**Biomedical and Biopharmaceutical Research**
**Abbreviation**: Biomed. Biopharm. Res.
Volume: 22: Issue: 01 |Year: 2025
Page Number: 397-410

# STUDY OF ANALGESIC EFFECT OF BILATERAL SUPERFICIAL CERVICAL PLEXUS BLOCK ADMINISTERED BEFORE THYROID SURGERY UNDER GENERAL ANAESTHESIA AS COMPARED TO GENERAL ANAESTHESIA ALONE

**Dr GARGI BHADRA[1], Dr RINA MAJUMDAR[2]**
[1]Md Anaesthesia, Assistant professor, MEDICAL COLLEGE AND HOSPITAL KOLKATA
[2]MD DNB ANAESTHESIA, SENIOR RESIDENT, MEDICAL COLLEGE AND HOSPITAL KOLKATA.

***Corresponding Author***

**Dr GARGI BHADRA**
Md Anaesthesia, Assistant professor, MEDICAL COLLEGE AND HOSPITAL KOLKATA

Article Received:15-02-2025

Article Accepted:10-04-2025



## ABSTRACT

**Background:** Postoperative pain management is crucial in patients undergoing thyroid surgery. This study aimed to evaluate the analgesic efficacy of bilateral superficial cervical plexus block (BSCPB) with bupivacaine and clonidine in combination with general anesthesia (GA) compared to GA alone or GA with BSCPB using bupivacaine only.

**Methods:** In this prospective, randomized study, 144 patients undergoing thyroid surgery were allocated into three groups: GA+BSCPB with bupivacaine and clonidine, GA+BSCPB with bupivacaine only, and GA alone. Postoperative pain scores, time to first analgesic administration, analgesic requirements, and perioperative hemodynamic parameters were assessed.

**Results:** The mean Visual Analog Scale (VAS) scores at 2 and 6 hours postoperatively were significantly lower in the GA+BSCPB with bupivacaine and clonidine group (2.48 ± 0.68 and 1.98 ± 0.36, respectively) compared to the GA+BSCPB with bupivacaine only (4.79 ± 0.68 and 4.25 ± 0.78, respectively) and GA alone groups (7.23 ± 0.42 and 6.37 ± 0.48, respectively) ($p<0.01$). The mean time to first analgesic administration was significantly longer, and the mean dose of diclofenac received at 6 hours was significantly lower in the GA+BSCPB with bupivacaine and clonidine group compared to the other two groups ($p<0.01$). BSCPB with bupivacaine and clonidine also resulted in significantly lower perioperative pulse rate and blood pressure ($p<0.0001$).

**Conclusion:** BSCPB with bupivacaine and clonidine in combination with GA provides superior postoperative analgesia and perioperative hemodynamic stability compared to GA alone or GA with BSCPB using bupivacaine only in patients undergoing thyroid surgery.

**Keywords:** Bilateral superficial cervical plexus block, bupivacaine, clonidine, general anesthesia, postoperative pain, thyroid surgery.

## INTRODUCTION

Thyroid surgery, one of the most common surgical procedures, is associated with significant postoperative pain that can lead to increased morbidity and prolonged hospital stay [1]. Effective pain management is crucial for improving patient outcomes and reducing healthcare costs. General anesthesia (GA) is the standard technique for thyroid surgery; however, it may not provide adequate postoperative analgesia [2]. Superficial cervical plexus block (SCPB) has emerged as a promising technique for enhancing postoperative pain control in thyroid surgery patients [3].

The superficial cervical plexus, formed by the anterior rami of the C2-C4 spinal nerves, provides sensory innervation to the anterolateral neck region [4]. SCPB involves the infiltration of local anesthetic around these nerves, thereby blocking the transmission of pain signals from the surgical site [5]. Several studies have investigated the efficacy of SCPB in reducing postoperative pain and analgesic consumption in thyroid surgery patients [6-8].

A meta-analysis by Warschkow et al. [9] demonstrated that SCPB significantly reduced postoperative pain scores and opioid consumption in patients undergoing thyroid surgery under GA. However, the included studies had heterogeneous designs and small sample sizes, limiting the generalizability of the findings. More recent randomized controlled trials (RCTs) have provided further evidence supporting the analgesic benefits of SCPB in thyroid surgery [10,11].

Despite the growing body of literature on SCPB in thyroid surgery, there is a lack of consensus regarding its optimal timing, technique, and effects on other postoperative outcomes such as nausea, vomiting, and hospital length of stay [12]. Some studies have suggested that preoperative SCPB may be more effective than postoperative block in reducing pain

and analgesic requirements [13,14]. However, the evidence is not conclusive, and further research is needed to establish the most effective timing and technique for SCPB in thyroid surgery.

In addition to its analgesic effects, SCPB may have other potential benefits in thyroid surgery patients. A study by Gürkan et al. [15] found that SCPB significantly reduced the incidence of postoperative hoarseness and dysphagia, which are common complications of thyroid surgery. The authors hypothesized that SCPB may reduce the risk of these complications by decreasing the inflammatory response and muscle spasms in the neck region. However, more studies are needed to confirm these findings and elucidate the underlying mechanisms.

The present study aims to investigate the analgesic efficacy of bilateral SCPB administered before thyroid surgery under GA compared to GA alone. The primary outcome will be postoperative pain scores, while secondary outcomes will include analgesic consumption, patient satisfaction, and postoperative complications such as nausea, vomiting, hoarseness, and dysphagia. The findings of this study will contribute to the growing evidence base on the use of SCPB in thyroid surgery and help inform clinical practice guidelines for optimal pain management in this patient population.

## AIMS AND OBJECTIVES

The primary objective of this study was to assess the effect of bilateral superficial cervical plexus block on post-operative pain with general anesthesia compared to general anesthesia alone in elective thyroid surgery cases. The secondary objectives were to compare the incidence of post-operative nausea and vomiting among three groups, to study the incidence of complications of superficial cervical plexus block, and to observe hemodynamic stability in the perioperative period by non-invasive blood pressure (NIBP), heart rate, and oxygen saturation (SPO2).

## MATERIALS AND METHODS

### Study Design

This was a prospective, comparative, randomized, single-blinded study conducted in the operation theatre of the Department of General Surgery and Otorhinolaryngology at Medical College, Kolkata, West Bengal, India. The study was carried out for 8 months, followed by 2 months for statistical analysis and another 2 months for thesis writing and submission.

### Study Population

The study population consisted of 144 adult patients aged between 18-60 years of either gender, belonging to the American Society of Anesthesiologists (ASA) physical status 1 and 2, who were scheduled for elective thyroidectomy during the period of data collection at Medical College and Hospital, Kolkata.

### Sample Size

The sample size was calculated assuming a p-value $<0.05$ to be significant and considering the effect to be two-sided. With $Z\alpha=1.96$ and a power of 90% ($Z1-\beta=1.28$), and considering an effect size (difference in pain score) of 2 to be statistically significant, the minimum sample size required for each group was 48 patients. Hence, a total of 144 patients were included in the study, with 48 patients in each of the three groups.

### Inclusion and Exclusion Criteria

The inclusion criteria for the study were adult patients aged between 18-60 years of either gender, ASA 1 and ASA 2 physical status, and patients scheduled for elective thyroidectomy. The exclusion criteria were patient refusal, any bleeding disorder, allergy to amide-type local anesthetics, infection at the injection site, pregnancy or breastfeeding, severe obesity (BMI >35 kg/m2), past history of musculoskeletal disorder, and patients with long-duration thyroid surgery (e.g., malignancy).

### Randomization and Blinding

The study was randomized and single-blinded. Patients were randomly assigned to three groups (A, B, and C) on the day of the preoperative check-up using an open Epi Random Number Generator. The random allocation was kept with the Sister in Charge of the operating theatre and handed over to the anesthetist in a concealed envelope on the morning of the surgery. Patients were not informed about their group allocation, and data analysis was performed by the anesthetist involved in the study.

### Data Collection and Procedures

Patients were screened during the pre-anesthesia check-up for eligibility and were offered study-related information verbally and in writing. Willing patients provided written informed consent for participation. Patients were then randomized into three groups:

- Group A: General anesthesia with bilateral superficial cervical plexus block using 0.25% isobaric bupivacaine and clonidine
- Group B: General anesthesia with bilateral superficial cervical plexus block using 0.25% isobaric bupivacaine only
- Group C: General anesthesia alone

Preoperative preparation included tablet ranitidine 150 mg and tablet alprazolam 0.5 mg the night before surgery. On the day of surgery, patients were cannulated with an 18-gauge IV catheter, and lactated Ringer's solution was started as a maintenance fluid. Supplemental oxygen was provided through a nasal cannula, and a multichannel monitor was attached for monitoring SPO2, ECG, and NIBP at baseline.

For patients in Groups A and B, bilateral superficial cervical plexus block was performed in the supine position on the operating table. A 10ml syringe containing the respective drugs (0.25% isobaric bupivacaine with or without clonidine) was attached to a 22-gauge intramuscular needle. After explaining the procedure to the patient, the injections were administered at the posterior border of the sternocleidomastoid muscle, 1-2 cm deep, between the mastoid process and the landmark of the C6 transverse process. After negative aspiration, 4ml of the drug was injected horizontally, and the remaining 6ml was fanned cephalad and caudally. The same method was carried out on the opposite side of the neck.

For general anesthesia, all patients received premedication with intravenous glycopyrrolate 0.01 mg/kg, fentanyl 2mcg/kg, and midazolam 0.01 mg/kg 15 minutes before induction. After pre-oxygenation with 100% FiO2 for 3 minutes, anesthesia was induced with intravenous propofol 2.5 mg/kg until loss of response to verbal command. Succinylcholine 1.5 mg/kg was administered to facilitate tracheal intubation. Anesthesia was maintained with a 2:1 ratio of nitrous oxide and oxygen, along with sevoflurane in a closed breathing circuit. Muscle relaxation was achieved with atracurium 0.5mg/kg loading dose and maintained with 0.1mg/kg. Ondansetron 4mg IV was given 5 minutes before reversal. After the completion of surgery, patients were reversed with neostigmine (0.05 mg/kg) and glycopyrrolate (0.01mg/kg).

Intraoperative monitoring included close observation of NIBP, heart rate, oxygen saturation (SPO2), capnography, and three-lead ECG at frequent intervals.

Outcome Measures

The primary outcome measure was the assessment of post-operative pain using the Visual Analogue Scale (VAS), where 0 indicated no pain and 10 indicated the worst pain imaginable. Secondary outcome measures included the time to the first dose of analgesic (in minutes) after surgery, the total amount of rescue analgesics (in mg) consumed within 6 hours of surgery, and the assessment of post-operative nausea and vomiting (PONV).

Statistical Analysis

Data were entered into a Microsoft Excel spreadsheet and analyzed using SPSS (version 27.0) and GraphPad Prism (version 5). Continuous variables were summarized as mean and standard deviation, while categorical variables were presented as count and percentages. Two-sample t-tests were used for comparing means of independent samples, and paired t-tests were used for blocking. Chi-squared tests or Fisher's exact tests were used to compare unpaired proportions, as appropriate. A p-value $\leq 0.05$ was considered statistically significant.

**RESULTS**

Age Distribution and ASA Physical Status

The study included 144 patients divided into three groups: GA+BUPI+CLONI, GA+BUPI, and GA. The age distribution among the groups was similar, with the majority of patients falling within the age range of 21-40 years. In the GA+BUPI+CLONI group, 4.2% of patients were younger than 20 years, 31.3% were between 21-30 years, 39.6% were between 31-40 years, 20.8% were between 41-50 years, and 4.2% were older than 51 years. The GA+BUPI group had a similar distribution, with 4.2% of patients younger than 20 years, 37.5% between 21-30 years, 31.3% between 31-40 years, 22.9% between 41-50 years, and 4.2% older than 51 years. The GA group had 8.3% of patients younger than 20 years, 27.1% between 21-30 years, 41.7% between 31-40 years, 18.8% between 41-50 years, and 4.2% older than 51 years. The comparison of age distribution among the groups was not statistically significant (p=0.9461).

Regarding ASA physical status, the majority of patients in all three groups belonged to ASA II. In the GA+BUPI+CLONI group, 4.2% of patients were ASA I, and 95.8% were ASA II. The GA+BUPI group had 100% of patients in ASA II, while the GA group had 4.2% of patients in ASA I and 95.8% in ASA II. The comparison of ASA physical status among the groups was not statistically significant (p=0.3575).

Mean Age, Height, Weight, and BMI

The mean age, height, weight, and BMI were compared among the three groups. In the GA+BUPI+CLONI group, the mean age was 34.8125 ± 9.2014 years, mean height was 152.3125 ± 1.7278 cm, mean weight was 57.3125 ± 6.8079 kg,

and mean BMI was 24.6833 ± 2.7458 kg/m². The GA+BUPI group had a mean age of 34.3958 ± 9.2500 years, mean height of 152.1458 ± 1.8217 cm, mean weight of 56.3542 ± 6.9020 kg, and mean BMI of 24.3207 ± 2.7628 kg/m². In the GA group, the mean age was 35.0208 ± 9.1593 years, mean height was 152.1667 ± 1.8257 cm, mean weight was 56.5417 ± 6.8229 kg, and mean BMI was 24.3936 ± 2.7105 kg/m².

The differences in mean age (p=0.9443), height (p=0.8842), weight (p=0.7681), and BMI (p=0.7907) among the groups were not statistically significant. These findings suggest that the three groups were well-matched in terms of age, ASA physical status, height, weight, and BMI, ensuring the comparability of the groups for the purpose of the study.

Perioperative Pulse Rate, Non-Invasive Blood Pressure, and Oxygen Saturation

The perioperative pulse rate, systolic blood pressure (SBP), diastolic blood pressure (DBP), and oxygen saturation (SPO2) were compared among the three groups at various time intervals (Tables 1, 2, 3, and 4).

The mean pulse rate was significantly lower in the GA+BUPI+CLONI group compared to the GA+BUPI and GA groups at all time points (p<0.0001). The lowest mean pulse rate was observed in the GA+BUPI+CLONI group at 5 minutes (73.4583 ± 2.3152), while the highest was in the GA group at 75 minutes (96.1481 ± 1.9156).

Similarly, the mean SBP and DBP were significantly lower in the GA+BUPI+CLONI group compared to the other two groups at all time points (p<0.0001). The lowest mean SBP was recorded in the GA+BUPI+CLONI group at 45 minutes (116.0417 ± 3.4700), while the highest was in the GA group at 90 minutes (139.0000 ± 1.7168). The lowest mean DBP was observed in the GA+BUPI+CLONI group at 30 minutes (78.1250 ± 3.4679), and the highest was in the GA group at 1 hour postoperatively (89.1458 ± 0.3567).

The mean SPO2 values were comparable among the groups at most time points, with statistically significant differences observed at 5, 10, 15, 30, 45, and 75 minutes perioperatively, and at 1, 2, 3, 4, 5, and 6 hours postoperatively (p<0.05). However, the differences were clinically insignificant, as all values remained within the normal range.

Perioperative End-Tidal Carbon Dioxide

The mean end-tidal carbon dioxide (ETCO2) levels were compared among the groups at various time intervals (Table 5). Statistically significant differences were observed at 10, 30, 45, 60, and 75 minutes perioperatively (p<0.05). The highest mean ETCO2 was recorded in the GA+BUPI+CLONI group at 90 minutes (31.7500 ± 0.4629), while the lowest was in the GA+BUPI group at 30 minutes (30.1875 ± 0.3944).

Visual Analog Scale Scores and Analgesic Requirements

The mean Visual Analog Scale (VAS) scores at 2 and 6 hours postoperatively were significantly lower in the GA+BUPI+CLONI group compared to the GA+BUPI and GA groups (p<0.01) (Tables 6 and 7). At 2 hours, the mean VAS scores were 2.48 ± 0.68, 4.79 ± 0.68, and 7.23 ± 0.42 in the GA+BUPI+CLONI, GA+BUPI, and GA groups, respectively. At 6 hours, the mean VAS scores were 1.98 ± 0.36, 4.25 ± 0.78, and 6.37 ± 0.48 in the GA+BUPI+CLONI, GA+BUPI, and GA groups, respectively.

The mean time to first analgesic administration was significantly longer in the GA+BUPI+CLONI group (6.96 ± 0.75 hours) compared to the GA+BUPI (5.63 ± 0.81 hours) and GA groups (3.14 ± 0.75 hours) (p<0.01) (Table 8). The mean dose of diclofenac received at 6 hours was also significantly lower in the GA+BUPI+CLONI group (6.96 ± 0.75 mg) compared to the GA+BUPI (5.63 ± 0.81 mg) and GA groups (3.14 ± 0.75 mg) (p<0.01) (Table 9).

In summary, the addition of bilateral superficial cervical plexus block to general anesthesia, particularly with bupivacaine and clonidine, resulted in significantly lower perioperative pulse rate, blood pressure, postoperative pain scores, and analgesic requirements compared to general anesthesia alone or with bupivacaine only. The differences in perioperative oxygen saturation and end-tidal carbon dioxide levels, although statistically significant at some time points, were clinically insignificant.

*Table1: DistributionofmeanPRatdifferent timeinterval: Group*

| | | Number | Mean | SD | Minimum | Maximum | Median | p-value |
|---|---|---|---|---|---|---|---|---|
| **PERI-OP PR 0 min** | GA+BUPI+CLONI | 48 | 73.8750 | 2.3756 | 70.0000 | 78.0000 | 74.0000 | <0.0001 |
| | GA+BUPI | 48 | 78.0417 | 1.9125 | 70.0000 | 80.0000 | 78.0000 | |
| | GA | 48 | 85.9375 | 2.4617 | 81.0000 | 89.0000 | 87.0000 | |
| | GA+BUPI+CLONI | 48 | 73.4583 | 2.3152 | 68.0000 | 78.0000 | 74.0000 | |
| | GA+BUPI | 48 | 80.9167 | 3.0516 | 68.0000 | 84.0000 | 81.0000 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **PERI-OP PR 5 min** | GA | 48 | 89.3750 | 1.2653 | 88.0000 | 92.0000 | 89.0000 | <0.0001 |
| **PERI-OP PR 10 min** | GA+BUPI+CLONI | 48 | 73.5833 | 2.4567 | 69.0000 | 78.0000 | 73.5000 | <0.0001 |
| | GA+BUPI | 48 | 81.5000 | 2.9319 | 69.0000 | 84.0000 | 82.0000 | |
| | GA | 48 | 89.7708 | 1.9812 | 87.0000 | 94.0000 | 89.0000 | |
| **PERI-OP PR 15 min** | GA+BUPI+CLONI | 48 | 73.7083 | 2.4664 | 68.0000 | 79.0000 | 74.0000 | <0.0001 |
| | GA+BUPI | 48 | 82.3125 | 3.1901 | 71.0000 | 85.0000 | 83.0000 | |
| | GA | 48 | 90.3750 | 1.5795 | 88.0000 | 93.0000 | 90.0000 | |
| **PERI-OP PULSE RATE 30 MIN** | GA+BUPI+CLONI | 48 | 73.5833 | 2.3505 | 68.0000 | 79.0000 | 74.0000 | <0.0001 |
| | GA+BUPI | 48 | 82.7292 | 4.5323 | 68.0000 | 88.0000 | 84.0000 | |
| | GA | 48 | 91.2292 | 1.2418 | 90.0000 | 94.0000 | 91.0000 | |
| **PERI-OP PULSE RATE 45 MIN** | GA+BUPI+CLONI | 48 | 73.9167 | 2.5751 | 70.0000 | 78.0000 | 74.0000 | <0.0001 |
| | GA+BUPI | 48 | 83.5833 | 3.8913 | 70.0000 | 88.0000 | 83.0000 | |
| | GA | 48 | 92.1042 | 1.2418 | 91.0000 | 94.0000 | 92.0000 | |
| **PERI-OP PULSE RATE 60MIN** | GA+BUPI+CLONI | 48 | 73.7917 | 2.3516 | 70.0000 | 79.0000 | 74.0000 | <0.0001 |
| | GA+BUPI | 48 | 83.9167 | 3.2146 | 71.0000 | 87.0000 | 84.0000 | |
| | GA | 48 | 93.4792 | 2.4056 | 90.0000 | 98.0000 | 93.0000 | |
| **PERI-OP PULSE RATE 75 MIN** | GA+BUPI+CLONI | 48 | 74.5000 | 2.2509 | 71.0000 | 78.0000 | 74.5000 | <0.0001 |
| | GA+BUPI | 48 | 85.4231 | 1.5013 | 84.0000 | 88.0000 | 85.0000 | |
| | GA | 48 | 96.1481 | 1.9156 | 94.0000 | 99.0000 | 95.0000 | |
| **PERI-OP PULSE RATE 90 min** | GA+BUPI+CLONI | 48 | 75.0000 | 2.0000 | 73.0000 | 78.0000 | 74.5000 | <0.0001 |
| | GA+BUPI | 48 | 85.6500 | .4894 | 85.0000 | 86.0000 | 86.0000 | |
| | GA | 48 | 96.1500 | 2.6213 | 94.0000 | 100.0000 | 95.0000 | |
| **POST-OP PULSE RATE 1 hr** | GA+BUPI+CLONI | 48 | 74.1667 | 2.1766 | 70.0000 | 78.0000 | 74.0000 | <0.0001 |
| | GA+BUPI | 48 | 85.0833 | 3.6369 | 70.0000 | 88.0000 | 86.0000 | |
| | GA | 48 | 94.7708 | 2.5702 | 91.0000 | 99.0000 | 94.0000 | |
| **POST-** | GA+BUPI+CLONI | 48 | 74.4583 | 2.1033 | 71.0000 | 79.0000 | 75.0000 | |

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|---|---|---|---|---|---|---|---|---|
| **OP** | | | | | | | | |
| **PULSE RATE 2 hr** | GA+BUPI | 48 | 85.3125 | 3.3144 | 72.0000 | 88.0000 | 86.0000 | <0.0001 |
| | GA | 48 | 95.8125 | 4.8231 | 90.0000 | 105.0000 | 95.0000 | |
| **POST-OP PULSE RATE 3 hr** | GA+BUPI+CLONI | 48 | 75.1667 | 2.5710 | 71.0000 | 80.0000 | 75.5000 | |
| | GA+BUPI | 48 | 80.5625 | 10.6729 | 54.0000 | 87.0000 | 85.0000 | <0.0001 |
| | GA | 48 | 95.4375 | 4.6260 | 91.0000 | 102.0000 | 93.0000 | |
| **POST-OP PULSE RATE 4 hr** | GA+BUPI+CLONI | 48 | 75.8750 | 2.4979 | 70.0000 | 76.0000 | 79.0000 | |
| | GA+BUPI | 48 | 86.3542 | 3.8729 | 70.0000 | 88.0000 | 89.0000 | <0.0001 |
| | GA | 48 | 94.6250 | 3.1054 | 90.0000 | 94.0000 | 99.0000 | |
| **POST-OP PULSE RATE 5 hr** | GA+BUPI+CLONI | 48 | 76.7500 | 2.3384 | 72.0000 | 81.0000 | 77.0000 | <0.0001 |
| | GA+BUPI | 48 | 86.2500 | 3.9004 | 72.0000 | 89.0000 | 88.0000 | |
| | GA | 48 | 96.5000 | 2.5011 | 92.0000 | 100.0000 | 96.0000 | |
| **POST-OP PULSE RATE 6 hr** | GA+BUPI+CLONI | 48 | 77.6667 | 2.6202 | 71.0000 | 81.0000 | 78.0000 | |
| | GA+BUPI | 48 | 87.1667 | 3.6105 | 71.0000 | 90.0000 | 88.0000 | |
| | GA | 48 | 97.4792 | 2.4667 | 94.0000 | 100.0000 | 99.0000 | <0.0001 |

*Table2:Distribution ofmeanSBPatdifferenttime interval: Group*

| | | **Number** | **Mean** | **SD** | **Minimum** | **Maximum** | **Median** | **p-value** |
|---|---|---|---|---|---|---|---|---|
| **PERI-OP NIBP 0 min(SBP)** | GA+BUPI+CLONI | 48 | 116.3750 | 3.9659 | 108.0000 | 121.0000 | 118.0000 | <0.0001 |
| | GA+BUPI | 48 | 118.2292 | 2.4342 | 108.0000 | 121.0000 | 119.0000 | |
| | GA | 48 | 127.4375 | 1.5285 | 125.0000 | 130.0000 | 128.0000 | |
| **PERI-OP NIBP 5 min(SBP)** | GA+BUPI+CLONI | 48 | 116.3750 | 3.3493 | 109.0000 | 120.0000 | 118.0000 | |
| | GA+BUPI | 48 | 121.1250 | 2.9291 | 110.0000 | 125.0000 | 122.0000 | <0.0001 |
| | GA | 48 | 129.7083 | .7133 | 129.0000 | 131.0000 | 130.0000 | |
| **PERI-OP NIBP 10 minSBP** | GA+BUPI+CLONI | 48 | 116.1250 | 4.0771 | 107.0000 | 121.0000 | 118.0000 | |
| | GA+BUPI | 48 | 122.1667 | 3.5149 | 107.0000 | 124.0000 | 124.0000 | <0.0001 |
| | GA | 48 | 131.2917 | 1.4136 | 130.0000 | 134.0000 | 131.0000 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **PERI-OP NIBP 15 minSBP** | GA+BUPI+CLONI | 48 | 116.5833 | 3.9022 | 109.0000 | 121.0000 | 118.0000 | <0.0001 |
| | GA+BUPI | 48 | 122.5000 | 3.3390 | 109.0000 | 126.0000 | 124.0000 | |
| | GA | 48 | 133.0208 | 2.4967 | 131.0000 | 138.0000 | 132.0000 | |
| **PERI-OP NIBP 30 MINSBP** | GA+BUPI+CLONI | 48 | 116.0417 | 3.4700 | 108.0000 | 119.0000 | 118.0000 | <0.0001 |
| | GA+BUPI | 48 | 121.9583 | 2.9962 | 110.0000 | 126.0000 | 122.0000 | |
| | GA | 48 | 133.6250 | 2.3395 | 131.0000 | 138.0000 | 134.0000 | |
| **PERI-OP NIBP 45 MINSBP** | GA+BUPI+CLONI | 48 | 116.2917 | 3.9300 | 108.0000 | 120.0000 | 118.0000 | <0.0001 |
| | GA+BUPI | 48 | 122.8542 | 3.6669 | 108.0000 | 126.0000 | 123.0000 | |
| | GA | 48 | 134.7083 | 1.3040 | 132.0000 | 136.0000 | 135.0000 | |
| **PERI-OP NIBP 60 min SBP** | GA+BUPI+CLONI | 48 | 116.2083 | 3.8258 | 109.0000 | 120.0000 | 118.0000 | <0.0001 |
| | GA+BUPI | 48 | 122.3125 | 4.0115 | 109.0000 | 127.0000 | 122.0000 | |
| | GA | 48 | 136.5417 | 2.6008 | 131.0000 | 139.0000 | 138.0000 | |
| **PERI-OP NIBP 75 minSBP** | GA+BUPI+CLONI | 48 | 117.0000 | 4.1312 | 108.0000 | 120.0000 | 119.0000 | <0.0001 |
| | GA+BUPI | 48 | 122.8846 | 1.8831 | 121.0000 | 126.0000 | 122.0000 | |
| | GA | 48 | 138.7037 | 1.3248 | 137.0000 | 140.0000 | 138.0000 | |
| **PERI-OP NIBP 90 minSBP** | GA+BUPI+CLONI | 48 | 119.7500 | .8864 | 119.0000 | 121.0000 | 119.5000 | <0.0001 |
| | GA+BUPI | 48 | 124.3000 | 1.7800 | 122.0000 | 126.0000 | 125.0000 | |
| | GA | 48 | 139.0000 | 1.7168 | 137.0000 | 141.0000 | 139.0000 | |
| **POST-OP NIBP1hrSBP** | GA+BUPI+CLONI | 48 | 116.8333 | 3.2046 | 110.0000 | 120.0000 | 118.0000 | <0.0001 |
| | GA+BUPI | 48 | 121.7500 | 2.8096 | 110.0000 | 124.0000 | 122.0000 | |
| | GA | 48 | 136.6458 | 2.7790 | 132.0000 | 140.0000 | 138.0000 | |
| **POST-OP NIBP2hrSBP** | GA+BUPI+CLONI | 48 | 117.1667 | 3.1645 | 109.0000 | 121.0000 | 118.0000 | <0.0001 |
| | GA+BUPI | 48 | 121.9375 | 2.7860 | 111.0000 | 125.0000 | 122.0000 | |
| | GA | 48 | 135.7292 | 2.6557 | 132.0000 | 139.0000 | 137.0000 | |
| **POST-OP NIBP3hrSBP** | GA+BUPI+CLONI | 48 | 117.9167 | 2.8272 | 110.0000 | 122.0000 | 119.0000 | <0.0001 |
| | GA+BUPI | 48 | 121.7500 | 2.2170 | 112.0000 | 124.0000 | 122.0000 | |
| | GA | 48 | 136.8333 | 1.7544 | 135.0000 | 139.0000 | 137.0000 | |
| | GA+BUPI+CLO | 48 | 118.458 | 3.300 | 109.0000 | 122.0000 | 119.000 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **POST-OP NIBP4hrSBP** | NI | | 3 | 3 | | | 0 | |
| | GA+BUPI | 48 | 122.7917 | 3.1145 | 110.0000 | 126.0000 | 124.0000 | <0.0001 |
| | GA | 48 | 138.1458 | 1.9240 | 134.0000 | 140.0000 | 138.0000 | |
| **POST-OP NIBP5hrSBP** | GA+BUPI+CLONI | 48 | 118.9167 | 3.2212 | 108.0000 | 122.0000 | 120.0000 | <0.0001 |
| | GA+BUPI | 48 | 124.5208 | 2.6416 | 113.0000 | 126.0000 | 125.0000 | |
| | GA | 48 | 138.5417 | .8982 | 137.0000 | 140.0000 | 139.0000 | |
| **POST-OP NIBP6hrSBP** | GA+BUPI+CLONI | 48 | 119.5833 | 3.2212 | 109.0000 | 122.0000 | 121.0000 | <0.0001 |
| | GA+BUPI | 48 | 124.5000 | 3.4146 | 112.0000 | 127.0000 | 126.0000 | |
| | GA | 48 | 138.1458 | 1.6757 | 135.0000 | 140.0000 | 138.0000 | |

*Table3:Distribution ofmeanDBPat differenttime interval : Group*

| | | **Number** | **Mean** | **SD** | **Minimum** | **Maximum** | **Median** | **p-value** |
|---|---|---|---|---|---|---|---|---|
| **PERI-OP NIBP 0 min(DBP)** | GA+BUPI+CLONI | 48 | 80.7917 | 4.7578 | 70.0000 | 86.0000 | 81.5000 | <0.0001 |
| | GA+BUPI | 48 | 81.8542 | 2.2596 | 75.0000 | 85.0000 | 82.0000 | |
| | GA | 48 | 87.0208 | 1.8041 | 85.0000 | 89.0000 | 86.0000 | |
| **PERI-OP NIBP 5 min(DBP)** | GA+BUPI+CLONI | 48 | 80.5000 | 4.3565 | 71.0000 | 86.0000 | 82.0000 | <0.0001 |
| | GA+BUPI | 48 | 83.3750 | 3.7395 | 71.0000 | 90.0000 | 84.0000 | |
| | GA | 48 | 87.2917 | 1.7860 | 84.0000 | 89.0000 | 87.0000 | |
| **PERI-OP NIBP 10 minDBP** | GA+BUPI+CLONI | 48 | 79.5833 | 4.5092 | 70.0000 | 87.0000 | 81.0000 | <0.0001 |
| | GA+BUPI | 48 | 82.8333 | 3.4661 | 72.0000 | 86.0000 | 84.0000 | |
| | GA | 48 | 86.4167 | 2.0299 | 84.0000 | 89.0000 | 87.0000 | |
| **PERI-OP NIBP 15 minDBP** | GA+BUPI+CLONI | 48 | 79.4583 | 4.0944 | 70.0000 | 86.0000 | 80.5000 | <0.0001 |
| | GA+BUPI | 48 | 83.5833 | 3.9293 | 73.0000 | 89.0000 | 85.0000 | |
| | GA | 48 | 87.5417 | 1.7005 | 84.0000 | 89.0000 | 88.0000 | |
| **PERI-OP NIBP 30 MINDBP** | GA+BUPI+CLONI | 48 | 78.1250 | 3.4679 | 72.0000 | 83.0000 | 80.0000 | <0.0001 |
| | GA+BUPI | 48 | 83.7708 | 4.4399 | 74.0000 | 88.0000 | 86.0000 | |
| | GA | 48 | 85.8333 | 1.7544 | 84.0000 | 89.0000 | 85.0000 | |
| **PERI-OP NIBP 45 MINDBP** | GA+BUPI+CLONI | 48 | 80.1667 | 3.5927 | 72.0000 | 85.0000 | 81.0000 | <0.0001 |
| | GA+BUPI | 48 | 84.1250 | 3.5767 | 72.0000 | 88.0000 | 85.0000 | |
| | GA | 48 | 86.9583 | 1.9456 | 84.0000 | 90.0000 | 87.0000 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **PERI-OP NIBP60 min DBP** | GA+BUPI+CLONI | 48 | 78.8333 | 4.4211 | 70.0000 | 88.0000 | 80.0000 | <0.0001 |
| | GA+BUPI | 48 | 83.7708 | 5.2562 | 71.0000 | 89.0000 | 85.0000 | |
| | GA | 48 | 86.1667 | 1.7544 | 85.0000 | 90.0000 | 85.0000 | |
| **PERI-OP NIBP 75 minDBP** | GA+BUPI+CLONI | 48 | 80.0000 | 4.0332 | 75.0000 | 85.0000 | 81.0000 | <0.0001 |
| | GA+BUPI | 48 | 84.5385 | 3.7334 | 79.0000 | 89.0000 | 85.0000 | |
| | GA | 48 | 87.1852 | 2.0946 | 84.0000 | 89.0000 | 87.0000 | |
| **PERI-OP NIBP 90 minDBP** | GA+BUPI+CLONI | 48 | 82.0000 | 1.3093 | 81.0000 | 84.0000 | 81.5000 | <0.0001 |
| | GA+BUPI | 48 | 84.5000 | 3.4868 | 80.0000 | 88.0000 | 86.0000 | |
| | GA | 48 | 87.2500 | 2.4468 | 84.0000 | 89.0000 | 89.0000 | |
| **POST-OP NIBP 1 hrDBP** | GA+BUPI+CLONI | 48 | 80.1250 | 4.0139 | 71.0000 | 85.0000 | 81.0000 | <0.0001 |
| | GA+BUPI | 48 | 81.7500 | 4.2950 | 71.0000 | 86.0000 | 84.0000 | |
| | GA | 48 | 89.1458 | .3567 | 89.0000 | 90.0000 | 89.0000 | |
| **PONIBP2 DBP** | GA+BUPI+CLONI | 48 | 80.6667 | 4.4785 | 73.0000 | 91.0000 | 81.0000 | <0.0001 |
| | GA+BUPI | 48 | 84.9792 | 3.3548 | 73.0000 | 89.0000 | 86.0000 | |
| | GA | 48 | 85.7917 | 1.6106 | 84.0000 | 89.0000 | 86.0000 | |
| **POST-OP NIBP3hrDBP** | GA+BUPI+CLONI | 48 | 80.5833 | 4.2867 | 71.0000 | 89.0000 | 81.0000 | <0.0001 |
| | GA+BUPI | 48 | 84.7083 | 3.1485 | 71.0000 | 87.0000 | 85.0000 | |
| | GA | 48 | 87.3958 | 2.0184 | 84.0000 | 89.0000 | 89.0000 | |
| **POST-OP NIBP4hrDBP** | GA+BUPI+CLONI | 48 | 80.5000 | 3.4394 | 74.0000 | 87.0000 | 81.0000 | <0.0001 |
| | GA+BUPI | 48 | 82.6458 | 3.6055 | 74.0000 | 86.0000 | 84.0000 | |
| | GA | 48 | 86.7917 | 2.7129 | 82.0000 | 90.0000 | 87.0000 | |
| **POST-OP NIBP5hrDBP** | GA+BUPI+CLONI | 48 | 81.5000 | 3.5129 | 75.0000 | 87.0000 | 81.0000 | <0.0001 |
| | GA+BUPI | 48 | 84.9792 | 3.4177 | 75.0000 | 89.0000 | 86.0000 | |
| | GA | 48 | 86.6667 | 2.5208 | 84.0000 | 90.0000 | 87.0000 | |
| **POST-OP NIBP6hrDBP** | GA+BUPI+CLONI | 48 | 80.7500 | 3.1589 | 74.0000 | 85.0000 | 81.0000 | <0.0001 |
| | GA+BUPI | 48 | 85.3333 | 3.1239 | 74.0000 | 89.0000 | 85.0000 | |
| | GA | 48 | 87.8333 | 1.9167 | 84.0000 | 89.0000 | 89.0000 | |

*Table4: DistributionofmeanSPO2atdifferent timeinterval : Group*

| | | Number | Mean | SD | Minimum | Maximum | Median | p-value |
|---|---|---|---|---|---|---|---|---|
| **PERI-OP SPO20 min** | GA+BUPI+CLONI | 48 | 99.8333 | .3766 | 99.0000 | 100.0000 | 100.0000 | 0.1716 |
| | GA+BUPI | 48 | 99.8750 | .3342 | 99.0000 | 100.0000 | 100.0000 | |
| | GA | 48 | 99.7292 | .4491 | 99.0000 | 100.0000 | 100.0000 | |
| **PERI-OP SPO25 min** | GA+BUPI+CLONI | 48 | 99.9583 | .2019 | 99.0000 | 100.0000 | 100.0000 | 0.0071 |
| | GA+BUPI | 48 | 99.7292 | .4491 | 99.0000 | 100.0000 | 100.0000 | |
| | GA | 48 | 99.8542 | .3567 | 99.0000 | 100.0000 | 100.0000 | |
| **PERI-OP SPO2 10 min** | GA+BUPI+CLONI | 48 | 99.7917 | .4104 | 99.0000 | 100.0000 | 100.0000 | <0.0001 |
| | GA+BUPI | 48 | 100.0000 | .0000 | 100.0000 | 100.0000 | 100.0000 | |
| | GA | 48 | 100.0000 | .0000 | 100.0000 | 100.0000 | 100.0000 | |
| **PERI-OP SPO2 15 min** | GA+BUPI+CLONI | 48 | 99.8333 | .3766 | 99.0000 | 100.0000 | 100.0000 | 0.0497 |
| | GA+BUPI | 48 | 99.6667 | .4764 | 99.0000 | 100.0000 | 100.0000 | |
| | GA | 48 | 99.8542 | .3567 | 99.0000 | 100.0000 | 100.0000 | |
| **PERI-OP SPO2 30 MIN** | GA+BUPI+CLONI | 48 | 99.7500 | .4376 | 99.0000 | 100.0000 | 100.0000 | 0.0009 |
| | GA+BUPI | 48 | 100.0000 | .0000 | 100.0000 | 100.0000 | 100.0000 | |
| | GA | 48 | 99.8750 | .3342 | 99.0000 | 100.0000 | 100.0000 | |
| **PERI-OP SPO2 45 MIN** | GA+BUPI+CLONI | 48 | 99.8750 | .3342 | 99.0000 | 100.0000 | 100.0000 | 0.0496 |
| | GA+BUPI | 48 | 99.8750 | .3342 | 99.0000 | 100.0000 | 100.0000 | |
| | GA | 48 | 99.7083 | .4593 | 99.0000 | 100.0000 | 100.0000 | |
| **PERI-OP SPO2 60 min** | GA+BUPI+CLONI | 48 | 99.7083 | .4593 | 99.0000 | 100.0000 | 100.0000 | 0.0639 |
| | GA+BUPI | 48 | 99.6875 | .4684 | 99.0000 | 100.0000 | 100.0000 | |
| | GA | 48 | 99.8750 | .3342 | 99.0000 | 100.0000 | 100.0000 | |
| **PERI-OP SPO2 75 min** | GA+BUPI+CLONI | 48 | 99.7500 | .4472 | 99.0000 | 100.0000 | 100.0000 | <0.0001 |
| | GA+BUPI | 48 | 100.0000 | .0000 | 100.0000 | 100.0000 | 100.0000 | |
| | GA | 48 | 99.5185 | .5092 | 99.0000 | 100.0000 | 100.0000 | |
| **PERI-OP SPO2 90 min** | GA+BUPI+CLONI | 48 | 99.7500 | .4629 | 99.0000 | 100.0000 | 100.0000 | 0.0141 |
| | GA+BUPI | 48 | 99.6500 | .4894 | 99.0000 | 100.0000 | 100.0000 | |
| | GA | 48 | 100.0000 | .0000 | 100.0000 | 100.0000 | 100.0000 | |
| **POST-OP SPO21 hr** | GA+BUPI+CLONI | 48 | 99.9167 | .2793 | 99.0000 | 100.0000 | 100.0000 | 0.0493 |
| | GA+BUPI | 48 | 100.0000 | .0000 | 100.0000 | 100.0000 | 100.0000 | |
| | GA | 48 | 99.8750 | .3342 | 99.0000 | 100.0000 | 100.0000 | |
| **POST-OP SPO22 hr** | GA+BUPI+CLONI | 48 | 99.9167 | .2793 | 99.0000 | 100.0000 | 100.0000 | 0.0258 |
| | GA+BUPI | 48 | 100.0000 | .0000 | 100.0000 | 100.0000 | 100.0000 | |
| | GA | 48 | 99.8542 | .3567 | 99.0000 | 100.0000 | 100.0000 | |
| **POST-OP SPO23 hr** | GA+BUPI+CLONI | 48 | 99.9583 | .2019 | 99.0000 | 100.0000 | 100.0000 | 0.0093 |
| | GA+BUPI | 48 | 100.0000 | .0000 | 100.0000 | 100.0000 | 100.0000 | |
| | GA | 48 | 99.8542 | .3567 | 99.0000 | 100.0000 | 100.0000 | |
| **POST-** | GA+BUPI+CLONI | 48 | 99.9167 | .2793 | 99.0000 | 100.0000 | 100.0000 | |
| | GA+BUPI | 48 | 100.0000 | .0000 | 100.0000 | 100.0000 | 100.0000 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **OP SPO24 hr** | GA | 48 | 100.0000 | .0000 | 100.0000 | 100.0000 | 100.0000 | 0.0158 |
| **POST-OP SPO25 hr** | GA+BUPI+CLONI | 48 | 99.8750 | .3342 | 99.0000 | 100.0000 | 100.0000 | 0.0391 |
| | GA+BUPI | 48 | 99.6875 | .4684 | 99.0000 | 100.0000 | 100.0000 | |
| | GA | 48 | 99.8542 | .3567 | 99.0000 | 100.0000 | 100.0000 | |
| **POST-OP SPO26 hr** | GA+BUPI+CLONI | 48 | 100.0000 | .0000 | 100.0000 | 100.0000 | 100.0000 | <0.0001 |
| | GA+BUPI | 48 | 100.0000 | .0000 | 100.0000 | 100.0000 | 100.0000 | |
| | GA | 48 | 99.7083 | .4593 | 99.0000 | 100.0000 | 100.0000 | |

*Table5:Distributionofmean ETCO2atdifferenttimeinterval: Group*

| | | **Number** | **Mean** | **SD** | **Minimum** | **Maximum** | **Median** | **p-value** |
|---|---|---|---|---|---|---|---|---|
| **PERI-OP ETCO2 0 min** | GA+BUPI+CLONI | 48 | 30.7500 | .8873 | 29.0000 | 32.0000 | 31.0000 | 0.5130 |
| | GA+BUPI | 48 | 30.6250 | .7614 | 29.0000 | 32.0000 | 31.0000 | |
| | GA | 48 | 30.5833 | .4982 | 30.0000 | 31.0000 | 31.0000 | |
| **PERI-OP ETCO2 5 min** | GA+BUPI+CLONI | 48 | 31.0417 | .8495 | 29.0000 | 32.0000 | 31.0000 | 0.4548 |
| | GA+BUPI | 48 | 31.0417 | .7426 | 30.0000 | 32.0000 | 31.0000 | |
| | GA | 48 | 30.8750 | .6400 | 30.0000 | 32.0000 | 31.0000 | |
| **PERI-OP ETCO2 10 min** | GA+BUPI+CLONI | 48 | 31.4167 | .8711 | 30.0000 | 33.0000 | 31.0000 | 0.0019 |
| | GA+BUPI | 48 | 30.8333 | .8337 | 30.0000 | 32.0000 | 31.0000 | |
| | GA | 48 | 31.1458 | .6520 | 30.0000 | 32.0000 | 31.0000 | |
| **PERI-OP ETCO2 15 min** | GA+BUPI+CLONI | 48 | 31.1250 | .9812 | 28.0000 | 33.0000 | 31.0000 | 0.3217 |
| | GA+BUPI | 48 | 30.8750 | .6400 | 30.0000 | 32.0000 | 31.0000 | |
| | GA | 48 | 31.0000 | .7718 | 30.0000 | 32.0000 | 31.0000 | |
| **PERI-OP ETCO2 30 min** | GA+BUPI+CLONI | 48 | 31.1667 | .9964 | 29.0000 | 33.0000 | 31.0000 | <0.0001 |
| | GA+BUPI | 48 | 30.1875 | .3944 | 30.0000 | 31.0000 | 30.0000 | |
| | GA | 48 | 30.7292 | .7068 | 30.0000 | 32.0000 | 31.0000 | |
| **PERI-OP ETCO2 45 MIN** | GA+BUPI+CLONI | 48 | 31.2917 | 1.0306 | 29.0000 | 33.0000 | 31.0000 | 0.0002 |
| | GA+BUPI | 48 | 30.6667 | .6945 | 30.0000 | 32.0000 | 31.0000 | |
| | GA | 48 | 30.6875 | .6890 | 30.0000 | 32.0000 | 31.0000 | |
| **PERI-OP ETCO2 60 min** | GA+BUPI+CLONI | 48 | 31.2083 | .6510 | 30.0000 | 32.0000 | 31.0000 | <0.0001 |
| | GA+BUPI | 48 | 31.2917 | 1.0306 | 30.0000 | 33.0000 | 31.0000 | |
| | GA | 48 | 30.5833 | .7390 | 30.0000 | 32.0000 | 30.0000 | |
| **PERI-OP ETCO2 75 min** | GA+BUPI+CLONI | 48 | 31.1250 | .9574 | 30.0000 | 33.0000 | 31.0000 | 0.0013 |
| | GA+BUPI | 48 | 30.7692 | .4297 | 30.0000 | 31.0000 | 31.0000 | |
| | GA | 48 | 31.5556 | .8473 | 30.0000 | 32.0000 | 32.0000 | |
| | GA+BUPI+CLONI | 48 | 31.7500 | .4629 | 31.0000 | 32.0000 | 32.0000 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **PERI-OP ETCO2 90 min** | GA+BUPI | 48 | 31.4000 | .9403 | 30.0000 | 32.0000 | 32.0000 | 0.1220 |
| | GA | 48 | 31.0500 | .8256 | 30.0000 | 32.0000 | 31.0000 | |

*Table6:Comparison ofmeanVAS scoreat2 hours*

| | GA+BUPI+CLONI | GA+BUPI | GA | PVALUE |
|---|---|---|---|---|
| MEAN | 2.48 | 4.79 | 7.23 | <0.01 |
| MEDIAN | 3 | 5 | 7 | |
| STANDARD DEVIATION | 0.68 | 0.68 | 0.42 | |

*Table7:Comparison ofmeanVAS scoreat6 hours*

| | GA+BUPI+CLONI | GA+BUPI | GA | PVALUE |
|---|---|---|---|---|
| MEAN | 1.98 | 4.25 | 6.37 | <0.01 |
| MEDIAN | 2 | 4 | 6 | |
| STANDARD DEVIATION | 0.36 | 0.78 | 0.48 | |

*Table8:Comparisonoftimeoffirstanalgesicadministration*

| | GA+BUPI+CLONI | GA+BUPI | GA | PVALUE |
|---|---|---|---|---|
| MEAN | 6.96 | 5.63 | 3.14 | <0.01 |
| STANDARD DEVIATION | 0.75 | 0.81 | 0.75 | |

*Table9:Doseof diclofenac receivedat6hours*

| | GA+BUPI+CLONI | GA+BUPI | GA | PVALUE |
|---|---|---|---|---|
| MEAN | 6.96 | 5.63 | 3.14 | <0.01 |
| STANDARD DEVIATION | 0.75 | 0.81 | 0.75 | |

DISCUSSION

The present study investigated the analgesic efficacy of bilateral superficial cervical plexus block (BSCPB) with bupivacaine and clonidine in combination with general anesthesia (GA) compared to GA alone or GA with BSCPB using bupivacaine only in patients undergoing thyroid surgery. The results demonstrated that the addition of BSCPB, particularly with bupivacaine and clonidine, significantly reduced perioperative pulse rate, blood pressure, postoperative pain scores, and analgesic requirements.

These findings are consistent with several previous studies that have examined the effects of BSCPB on postoperative pain and analgesic consumption in thyroid surgery. A randomized controlled trial by Shih et al. [16] found that patients who received BSCPB with 0.5% bupivacaine before GA had significantly lower postoperative pain scores and morphine consumption compared to those who received GA alone ($p<0.05$). The mean VAS scores at 2 and 4 hours postoperatively were $2.5 \pm 1.3$ and $2.3 \pm 1.2$ in the BSCPB group, compared to $4.2 \pm 1.8$ and $3.9 \pm 1.6$ in the GA group, respectively.

Similarly, a study by Kannan et al. [17] demonstrated that BSCPB with 0.25% bupivacaine significantly reduced postoperative pain scores and fentanyl requirement in patients undergoing thyroidectomy under GA. The mean VAS scores at 0, 2, 4, and 6 hours postoperatively were significantly lower in the BSCPB group compared to the control group ($p<0.001$). The total fentanyl consumption in the first 24 hours was also significantly lower in the BSCPB group ($178.5 \pm 56.4$ μg) compared to the control group ($352.5 \pm 68.2$ μg) ($p<0.001$).

The addition of clonidine to local anesthetics has been shown to enhance the analgesic effects of peripheral nerve blocks [18]. In a randomized, double-blind study by Chakraborty et al. [19], patients who received BSCPB with 0.25% bupivacaine and 1 μg/kg clonidine had significantly lower postoperative pain scores and longer duration of analgesia compared to those who received BSCPB with bupivacaine alone ($p<0.05$). The mean duration of analgesia was 16.2 ± 1.4 hours in the bupivacaine-clonidine group and 11.6 ± 1.2 hours in the bupivacaine group.

In contrast, a study by Herbland et al. [20] found no significant difference in postoperative pain scores or morphine consumption between patients who received BSCPB with 0.75% ropivacaine before or after thyroid surgery and those who received GA alone. However, the authors acknowledged that the small sample size and the use of a different local anesthetic might have influenced the results.

The present study also found that BSCPB with bupivacaine and clonidine resulted in significantly lower perioperative pulse rate and blood pressure compared to the other two groups. This finding is in agreement with a study by Andrieu et al. [21], which demonstrated that BSCPB with 0.75% ropivacaine significantly reduced intraoperative remifentanil requirement and provided better hemodynamic stability compared to GA alone in patients undergoing thyroidectomy.

The differences in perioperative oxygen saturation and end-tidal carbon dioxide levels among the groups in the present study, although statistically significant at some time points, were not clinically relevant. This finding suggests that BSCPB with bupivacaine and clonidine does not have a significant impact on respiratory function during thyroid surgery under GA.

One of the strengths of the present study is the use of a three-arm design, which allowed for a comparison of the analgesic effects of BSCPB with bupivacaine alone and in combination with clonidine. Additionally, the study assessed multiple outcome measures, including perioperative hemodynamic parameters, postoperative pain scores, and analgesic requirements, providing a comprehensive evaluation of the effectiveness of BSCPB in thyroid surgery.

However, the study has some limitations that should be considered when interpreting the results. First, the sample size was relatively small, which might have limited the power to detect significant differences in some outcome measures. Second, the study did not assess the long-term effects of BSCPB on postoperative pain and analgesic requirements beyond 6 hours. Future studies with larger sample sizes and longer follow-up periods are needed to confirm and extend the findings of the present study.

The present study demonstrates that BSCPB with bupivacaine and clonidine in combination with GA provides superior postoperative analgesia and perioperative hemodynamic stability compared to GA alone or GA with BSCPB using bupivacaine only in patients undergoing thyroid surgery. These findings suggest that BSCPB with bupivacaine and clonidine is an effective technique for postoperative pain management in thyroid surgery and should be considered as a component of multimodal analgesia in this patient population.

**CONCLUSION**

In conclusion, the present study demonstrates that bilateral superficial cervical plexus block (BSCPB) with bupivacaine and clonidine in combination with general anesthesia (GA) provides superior postoperative analgesia and perioperative hemodynamic stability compared to GA alone or GA with BSCPB using bupivacaine only in patients undergoing thyroid surgery. The addition of BSCPB, particularly with bupivacaine and clonidine, resulted in significantly lower postoperative pain scores, longer duration of analgesia, and reduced analgesic requirements.

The mean Visual Analog Scale (VAS) scores at 2 and 6 hours postoperatively were significantly lower in the GA+BSCPB with bupivacaine and clonidine group (2.48 ± 0.68 and 1.98 ± 0.36, respectively) compared to the GA+BSCPB with bupivacaine only (4.79 ± 0.68 and 4.25 ± 0.78, respectively) and GA alone groups (7.23 ± 0.42 and 6.37 ± 0.48, respectively) ($p<0.01$). The mean time to first analgesic administration was significantly longer, and the mean dose of diclofenac received at 6 hours was significantly lower in the GA+BSCPB with bupivacaine and clonidine group compared to the other two groups ($p<0.01$).

Furthermore, BSCPB with bupivacaine and clonidine resulted in significantly lower perioperative pulse rate and blood pressure compared to the other two groups, suggesting better hemodynamic stability. The differences in perioperative oxygen saturation and end-tidal carbon dioxide levels among the groups, although statistically significant at some time points, were not clinically relevant.

These findings suggest that BSCPB with bupivacaine and clonidine is an effective technique for postoperative pain management in thyroid surgery and should be considered as a component of multimodal analgesia in this patient

population. Future studies with larger sample sizes and longer follow-up periods are needed to confirm and extend the findings of the present study and to assess the long-term effects of BSCPB on postoperative pain and analgesic requirements.

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