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EVALUATION OF THE EFFICACY OF BUPIVACAINE WITH CLONIDINE IN BILATERAL SUPERFICIAL CERVICAL PLEXUS BLOCK FOR THYROID SURGERY- A PROSPECTIVE OBSERVATIONAL STUDY

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ABSTRACT

Background: Effective postoperative pain management is crucial for patients undergoing thyroid surgery to improve recovery and satisfaction. Systemic opioids, a traditional method for pain relief, are often associated with adverse effects like nausea, respiratory depression, and vomiting. A superficial cervical plexus block offers an alternative by providing targeted pain control with fewer side effects. Bupivacaine is a long-acting local anesthetic commonly used for this block, and adding clonidine, an alpha-2 adrenergic agonist, may prolong its analgesic effects. **Material and Methods:** This prospective observational study included 60 patients of American Society of Anesthesiologists (ASA) physical status I or II, aged 18 to 60, scheduled for elective thyroid surgery. After receiving standardized general anesthesia, patients underwent a bilateral superficial cervical plexus block using a mixture of 7 ml of 0.5% bupivacaine and 2 mcg/kg of clonidine on each side. Postoperative pain was assessed using the Numerical Rating Scale (NRS) at 2, 4, 6, 8, 16, and 24 hours. The primary objective was to assess the duration of analgesia. Hemodynamic stability and the time to first rescue analgesia were also recorded. **Results:** The mean duration of analgesia was 435.50 ± 56.46 minutes. The mean time to the first request for rescue analgesia was 7.51 ± 1.45 hours. Pain scores (NRS) were 0 for the first 2 hours post-surgery and gradually increased to a mean of 5.35 at 24 hours. Hemodynamic parameters, including heart rate and blood pressure, remained stable throughout the postoperative period. No major complications were reported. **Conclusion:** The bilateral superficial cervical plexus block with clonidine added to bupivacaine is an effective component of multimodal postoperative analgesia for thyroid surgery. This combination provides extended analgesia, maintains hemodynamic stability, and reduces the need for postoperative opioids, thereby improving the quality of patient recovery.

Keywords: Bupivacaine, Clonidine, Superficial Cervical Plexus Block, Thyroid Surgery, Postoperative Analgesia, Pain Management

INTRODUCTION

Thyroid surgery is a common procedure requiring effective postoperative pain management to improve patient recovery and satisfaction. Traditional pain relief methods, such as systemic opioids, often come with significant side effects including nausea, vomiting, and the risk of respiratory depression. The potential for respiratory depression is a major concern in the postoperative period, as patients are already vulnerable due to anesthesia and surgical stress. These side effects highlight the necessity for alternative pain management strategies.

Regional anesthesia techniques like the superficial cervical plexus block present a promising alternative, offering targeted pain relief with minimal systemic effects. This block is particularly well-suited for thyroid surgery as it anesthetizes the neck region where the incision is made. Bupivacaine, a long-acting local anesthetic, is frequently used for this block due to its prolonged duration of action. However, its effects can be enhanced by adding an adjuvant.

Clonidine, an alpha-2 adrenergic agonist, has emerged as a promising adjuvant that can extend the duration of analgesia and improve the quality of pain relief when combined with bupivacaine. This combination has been shown to result in lower postoperative pain scores, reduced need for rescue analgesics, and stable hemodynamics during and after surgery. The use of ultrasound guidance further improves the safety and precision of administering the block. This study aims to evaluate the efficacy of combining bupivacaine with clonidine for bilateral superficial cervical plexus blocks in patients undergoing thyroid surgery.

MATERIAL AND METHODS

This was a prospective observational study conducted after obtaining clearance from the Institutional Human Ethics Committee of Government Dharmapuri Medical College.

INCLUSION CRITERIA

- Patients aged 18 to 60 years.
- ASA physical status I or II.
- Patients in a euthyroid state scheduled for elective thyroid surgery.
- Provided informed consent.

EXCLUSION CRITERIA

- Known allergy to study drugs.
- Difficult airway.
- Pregnancy.
- Significant cardiovascular, respiratory, renal, or hepatic diseases.
- History of seizures or neurological deficits.
- Patient refusal.

INTERVENTION

The study enrolled 60 patients scheduled for elective thyroid surgery. After a thorough preanesthetic examination and obtaining written informed consent, patients were educated on the use of the Numerical Rating Scale (NRS). All patients were premedicated with IV Midazolam 1mg and IV Glycopyrrolate 0.2mg. Anesthesia was induced with Fentanyl 2 mcg/kg, Thiopentone 5mg/kg, and Succinylcholine 2 mg/kg, followed by intubation.

Under anesthesia, a bilateral superficial cervical plexus block was performed using ultrasound guidance. With the patient supine and head turned, a high-frequency linear transducer was used to identify the fascial plane under the sternocleidomastoid muscle. Following negative aspiration, a mixture of 7ml of 0.5% bupivacaine and clonidine 2 mcg/kg was injected on each side.

Anesthesia was maintained with N2O:O2, Isoflurane 1.2%, and atracurium. Postoperatively, patients were monitored in the SHDU, and NRS scores were assessed at 2, 4, 6, 8, 16, and 24 hours. IV Paracetamol 10mg/kg was administered as rescue analgesia if the NRS score was >4.

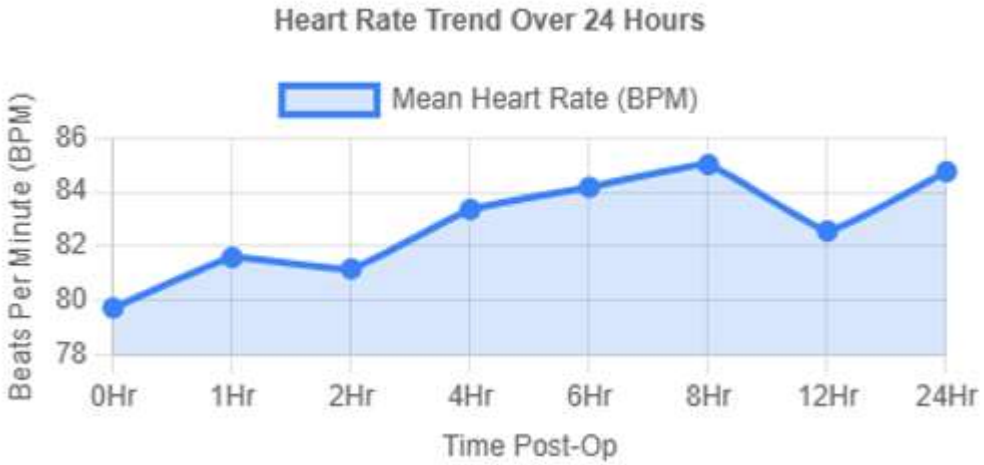
STATISTICAL METHODS Data was collected preoperatively, intraoperatively, and postoperatively. Continuous variables were analyzed using t-tests or ANOVA, while categorical variables were analyzed using chi-square tests. A p-value < 0.05 was considered statistically significant.

RESULTS

The study included 60 patients, with the largest group (40%) aged 31-40 years and the majority (48.3%) weighing between 56-65 kg. All patients in the study were female.

TABLE 1: Mean Heart rate of participants

Parameter	**Mean ± Std. Deviation (SBP)**
HR (0 Hr)	79.71 ±5.70
HR (1 Hr)	81.58± 5.76
HR (2 Hr)	81.16±5.37
HR (4 Hr)	83.36±6.19
HR (6 Hr)	84.18±5.83
HR (8 Hr)	85.02±6.28
HR (12 Hr)	82.56±5.41
HR (24 Hr)	84.76±5.99



The heart rate showed a significant increase from baseline over 24 hours, peaking at 8 hours.

TABLE 2: Mean systolic and diastolic blood pressure of participants

Parameter	Mean ± Std. Deviation (SBP)	Mean ± Std. Deviation (DBP)
0 Hr	114.43 ±9.63	71.36 ±7.03
1 Hr	115.50 ± 11.08	73.96±8.10
2 Hr	114.53 ± 8.89	71.80 ±7.45
4 Hr	111.93±9.22	73.46 ±8.72
6 Hr	115.10 ± 9.30	72.20 ±8.04
8 Hr	114.10 ±10.80	74.60 ±7.83
12 Hr	116.26 ±8.15	77.33±7.80
24 Hr	116.60 ± 11.33	71.20 ±8.43

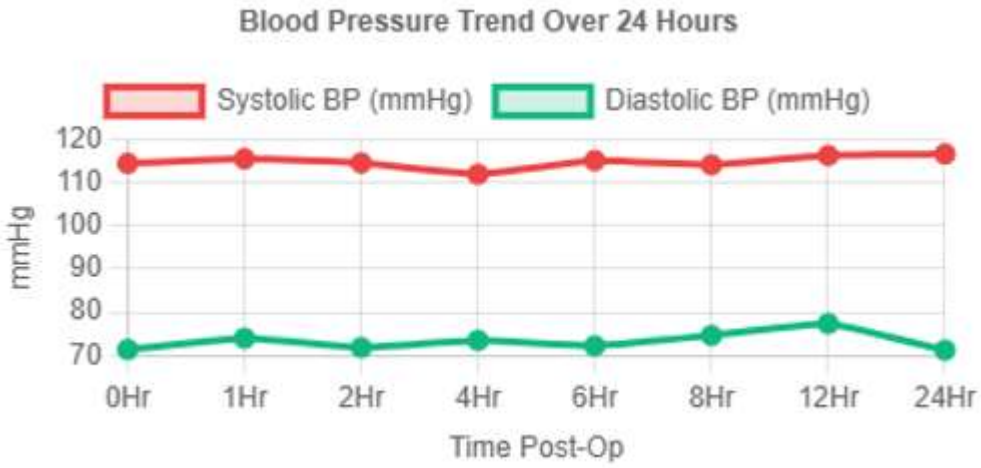


Figure 2

Statistically significant fluctuations in SBP and DBP were observed over 24 hours, but values remained within a stable range. DBP peaked at 12 hours before returning near baseline.

TABLE 3: Mean numerical rating pain score of participants

Parameter	Mean ± Std. Deviation
NRS SCORE (O Hr)	0.00
NRS SCORE (1Hr)	0.00
NRS SCORE (2Hr)	0.00
NRS SCORE (4Hr)	1.16 ± 0.82
NRS SCORE (6Hr)	2.16 ± 0.90
NRS SCORE (8Hr)	3.10 ± 0.81
NRS SCORE (12Hr)	4.05 ± 1.01
NRS SCORE (24Hr)	5.35 ±1.36

Figure 3

Participants reported no pain for the first 2 hours. From 4 hours onward, the mean NRS score increased gradually and significantly, peaking at 24 hours.

TABLE 4: Mean duration of analgesia and first rescue analgesia

Parameter	**Mean ± Std. Deviation**
Duration of Analgesia	435.50 ± 56.46 Minutes
First rescue analgesi	7.51 ± 1.45 hours

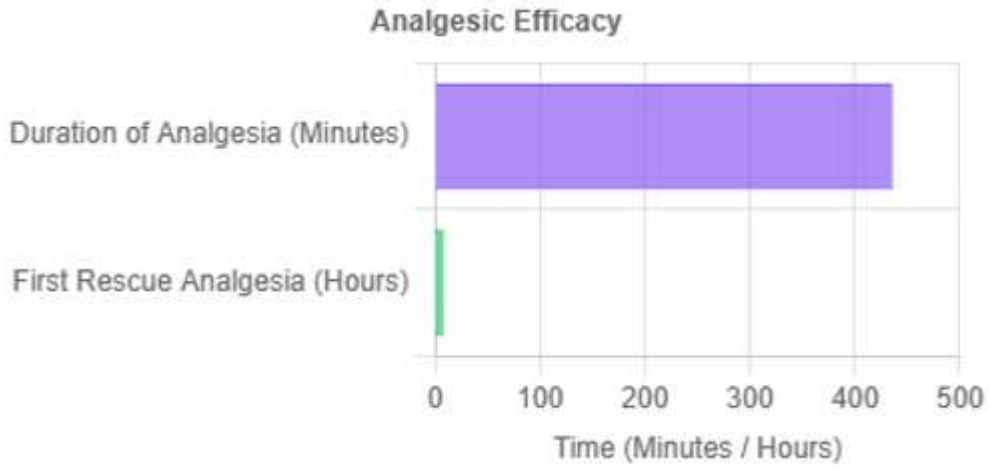


Figure 4

The mean duration of analgesia was 435.5 minutes, and the mean time for the first rescue analgesia was 7.51 hours, both of which were statistically significant. The median duration of analgesia was 420 minutes.

DISCUSSION

This study demonstrated that combining bupivacaine with clonidine in a bilateral superficial cervical plexus block provides effective and prolonged analgesia for thyroid surgery. Our findings are consistent with previous studies suggesting that clonidine enhances the analgesic

effects of local anesthetics. The mean analgesia duration of approximately 435.5 minutes and the first rescue analgesia requirement at a mean of 7.51 hours highlight the block's efficacy. The hemodynamic parameters remained stable throughout the study, which aligns with reports by White and Patel (2021), confirming the cardiovascular safety of adding clonidine. The low postoperative pain scores indicate effective pain management, which can lead to higher patient satisfaction, earlier mobilization, and potentially shorter hospital stays. A key clinical benefit is the reduction in opioid requirements, which mitigates the risks associated with opioid use, such as nausea and respiratory depression.

Study Limitations:

- The single-center design and a sample size of 60 patients may limit the generalizability of the findings.
- The study focused on immediate postoperative outcomes, and long-term effects were not assessed.
- A comprehensive analysis of side effects like hypotension and bradycardia was not fully explored and requires larger studies.

CONCLUSION

In cases of thyroid surgery requiring multimodal postoperative analgesia, the bilateral superficial cervical plexus block is an effective method. This study demonstrated that adding clonidine as an adjunct to bupivacaine provides better analgesia, maintains hemodynamic stability, and lowers the intraoperative and postoperative opioid requirement, contributing to a better quality of patient recovery.

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