



“ANALGESIC EFFICACY OF BILATERAL SUPERFICIAL CERVICAL PLEXUS BLOCK ADMINISTERED BEFORE THYROID SURGERY UNDER GENERAL ANAESTHESIA”

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Abstract

Introduction:

Pre-emptive analgesia aims to prevent pain potentiation by administering analgesics before the onset of noxious stimuli. Acute postoperative pain, especially after thyroid surgery, is associated with altered synaptic functions and nociceptive processing. The use of preoperative local anaesthetic blocks, such as Bilateral Superficial Cervical Plexus Block (BSCP), has shown to reduce postoperative pain, but no standard protocol is widely accepted. This study aims to assess the analgesic effectiveness of BSCP with ropivacaine versus ropivacaine plus clonidine for thyroid surgery under general anaesthesia.

Methods:

Sixty patients undergoing thyroid surgery were randomly assigned to two groups: Group R (ropivacaine) and Group RC (ropivacaine plus clonidine). BSCP was performed using a three-point technique, and postoperative pain was evaluated using the Visual Analogue Scale (VAS) at PACU and every 4 hours for the first 24 hours. Hemodynamic parameters, intraoperative analgesic requirements, and postoperative analgesic needs were recorded. Statistical analysis was performed using the Chi-square test and Student's t-test.

Results

At baseline, no significant differences in hemodynamic parameters were observed between the two groups. However, during induction and intubation, significant differences in systolic blood pressure (SBP), mean arterial pressure (MAP), and heart rate (HR) were noted between the two groups. The duration of analgesia was significantly longer in Group RC, with a reduced requirement for postoperative opioids. VAS pain scores were significantly lower in Group RC compared to Group R.

Conclusion:

Bilateral Superficial Cervical Plexus Block with ropivacaine plus clonidine significantly improves postoperative analgesia and reduces opioid consumption in patients undergoing thyroid surgery. The addition of clonidine enhances the duration of analgesia and reduces intraoperative analgesic requirements, suggesting its potential as an effective and safe method for managing postoperative pain in this surgical population.

Keywords- Pre-emptive analgesia, Bilateral Superficial Cervical Plexus Block (BSCPb), Thyroid surgery, Ropivacaine, Clonidine, Postoperative pain management

Introduction

Pre-emptive analgesia is the clinical concept of introducing analgesic management before the onset of noxious stimuli, which helps to prevent pain potentiation.¹

Acute postoperative pain is associated with alterations in synaptic function and nociceptive processing within the spinal cord dorsal horn, neuroendocrine responses, and sympathoadrenal activation.² Success in preventing the injury-associated afferent barrage and resultant central sensitization by using local anaesthetic blocks during surgery, although theoretically well based, has been inconsistent³.

The use of preoperative anaesthetic blocks has resulted in less postoperative pain compared with no local anaesthesia at all, but no protocol has as yet received wide acceptance.⁴ Accordingly, postoperative analgesia should be considered before the start of surgery, together with intraoperative analgesia.⁵

Post operative pain after thyroid surgery has also gained more importance and attention because thyroid surgery is recently being performed on a day case basis.⁶

One of the well-established regional anaesthesia modalities that can offer analgesia for thyroid surgery is superficial cervical plexus block, performed bilaterally⁷. The ventral rami of cervical nerves (C1-4) form the cervical plexus. The nerves pass laterally along the corresponding transverse process behind the vertebral vessels. The deep branches are purely motor, while the superficial ones are sensory supplying skin and subcutaneous tissues of the neck⁸.

Some authors have reported that Bilateral Superficial Cervical Plexus Block (BSCPb) combined with general anaesthesia for thyroid surgery has significantly reduced analgesic requirements.

By decreasing analgesic requirements, the block produces stable intra operative conditions in comparison to general anaesthesia alone.

BSCPb is also simpler and harmless than using the combined superficial and deep cervical plexus block. In addition, the use of BSCPb helps in decreasing the cost and side effects of opioids,

The objective of this study is hence to assess analgesic effectiveness of Bilateral superficial cervical plexus block (BSCPb) for post thyroidectomy pain control

The aim of the study is to compare the analgesic efficacy of ropivacaine versus ropivacaine plus clonidine in bilateral superficial cervical plexus block administer before thyroid surgery under general anaesthesia.

Materials and methodology

Inclusion criteria

1. ASA 1 & 2 patients who were posted for thyroid surgeries under General anesthesia in euthyroid state.
2. Age group -18-60 years Both sexes
3. Mallampatti grading I&II

Exclusion criteria

1. Patients refusal
2. ASA grade III&IV
3. Patients with coagulation disorders
4. Patients with sepsis both local and systemic
5. Pregnancy
6. Patients whose preoperative medication
7. Includes opiod or non opiod analgesics, corticosteroids, NSAIDS
8. History of allergy to local anaesthetics
9. Emergency procedures

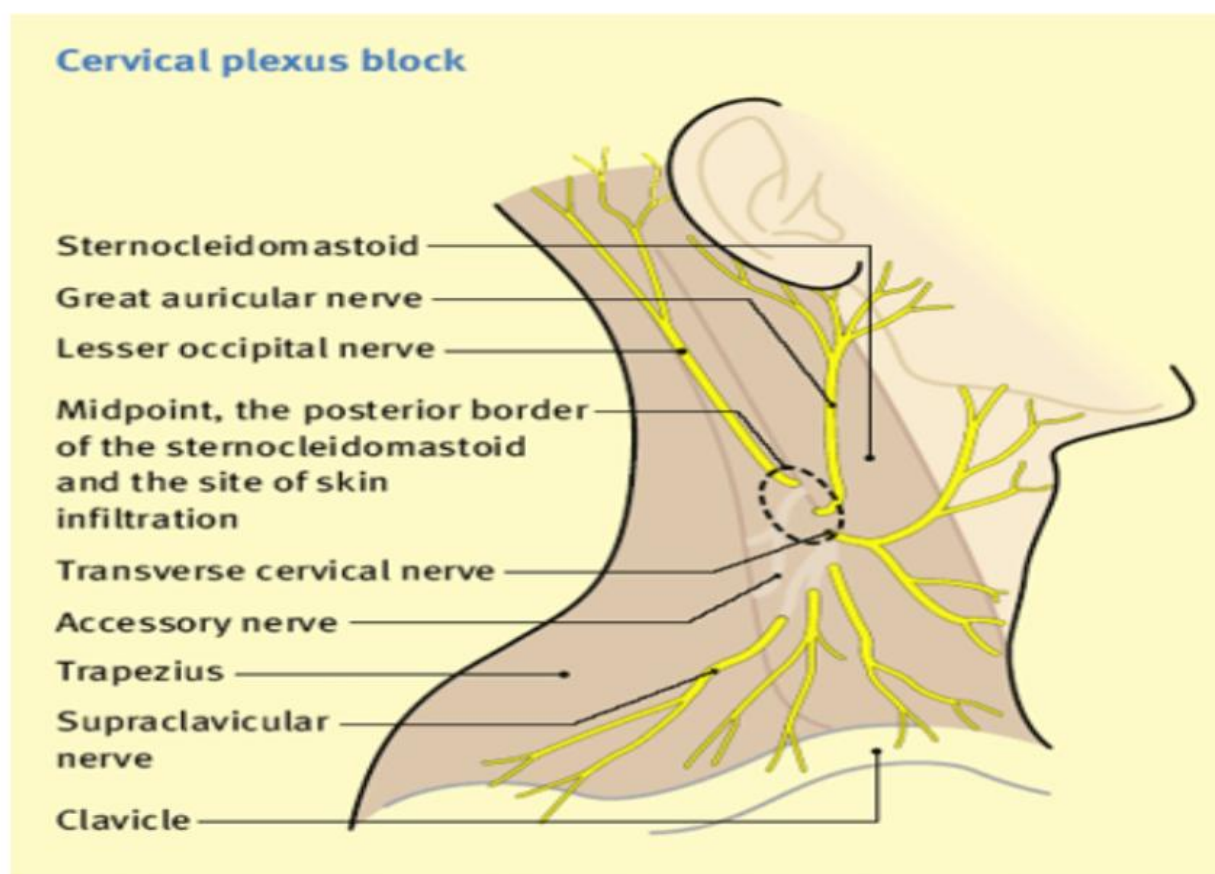
Sixty patients who underwent thyroid surgery under general anaesthesia were randomly assigned to one of two groups to receive BSCPb with either 10 mL of ropivacaine (R group, n = 30) or 9.5 mL of ropivacaine plus clonidine 75ug (RC group, n = 30).

Landmark technique

The patient is in supine position and neck turned slightly to opposite side, and landmark is identified as mid portion of the posterior border of the sternomastoid muscle. It consists of subcutaneous injection of local anesthetic along the posterior border of the sternomastoid muscle just under the skin. Two point technique A line drawn between the mastoid process and chassaignac's tubercle of C6 transverse process. At the midpoint of this line, 25 G block needle is inserted, skin wheal is raised and the needle is directed cephalad towards the mastoid process along the posterior border of sternomastoid muscle. 3 to 4 ml of local anesthetic is injected in a subcutaneous plane as the needle is withdrawn. Care must be taken to avoid piercing the external jugular vein. Then the needle is directed towards the clavicle and same amount of local anesthetic is injected in a subcutaneous plane while withdrawing the needle.

Three-point technique

In this technique, the land mark used is posterior border of the sternocleidomastoid muscle 2 cm above the clavicle. 10 ml local anesthetic preparation is used, and depth of injection is less than 5 mm. Now 2 ml of local anesthetic is injected at the site of needle entry, 6ml in the cephalad direction and another 2 ml in the transverse direction.



Assessment of hemodynamic effects i.e. changes in heart rate, systolic & diastolic BP, mean arterial pressure at baseline, induction, intubation, immediately after intubation and during intraoperative period was recorded. Intraoperative pain assessment by requirement of opioids and Postoperative pain scores was assessed at the postoperative anaesthesia care unit (PACU) and every 4 hrs for the first 24

hrs postoperatively using a visual analogue scale (VAS). Patients with VAS scores of ≥ 4 were administered rescue analgesics (IV paracetamol). The main outcome variables are pain scores during the first postoperative 24 h and the number of patients requiring postoperative analgesic rescue. Intraoperative pain assessment: requirement of opioids Postop pain assessment: visual analogue score (VAS) once in the first hour in the PACU, thereafter every 4 hrs for the first 24 hrs

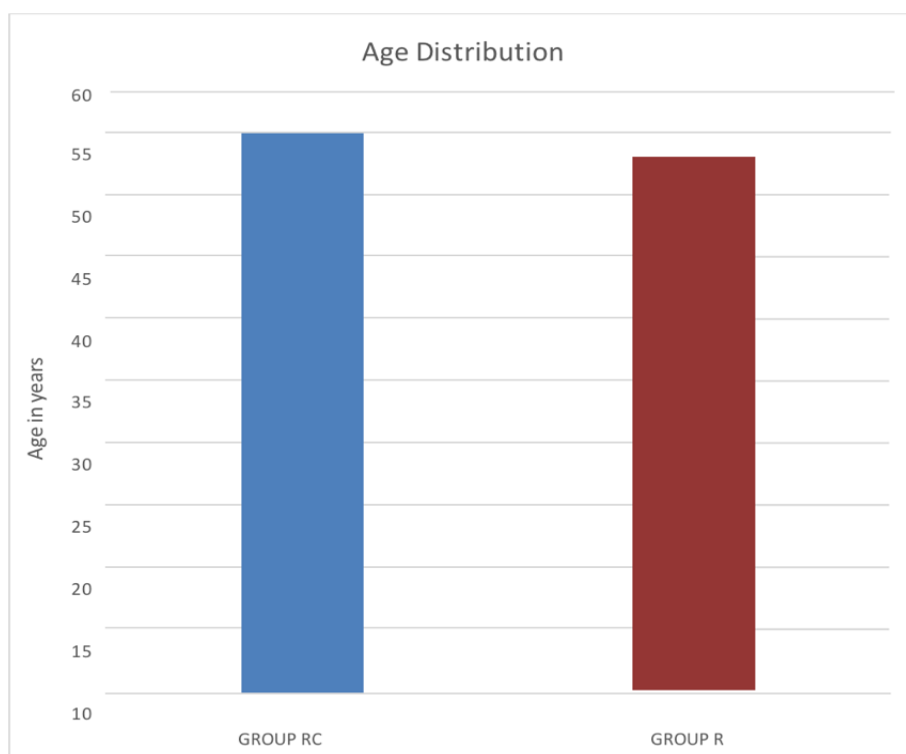
Results

All parametric data were analyzed with chi square test, student t test. The data analyzed were demographics, duration of post operative analgesia, post operative VAS score, haemodynamic status during preoperative baseline, induction, intubation and intraoperative period

Table – 1: Distribution Of Mean Age of subjects By Groups

Parameters	Group RC	Group R	p-value
No. of cases	30	30	0.09
Mean Age	34.4 $\pm$ 9.2	38.9 $\pm$ 9.7	

Graph – 1 : Distribution Of Mean Age of subjects By Groups



At baseline level, no significant difference in the Systolic blood pressure (SBP), Diastolic blood pressure (DBP), mean arterial pressure (MAP) and heart rate (HR) between the two groups was found.

Group (Nos.)	SBP (mm Hg)	DBP (mm Hg)	MAP (mm Hg)	HR (Per min)
RC (30)	118.7±5.0	71.6±3.0	87.3±3.5	86.7±11.1
R (30)	122.2±11.9	74.7.0±8.4	90.1±6.9	84.6±14.8
Probability	P=0.14	P=0.06	P=0.05	P=0.53

Table 2- Distribution of mean, standard deviation and significance between two groups at baseline recording

During induction period the difference in the Systolic blood pressure (SBP), Mean arterial pressure (MAP) and heart rate (HR) at induction and difference in the heart rate is highly significant between the two groups.

Table3- Distribution of mean, standard deviation and significance between two groups of intra operative period immediately after induction

Group (Nos.)	SBP (mm Hg)	DBP (mm Hg)	MAP (mm Hg)	HR (Per min)
RC (30)	118.7±5.0	71.6±3.0	87.3±3.5	84.7±14.5
R (30)	129.4±11	81.0±9.8	97.1±8.4	90.6±6.1
Probability	P=0.02*	P=0.06	P=0.04*	P=0.04*

Immediately after intubation, the difference in the Systolic blood pressure (SBP), Diastolic blood pressure (DBP) and heart rate (HR) are statistically significant between the two groups.

There is no statistically significant difference between two groups of patients on systolic blood pressure (SBP), diastolic blood pressure (DBP), mean arterial pressure (MAP) and heart rate (HR) in the immediate postoperative period.

Table 4- Distribution of mean, standard deviation and significance between two groups at immediate post operative period.

Group (Nos.)	SBP (mm Hg)	DBP (mm Hg)	MAP (mm Hg)	HR (Per min)
L (30)	119.6±5.0	77.4±7.2	91.1±9.8	79.6±4.9
R (30)	122.4±3.6	82.0±5.1	94.6±5.2	84.4±13.4
Probability	P=0.06	P=0.08	P=0.12	P=0.06

Duration of analgesia

There is highly significant difference between two groups in the duration of analgesia

Table 5- Mean and standard deviation of duration of analgesia and its significance in groups

Group	Mean (minutes)	P value
<u>RC</u> (30)	549.3±36.3	0.00*
<u>R</u> (30)	370±59.8	

Visual analogue scale- post operative

During postoperative period, the pain score was analyzed with Visual analogue scale. On comparing Group RC with Group R, VAS pain score was less in Group RC. The p-values are statistically significant between the groups.

Table 10: Mean and Standard deviation of Post operative Visual Analogue Scale and its significance in groups

Time(hrs)	Group RC (30)		Group <u>R</u> (30)		P value
	Mean	SD	Mean	SD	
1hr	0.00	0.00	0.03	0.18	0.32*
4hrs	0.50	0.50	0.80	0.61	0.04*
8hrs	1.20	0.48	1.60	0.62	0.007*
12hrs	1.30	0.53	1.90	0.88	0.002*
16hrs	1.37	1.03	2.50	0.73	<0.00**
20hrs	1.80	0.85	2.70	0.45	<0.00**

*-Significant

**- highly significant

The results of the study show that, Bilateral Superficial Cervical Plexus Block (BSCPb) performed by three point technique before general anaesthesia using injection Ropivacaine+clonidine (Group RC) and Ropivacaine (Group R) resulted in significant increase in the duration of postoperative analgesia and reduction in the requirement of opioids or other postoperative analgesia. In the present study, the greatest reduction in intraoperative analgesic requirement was seen in patients in whom BSCPb had been performed with a mixture of ropivacaine and clonidine. Clonidine is known to enhance pain relief after peripheral nerve block, probably via a central action due to systemic absorption and a direct action on local nerve fibres. Because a significant reduction in intraoperative analgesic requirement was only observed in the patients treated with ropivacaine and clonidine, systemic absorption may have been responsible for the enhanced block in our patients.

Discussion

Bilateral Superficial cervical plexus block performed prior to general anaesthesia using Ropivacaine plus clonidine had better post-operative analgesic efficacy with respect to the duration of analgesia and post-operative analgesic requirement in comparison to Ropivacaine in patients undergoing thyroid surgeries. It also reduces the intra operative opiates requirement and has lower VAS score with almost no side effects. From this study, we conclude that bilateral superficial cervical plexus block is an effective, safe and useful method to manage post-operative pain in patients undergoing thyroid surgeries.

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