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Efficacy of Bilateral Superficial Cervical Plexus Block for Postoperative Analgesia in Thyroidectomy

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Abstract: ***Background and Objective: As thyroid surgery is being performed as an ambulatory procedure, recent studies concerning post thyroidectomy analgesia have focused on regional techniques such as bilateral superficial cervical plexus block (BSCPB) and bilateral combined superficial and deep cervical plexus block. But, data regarding the efficacy of BSCPB are controversial. Hence, we compared the efficacy of BSCPB with 0.25% bupivacaine for postoperative analgesia in thyroidectomy cases. Methods: Patients (n = 40) undergoing thyroidectomy were randomized into 2 groups (n = 20 each) to receive BSCPB using 15 mL of 0.25% bupivacaine (group B) or 0.9% normal saline (group S) on each side before extubation. Postoperative pain scores were assessed for 24 hours. Results: Postoperative pain scores were significantly lower in group B (compared to S) at 2, 4 and 8 hours. Conclusion: BSCPB with 0.25% bupivacaineis effective in reducing postoperative pain and analgesic requirements in thyroidectomy.***

Keywords: Bilateral Superficial Cervical Plexus Block, 0.25% Bupivacaine, Analgesia, Thyroidectomy

1. Introduction

Pain after thyroid surgery is of moderate intensity.[1,2] with up to 90% of the patients requiring narcotics on the first postoperative day.[3] Pain is now emerged as a significant problem in the post operative period. Information regarding the efficacy of bilateral superficial cervical plexus block in postoperative analgesia has been controversial[4], with some studies[1,5,6] proving BSCPB to be effective and some other studies[7,8] finding no effect with the same. Hence, this study was undertaken to assess the efficacy of BSCPB using bupivacaine 0.25% and 0.9% normal saline as control in thyroidectomy under general anesthesia based on the pain assessment score.

2. Methods

This study was a hospital based, double-blind, randomized, placebo-controlled trial. This was performed in 40 patients undergoing elective thyroidectomy. Ethical committee approval was obtained. The study was conducted from June 2021 to November 2022.

Study population
All euthyroid patients undergoing elective thyroidectomy under general anesthesia, age more than 18 years, of either gender, belonging to ASA class I and II were eligible for the study. Written informed consent is obtained from all patients.

The exclusion criteria were inability to understand Visual Analog Scale (VAS), malignancy requiring block dissection, substernal goiter, contraindications to superficial cervical plexus block (allergy to local anesthetics, bleeding diatheses, and local infection or sepsis) or sensitivity to the anesthetic agent used or intolerance to the medications used, usage of steroids or opioids or other analgesics in the recent past or a history of stridor.

Using PS software 2.1.31, the sample size was calculated to be 20 patients in each group of our study.

Randomization, Allocation and Blinding:
Patients were randomized to receive BSCPB with bupivacaine 0.25% or normal saline 0.9% (placebo) by randomization performed using Microsoft Excel 2007. Allocation concealment was performed using serially numbered opaque sealed envelope technique. Envelopes were opened on the day of surgery outside the operating room by an anesthetist not involved in the research. The anesthetist prepared the solutions in 2 similar sterile unlabelled 20 mL syringes and handed them over to the anesthetist in-charge of the patient. As the drug solutions were colorless, it aided in blinding the anesthetist and the operating team. The patient and the investigator who assessed the outcome (pain) were also blinded. Hence the study was double-blind.

Intervention
A standard anesthesia protocol was used for all our patients. All patients were premedicated with alprazolam 0.5mg orally. Preinduction was carried out with IV midazolam 1–1.5 mg and IV fentanyl 1.5 mcg/kg, and then induction was performed with IV propofol 1.5–2 mg/kg. Intubation with an endotracheal tube was facilitated by IV vecuronium 0.1 mg/kg, and to suppress the laryngoscopy response, IV lignocaine 1.5 mg/kg was used.

General anesthesia was maintained with a mixture of oxygen 33% in nitrous oxide 66% and isoflurane 0.5–1.2%. Supplemental IV fentanyl was administered in incremental doses of 0.5 mcg/kg if the changes in blood pressure and pulse rate were more than 20% compared to a baseline value recorded during stable unstimulated anesthesia.

Bilateral superficial cervical plexus block was done after the completion of the surgical procedure and skin closure. The superficial cervical plexus was blocked[9] at the midpoint of the posterior border of the sternocleidomastoid muscle. A skin wheal is made at this point, and a 22-gauge, 4 cm needle is advanced, injecting 6 ml of 0.25% bupivacaine solution in group B or 6 ml of 0.9% NS in group S along the posterior border and medial surface of sternocleidomastoid muscle. The same is performed on the opposite side

After the BSCPB done, patients were extubated after reversal with neostigmine and glycopyrrolate, and then transferred to surgical intensive care unit (ICU).

Postoperative pain intensity was evaluated with the Visual Analog scale (VAS) of 0-10 score on admission into the surgical ICU. A bolus dose of IV Acetaminophen 1 gram was given in all patients of both groups to attain VAS score ≤ 2. The pain scores were assessed at 2, 4, 8, 16 and 24hours post operatively. Complications of the block if any were also studied.

Outcome:
The primary outcome variable was visual analog scale (VAS) at specific time intervals. The secondary outcome was the side effects of the block.

Statistical analysis:
Statistical analysis was performed using SPSS version 17 for windows 7. Paired t test was used to assess the data. The variables were summarized using mean. The P value < 0.05 was considered statistically significant.

3. Results

The group receiving 0.25% bupivacaine is denoted as Group B and the group receiving normal saline 0.9% is denoted as Group S. The median for VAS score was lowest for group B than group S at 2,4 and 8 hrs. The mean of VAS score is statistically significant with a p value < 0.05 at 2, 4, 8 hours. The VAS score at 16 and 24 hours were comparable in both groups. Patients were given narcotics if the VAS score was > 6. 4 patients (20%) in group B and 9 patients (45%) in group S had VAS ≥ 6 in the first 24 hours. No complications of the BSCPB were seen in both groups.

Table 1: Median and Mean VAS score of both groups at different time periods:

Time period	Median VAS score		Mean VAS score		Mean difference	P value
	Group B	Group S	Group B	Group S		
2hours	3	5	3.65	4.85	1.2	<0.001*
4hours	3	5	3.65	4.85	1.2	<0.001*
8 hours	4	5	3.8	4.95	1.15	<0.001*
16 hours	5	5	4.6	5.05	0.45	0.119
24 hours	5	5	4.75	5.25	0.5	0.106

4. Discussion

Thyroid surgery is considered to be moderately painful[10] with a mean postoperative pain score of 6.9 on a visual analog scale (VAS) from 0 to 10[3]. Recent reports[11] suggest that patients experience a significant amount of pain, especially in the early post operative hours[10] despite modern and less invasive surgical techniques. With thyroid surgery being more frequently performed as an ambulatory surgery, postoperative pain management has become all the more critical. Local anesthetic in filtration or cervical plexus block as a part of multimodal analgesia is performed to decrease the pain after thyroid surgery and the data regarding the beneficial effects of BSCPB on postoperative analgesia in thyroid surgery are not only limited but also controversial[4], and are most often from the western literature with a dearth of similar trials from the Indian subcontinent. Most authors[1,5,12] in their trials have observed that BSCPB before incision was instrumental in reducing intraoperative analgesic requirements while Herbland et al.[8] and Shih et al.[11] have observed BSCPB to be ineffective. Karthikeyan et al.[4]studied the efficacy of BSCPB in thyroidectomy cases. This study observed that the intraoperative requirement of fentanyl, postoperative requirement of narcotics and VAS score was less in groups with bupivacaine compared to the group with normal saline using for the block. They stated that the BSCPB is effective for postoperative analgesia in thyroidectomy. Also, many authors[1,5,6,12,13] have found BSCPB to effectively reduce postoperative analgesic requirements. However, few authors[7,8,14,15]were not able to demonstrate the analgesic efficacy of BSCPB in the postoperative period. This could be due to the differences in the timing of the block (preoperative or postoperative), agent used, and the technique employed (2- or 3-point injections). Complications of the block like hematoma, infection, or nerve injury aren't observed in our study.

5. Conclusion

BSCPB performed with bupivacaine 0.25% is safe and effective as postoperative analgesia and in reducing the postoperative analgesic requirements in thyroid surgery and is associated with fewer side effects.

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