

The Influence of Bilateral Superficial Cervical Plexuses Block (BSCBs) as Pre-emptive Analgesia on Patient Satisfaction after Thyroid Surgery

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Abstract

Background: Superficial cervical nerve block may reduce post-thyroidectomy pain. The aim of this study was to evaluate the influence of BSCBs as pre-emptive analgesia on patient satisfaction post-thyroidectomy surgery.

Patients & Methods: Fifty adult patients were randomly allocated to one of the two groups, to receive either 20 mL isotonic sodium chloride solution (Saline group) or 20 mL bupivacaine 0.25% (Bupivacaine group) as BSCBs before induction of general anesthesia. Thyroid surgery was performed according to a standardized procedure by the same surgeon. Patients were transferred to the PACU where they stayed for 2 h, then were transferred to the ward. Morphine was administered in PACU following a standardized protocol (1-2 mg repeated every 10 minutes until the pain was controlled) if the VAS score was ≥ 40 mm. **Measurements: Postoperative pain:** was assessed by visual analogue scale (VAS), with 100 being the worst pain and 0 being no pain, by a nurse trained in pain assessment when patient is fully awake and extubated (H0), before discharge from the PACU (H+2), and every 4 h until 24 h after the end of surgery. **Patients' satisfactions:** Was evaluated the day after surgery by the anaesthetist using a 5- point verbal score (0: poor; 1: moderate; 2 good; 3: very good; 4 excellent. **Total amount of morphine** used in PACU and after 24 hours. All adverse effects were recorded. **Results:** There were no significant statistical differences between both groups as regard demographic data, duration of anesthesia and duration of surgery. The main outcome variables were pain scores (VAS), the proportion of patients given morphine at PACU and 24-h after surgery as well as the amount of morphine required. The Bupivacaine group had a smaller proportion of patients given morphine (24% vs. 72%; $P = 0.0016$) and (40% vs. 84%) in PACU and 24 hour after surgery respectively. Patients given BSCBs had significantly lower VAS with excellent satisfaction.

Conclusion: We conclude that bilateral superficial cervical plexus blocks significantly reduce pain intensity and Opioids requirement in the postoperative period after thyroid surgery with excellent patient satisfaction.

Key words: Superficial Cervical Nerve Block; Thyroid Surgery, Patient Satisfaction, Pre-emptive Analgesia.

Introduction

Many patients require acute pain control during the first day after thyroid surgery performed under general anesthesia. Post-thyroidectomy pain may be treated with non-steroidal anti-inflammatory drugs (NSAIDs) or Opioids. However, many surgeons are reluctant to use NSAIDs so soon after this type of procedure because of fear of bleeding complications^(1,2). Opioids have many well-known undesirable effects, including postoperative nausea and vomiting, which are frequent after this type of procedure⁽³⁻⁶⁾

The aim of the present study was to assess the influence of bilateral superficial cervical plexus blocks (BSCBs) as pre-emptive analgesia performed with 0.25% bupivacaine versus placebo on pain intensity scores and 24-h postoperative morphine requirements as well as patient satisfaction after thyroid surgery.

Patients & Methods

After ethical committee approval and informed written consent, fifty adult patients ASA physical status I-III scheduled for elective thyroid surgery

under general anesthesia were eligible for the study. Patients were premedicated with midazolam (0.1 mg/kg PO). Patients were allocated randomly into two equal groups, to receive either 20 mL isotonic sodium chloride solution (Control group) or 20 mL bupivacaine 0.25% (Bupivacaine group) as BSCBs before induction of general anesthesia. BSCBs were performed as follows by the anesthetist: in both sides of the neck, a subcutaneous infiltration of 10 mL of the solution was made using a 22-gauge needle, inserted at the midpoint of the sternocleidomastoid muscle, corresponding to the C3 transverse apophysis, in three directions. Six mL of the solution was injected up and down at the posterior border of the sternocleidomastoid muscle to block the occipital, auricular, and supraclavicular branches of the superficial cervical plexus and 4 mL was injected horizontally above the muscle to block the transverse cervical nerve. After establishing standard monitoring, anesthesia was induced with fentanyl 1-2 mcg.kg⁻¹ IV and propofol 2-3mg.kg⁻¹IV. Orotracheal intubation was facilitated by the administration of atracurium 0.5mg.kg⁻¹ IV. Anesthesia was maintained with isoflurane (one minimum alveolar concentration (MAC) end-tidal) in a N2O/ O2 (FiO₂ = 0.4-0.5) mixture. Supplemental fentanyl was given in incremental doses of 25-50 mcg when necessary. Thyroid surgery was performed according to a standardized procedure by the same surgeon. Patients were transferred to the PACU where they stayed for 2 h, then were transferred to the ward. All patients received voltaren 100 mg PR after induction of anesthesia. In addition, morphine was administered in PACU following a standardized protocol (1-2 mg repeated every 10 minutes until the pain was controlled) if the VAS score was ≥ 40 .

Measurements:

Postoperative pain: was assessed by visual analogue scale (VAS), ranging from 0 (no pain) to 100 (worst possible pain) by a nurse trained in pain assessment when patient is fully awake and extubated (H0), before discharge from the PACU (H+2),

and every 4 h until 24 h after the end of surgery.

Patient satisfactions: All patients were reviewed on the first post operative day by the anaesthetist and were asked about their feeling on recovery from anesthesia and their satisfactions were evaluated using a 5- points verbal score (0: poor; 1: moderate; 2 good; 3: very good; 4 excellent). **Total amount of morphine:** used in PACU and 24 hours after surgery.

Statistical analysis

Results were expressed as mean \pm SD, analyzed using tests of significance to identify the variables significantly to differences in different groups: Paired t-test, student t- test. We used Fisher's Exact Test to compare between numbers of patients in each group. Statistical significance was considered at the level of $p < 0.05$

Results

There were no significant statistical differences between both groups as regard demographic data, duration of anesthesia and duration of surgery as shown in table (1). The mean age was 37.6 ± 9.53 and 38.1 ± 12.1 in control group and BSCBs group respectively. Seven males and eighteen female included in the control group, while six males and nineteen females were included in BSCBs group. The duration of surgery was 89.12 ± 7.95 and 87.52 ± 11.25 min in control group and BSCBs group respectively. The duration of anesthesia was 115.28 ± 11.31 and 109.4 ± 11.5 min in control group and BSCBs group respectively. Table (2) shows the intraoperative fentanyl requirements were significantly higher in control group compared to BSCBs group with mean 165 ± 51 , 67.4 ± 17.8 mcg respectively. Table (2), figure (1) shows, in PACU the morphine consumption was significantly higher in control group compared to BSCBs group with mean 10.36 ± 6.7 , 3.16 ± 5.85 mg respectively. Eighteen Patients in control group (72%) received morphine in PACU compared to 6 patients in

BSCBs group (24%). However, twenty-four hour after surgery 21 patients in control group (84%) required morphine compared to 10 patients in BSCBs group (40%) with mean 13.64 ± 6.98 , 2.88 ± 3.71 mg respectively. Table (3) shows, on admission to PACU, patients given BSCBs had significantly lower VAS score than control group with mean 47 ± 19 , 27 ± 17 mm respectively ($p= 0.002$). Seventeen patients (17/25) (68%) had moderate pain (VAS >30 mm) in control group compared to Five (5/25) (20%) in BSCBs group ($p= 0.001$). Two hours after surgery, pain scores were significantly higher in control group compared to

BSCBs group with mean 30 ± 12 and 22 ± 13 mm respectively ($p=0.04$). Eleventh patients (11/25) (44%) had moderate pain (VAS >30 mm) in control group compared to Three (3/25) (12%) in BSCBs group ($p= 0.025$). Table (4), figure (2) shows, patient satisfaction was significant in BSCBs with 21 patients (84%) had excellent satisfaction, 3 had very good (12%), and 1 had good satisfaction (4%), while in control group no patient had excellent satisfaction, 3 patient (12%) had very good, 11 patient had good satisfaction (44%), 9 had moderate (36%) and 2 had poor satisfaction (8%)

Table 1. Demographic Characteristics and Operative Data

	Control Group	BSCBs Group
Age (yr)	37.6 ± 9.53	38.1 ± 12.1
Sex	18 F / 7 M	19 F / 6 M
Weight (kg)	68 ± 14	64 ± 13
Duration of surgery (min)	89.12 ± 7.95	87.52 ± 11.25
Duration of Anesthesia (min)	115.28 ± 11.31	109.4 ± 11.5

Table 2. Intraoperative Fentanyl Consumption and Morphine Requirements in PACU and during the First 24 Hour in both Groups

	Control Group	BSCBs Group	P value
Intraoperative Fentanyl (mcg)	165 ± 51.5	$67.4 \pm 17.8^*$	0.01
Number of Patients Required Morphine in PACU	18/25 (72%)	6/25* (24%)	0.0016
Morphine consumption in PACU(mg)	10.36 ± 6.7	$3.16 \pm 5.85^*$	0.001
Number of Patients Required Morphine in 24 h after Surgery	21/25 (84%)	10/25* (40%)	0.0031
Morphine consumption in 24 h after surgery (mg)	13.64 ± 6.98	$2.88 \pm 3.74^*$	0.04

*significant in comparison to control group.

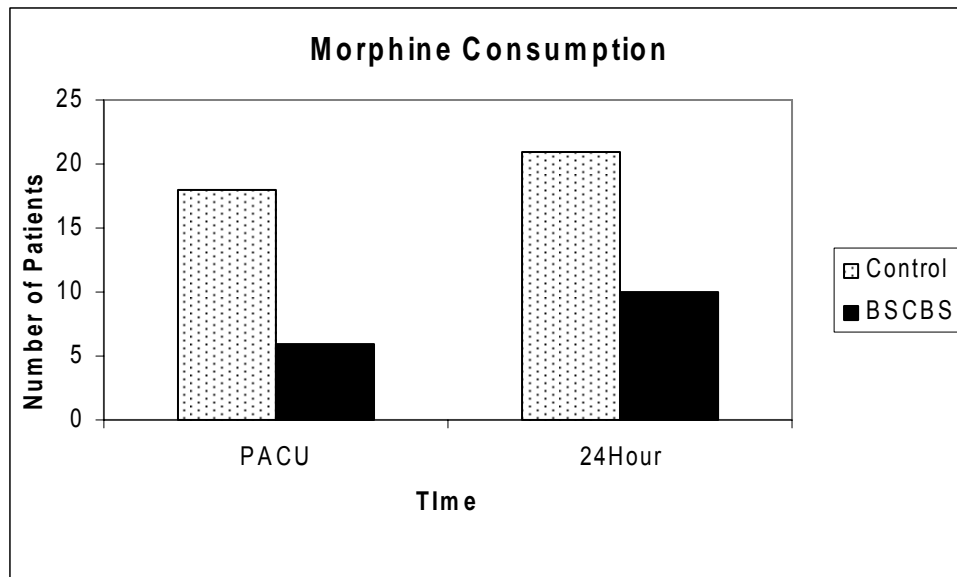


Figure (1).Morphine Consumption in PACU and 24-hour after Surgery

Table 3. VAS in mm (mean ± SD) with control and BSCBs group

VAS (mm)	Control Group	BSCBs	P Value
On admission to PACU (H0)	47± 19	27±17*	0.002
Number of patients had VAS >30 mm (H0)	17/25 (68%)	5/25 * (20%)	0.001
2 H After Admission to PACU (H+2)	30 ±12	22±13*	0.04
Number of patients had VAS >30 mm (H+2)	11 /25(44%)	3/25 * (12%)	0.025

*significant in comparison to control group.

Table 4. Patient satisfaction the day after surgery. Number of patients per group and for each group

score	Control Group	BSCBs
0 (Poor)	2 (8%)	0
1 (Moderate)	9 (36%)	0
2 (Good)	11 (44%)	1 (4%)
3 (Very Good)	3 (12%)	3 (12%)
4 (excellent)	0	21 (84%)
Total (n)	25	25

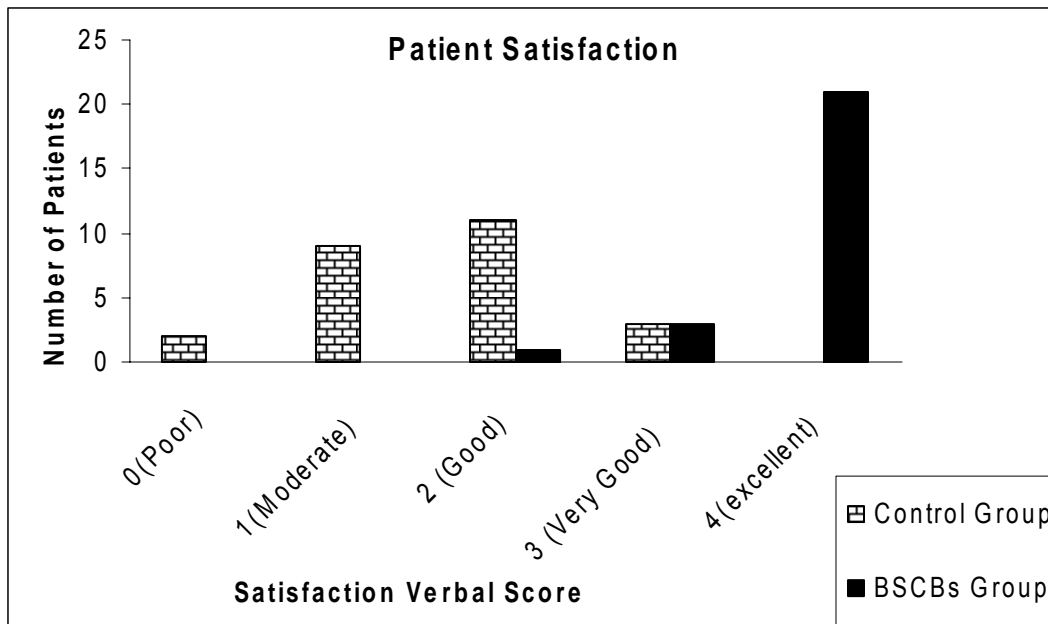


Figure (2).Patient Satisfaction between two Groups

Discussion

Post-thyroidectomy pain perception likely includes many components linked to the deep and superficial layers of the wound, intraoperative neck position and wound drainage. The incisional infiltration of local anesthetics has been used for postoperative pain relief in different types of surgery, the best results being observed in superficial and short-lasting procedures such as herniorrhaphy⁽⁷⁾. The expected decrease in pain scores or supplemental opioids has been disappointing in procedures with a major visceral component, such as major gynecological or cervical spine surgery^(8,9). The relatively short duration of action of local anesthetics is frequently seen as a major limitation to their use for postoperative pain relief⁽⁹⁻¹¹⁾.

Our results show that BSCBs has significant effect not only on the intraoperative requirement of fentanyl but also morphine demand in PACU and as well as 24 hour post- thyroidectomy, supporting the view that post-thyroidectomy pain has a large “superficial” component. However, we found a large proportion of patients given

morphine in the Saline (control) group (72%) in PACU which increased to (84%) after 24 hour, this proportion of morphine recipients in the Saline (control) group is much less than (90%) as the one observed in the control group in the study by Gozal et al⁽¹²⁾. Our explanation was due to the significant intraoperative demand of fentanyl in the control group.

The opioid analgesic sparing effect of BSCB was nonetheless stronger than expected from the data reported by Gozal et al⁽¹²⁾, who infiltrated the cervical incision with 10 mL bupivacaine 0.5% and found that only 30% of patients required morphine when the wound was infiltrated, while in our result, only 24% of BSCBs group required morphine in PACU. We believe that in our study the analgesic efficacy has been improved due to bilateral injection of larger doses (20 ml of bupivacaine 0.25%) near the emergence of the superficial cervical plexus branches as well as the pre-emptive effect of bilateral superficial plexus block. The use of a BSCB can preclude the postoperative need for other analgesics in approximately 80 % of patients in early postoperative period (PACU) and 60% of patients 24 hour post-thyroidectomy.

The concept of preemptive analgesia is debated in both clinical and basic science research. However, our results proved that pre-emptive administration of BSCBs has significant effect on postoperative morphine demand and patient satisfaction. Supporting our results, Hannibal et al⁽¹³⁾, who find that preoperative wound infiltration by bupivacaine reduces the early and late morphine requirement. Woolf et al⁽¹⁴⁾ have suggested that the timing of administration of analgesic drugs could influence their efficacy by reducing the sensitization of the nervous system induced by the nociceptive inputs. In contrast to our results Klien et al⁽¹⁵⁾ find that, it is unlikely that preoperative administration of local anesthetics would have been more effective than postoperative administration. Our study shows that patient satisfaction was 96% (84% excellent & 12% very good) in BSCBs compared to 12% (very good) in control group, which indeed supporting the efficacy of pre-emptive administration of BSCBs.

Similar to our results, Dieudonne et al⁽¹⁰⁾ found that BSCBs significantly reduce pain intensity in postoperative period after thyroid surgery. While, Aunac et al⁽¹⁶⁾ found similar results to ours, in contrast they used combined superficial and combined cervical plexus block. We believe that, as long as only superficial block is effective, the incidence of complications will increase by using unnecessary combined approach.⁽¹⁷⁾

However, cervical plexuses block requires experience and is not without pitfalls, such as unsatisfactory anesthesia and complications (systemic local anesthetic toxicity caused by either intravascular injection or vascular absorption in this highly vascularized region), no complications recorded in our study. The most common recorded complication is systemic local anesthetic toxicity, caused by either intravascular injection or vascular absorption in this highly vascularized region.⁽¹⁸⁻²⁰⁾

Meanwhile, emesis is dependent on a variety of factors and the study design did not cover this issue, high

degree of patient satisfaction in BSCBs group could be partly due to lower incidence of nausea and vomiting in this group. Clinically significant sedation and respiratory depression did not occur, even in patients with the largest morphine doses.

Patient satisfaction is the most important predictor of satisfactory anaesthesia; it depends not only on effective analgesia but also absence of postoperative complications.⁽²¹⁾ Our study shows, large number of patients (84%) in BSCBs group with excellent patient satisfaction.

In summary, a BSCB significantly reduces not only pain intensity scores in the early postoperative period after thyroid surgery, but also reduces the intra-operative opioid demand with consequent reduction of postoperative complications and excellent patient satisfaction.

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