic doses in 24 hours: The dexmedetomidine group required significantly fewer analgesic doses in the first 24 hours postoperatively compared to the dexamethasone group, indicating superior analgesic efficacy with dexmedetomidine [Table/Fig-11]. This finding was consistent with Raiger LK et al., who reported significantly lower total rescue analgesic consumption in the dexmedetomidine group (370.00±53.50 mg) compared to the plain ropivacaine group (413.33±62.88 mg) in patients undergoing thyroid surgeries [19]. Similarly, Mir S A et al., found significantly lower total tramadol consumption in the dexmedetomidine group (105.38±2.22 mg) compared to the plain ropivacaine group (240.56±7.3 mg) [20]. The reduced analgesic requirement with dexmedetomidine has important clinical implications. It not only improves patient comfort but also potentially reduces the incidence of analgesic-related side-effects, such as nausea, vomiting, sedation, or respiratory depression associated with opioids. This could contribute to earlier mobilisation, improved patient satisfaction, and potentially shorter hospital stays.

Visual Analog Scale (VAS) score: VAS scores between the two groups were comparable during the first two hours postoperatively [Table/Fig-9]. At four hours, the dexmedetomidine group showed lower pain scores compared to the dexamethasone group. From six hours to 20 hours, both groups maintained relatively stable pain scores with minimal differences. Interestingly, at later time points (22 hours and 24 hours), the pattern reversed, with the dexamethasone group showing significantly lower pain scores. The study results align with Raiger LK et al., who reported significantly lower pain scores in the dexmedetomidine group compared to the plain ropivacaine group at early time points postoperatively [19]. In contrast, study results of Jain N et al., recorded comparable VAS scores in both groups A and group B, ($p>0.05$) [2].

Ramsay sedation scale: The Ramsay Sedation Scale [15] was used to assess postoperative sedation levels. Immediately after surgery (0 hours), the dexmedetomidine group showed slightly higher sedation scores compared to the dexamethasone group. From four hours onwards, both groups were comparable, indicating cooperative, oriented, and tranquil patients. In similar to, Bhale PV and Dasmohapatra PB reported higher Ramsay sedation scores after extubation at 0, 10, 20, 40, 60, 90, 120 minutes in patients receiving dexmedetomidine as an adjuvant to ropivacaine for unilateral superficial cervical plexus block, $p<0.05$ [18]. Similarly, Lin YN et al., observed a sedative effect with dexmedetomidine when added to ropivacaine for cervical plexus block, $p<0.05$ [21].

Limitation(s)

The present study was a single-centre design, and focussed on a specific surgical population limiting its generalisability on findings. Doses for study drugs were fixed regardless of their individual weight limiting outcome of the findings. Additionally, the study did not include a control group receiving ropivacaine alone.

CONCLUSION(S)

Both dexmedetomidine and dexamethasone are effective adjuvants to ropivacaine in BSCPB for midline neck surgery under general anaesthesia. Dexmedetomidine provided significantly longer overall duration of analgesia but was associated with more pronounced haemodynamic effects, particularly bradycardia.

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