

## Comparison of Bilateral Superficial Cervical Plexus Block and Incision Line Infiltration for Postoperative Analgesia for Thyroid Surgeries Under General Anesthesia

Nagaraj AV<sup>1</sup>, Pradeep A Dongare<sup>2</sup>

<sup>1,2</sup>Assistant Professor, Department of Anesthesiology, ESIC PGIMSR Medical College, Bengaluru, Karnataka 560010, India.

### Abstract

**Introduction:** Thyroid surgeries are usually performed under general anesthesia as it involves manipulation of the trachea. Studies comparing bilateral superficial cervical plexus block and incision line infiltration for postoperative analgesia in thyroid surgeries are sparse. Hence, we decided to evaluate the effect of BSCP and incision line infiltration of local anaesthetic on post-operative VAS and analgesic requirements. **Methods:** After obtaining ethical clearance from the institutional ethical committee, 70 patients were randomly assigned to 2 groups of 35 patients each. Patient's in group were administered BSCP with 20 ml of 0.125% bupivacaine and 10 ml of normal saline along the line of incision. Patient's in group I were administered BSCP with 20 ml of normal saline and 10 ml of 0.25% bupivacaine along the line of incision. Intra-operatively requirement for analgesics were recorded. Results on continuous measurements are presented on Mean  $\pm$  SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance was assessed at 5% level of significance. Student t test (two tailed, independent) was used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters. **Results:** Mean VAS scores obtained postoperatively to assess postoperative pain were slightly lower statistically significant in the 2<sup>nd</sup>, 12<sup>th</sup> and 24<sup>th</sup> hour. Requirement of inj paracetamol and inj tramadol was not significantly different between the two groups. Vocal cord movement and the incidence of sore throat was comparable between the two groups. None of the patients in both the two groups had any episode of nausea or vomiting. **Conclusion:** We found that both BSCP and incision line infiltration are effective methods for providing analgesia for thyroid surgeries. There is no difference between the requirement of analgesics or postoperative pain scores over a 24 hr period.

**Keywords:** Analgesia; Cervical plexus block; Infiltration; Thyroidectomy

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### Introduction

Thyroid surgeries are usually performed under general anesthesia as it involves manipulation of the trachea. Local anesthesia and regional

anesthesia alone for thyroidectomy have been used previously<sup>1,2</sup>. Postoperative analgesia for thyroid surgeries has conventionally been intravenous opioids and acetaminophen. Opioids like fentanyl, morphine provide very good intra-operative and

**Corresponding Author:** Pradeep A Dongare, Assistant Professor, Department of Anesthesiology, ESIC PGIMSR Medical College, Bengaluru, Karnataka 560010, India.

**E-mail:** [pradeep.dongare@gmail.com](mailto:pradeep.dongare@gmail.com)

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postoperative analgesia, but are associated with side effects such as respiratory depression, pruritus, constipation, urinary retention & nausea vomiting<sup>3</sup>.

Acetaminophen provides good analgesia, but Somer JM *et al.*<sup>4</sup> have found that 70% of the patients had an VAS score of more than 40 mm when it was used as sole analgesic. Gozal *et al.* in a study found that the mean pain scores post thyroidectomy was 69 mm and 90% of the patients required opioids postoperatively<sup>5</sup>.

Bilateral superficial cervical plexus block has been used for regional anesthesia & analgesia. Andrieu *et al.* conducted a study to assess the analgesic efficacy of bilateral superficial cervical plexus block (BSCP) under general anesthesia & found that BSCP improved intraoperative analgesia & reduced analgesic requirements<sup>3</sup> Wound infiltration after thyroid surgeries have also been found to provide adequate analgesia<sup>1-4</sup>. Bagul A *et al.* conducted a study on pre incision infiltration of local anaesthetic on post-op pain & concluded that it provided easy & better analgesic control<sup>6</sup>. Studies comparing bilateral superficial cervical plexus block and incision line infiltration for postoperative analgesia in thyroid surgeries are sparse. Hence, we decided to evaluate the effect of BSCP and incision line infiltration of local anaesthetic on postoperative VAS and analgesic requirements.

## Materials and Methods

After obtaining ethical clearance from the institutional ethical committee, 70 patients were randomly assigned to 2 groups of 35 patients each. It was a prospective randomized double blinded study. The sample size of 35 patients in each group was calculated from a study conducted by Aysenur *et al.*<sup>8</sup>, comparing BSCP and Wound infiltration. In their study they found that the total requirement of postoperative morphine to be  $14.3 \pm 4.32$ . Based on this we calculated a sample size of 31 considering a reduction of 20% in the requirement of morphine. We included 35 patients in our study to allow for dropouts. ASA 1 & 2 patients, undergoing thyroid surgeries were included in the study. Patients with known allergy, sensitivity or contraindication to opioids, local anaesthetics or any NSAID, renal or liver failure, history of asthma, history of clotting disorder, retrosternal goiter and previous history of difficult intubations were excluded from the study. After obtaining an informed consent, they were premedicated with tablet ranitidine 150 mg and tablet alprazolam 0.5 mg the previous night

& were asked not to consume solid food after 12.00 AM on the day of surgery. Patients were shifted into the operation theatre and a large bore intravenous cannula (18G) were secured. Pulse oximeter, non invasive blood pressure, ECG, end tidal carbon-dioxide, bispectral index monitors were connected. Patients were pre-oxygenated with 100% O<sub>2</sub> for 3 mins. Inj. glycopyrrolate 0.2 mg IV, inj. midazolam 1 mg IV & inj. fentanyl 2 mcg/kg body weight were administered. Patient's were induced with Inj. Propofol 2 mg/kg body weight and the airway secured with Inj. vecuronium 0.1 mg/kg body weight. Patient's in group were administered BSCP with 20 ml of 0.125% bupivacaine and 10ml of normal saline along the line of incision. Patient's in group I were administered BSCP using the landmark technique with 20 ml of normal saline and 10 ml of 0.25% bupivacaine along the line of incision. Intra-operatively requirement for analgesics were recorded. SpO<sub>2</sub>, blood pressure, ECG, EtCO<sub>2</sub>, BIS was recorded every 5 mins. Intra-operatively patients were maintained with oxygen, nitrous oxide, sevoflurane & titrated vecuronium 1 mg intermittent boluses to the BIS of 40-60. After completion of surgery neuromuscular blockade were reversed with Inj. neostigmine 2.5 mg and Inj. glycopyrrolate 0.4 mg IV.

After adequate clinical parameters are achieved, patient's were extubated.

Postoperatively, patient's were monitored for 1hr in the recovery & then shifted to the ward. If the patient complained of pain inj. tramadol 50 mg IV bolus were given slowly. SpO<sub>2</sub>, NIBP, VAS scores were assessed hourly for the 1<sup>st</sup> 2 hours & subsequently every 5 hours for the next 10 hours & 6<sup>th</sup> hourly for the next 12 hours. The time to demand of 1<sup>st</sup> analgesic (Inj. tramadol 50 mg) were noted. Total dose of tramadol administered during the 1<sup>st</sup> 24 hours were noted. Adverse effects such as bradycardia, hypotension/hypertension, sedation, nausea/vomiting, desaturation, interscalene block, stellate ganglion block were noted down. The results of the above observations were subjected to statistical analysis. Descriptive and inferential statistical analysis was carried out. Results on continuous measurements are presented on Mean  $\pm$  SD (Min-Max) and results on categorical measurements are presented in Number (%). Significance was assessed at 5% level of significance. Student t test (two tailed, independent) was used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters. Leven's test for homogeneity of variance has been performed to assess the homogeneity of variance. Chi-square/

Fisher Exact test was used to find the significance of study parameters on categorical scale between two or more groups, Non-parametric setting for Qualitative data analysis. Fisher Exact test used when cell samples are very small.

**Results**

All 70 patients completed the study. There were no dropouts or loss to failure of technique. Demographic parameters, age, height, weight, type of surgery, gender distribution and duration of surgery were comparable between the two groups (Table 1). Intraoperative and postoperative heart rate, systolic blood pressure was comparable between the two groups. The data showed a statistically significant difference in the diastolic blood pressure between the 2 groups at the 75<sup>th</sup> minute intraoperatively but clinically it was not significant. Postoperative diastolic blood pressure was comparable between the two groups. The mean arterial pressure was also clinically comparable between the two groups even though the statistically significant difference was found in the 75<sup>th</sup> minute. The intraoperative and postoperative saturation was comparable between the two groups. 15 patients in group W received 1000 mg of inj paracetamol in the 24 hr period whereas 20 patients did not receive any paracetamol. In group I, 20 patients received 1000 mg of inj paracetamol in the 24 hr period and 15 patients did not receive any inj paracetamol ( $p=0.339$ ) (Table 2). Tramadol was the other rescue analgesic used. In group W, 8 patients did not receive any tramadol, 25 patients received 50 mg and 2 patients received 100 mg, whereas in group I, 5 patients did not receive tramadol, 25 patients received 50 mg and 5 patients received 100 mg of tramadol in the first 24 hrs postoperatively ( $p=0.448$ ) (Table 2). Mean VAS scores obtained postoperatively to assess postoperative pain were slightly lower statistically significant in the 2<sup>nd</sup>, 12<sup>th</sup> and 24<sup>th</sup> hour (Table 3). Duration of postoperative analgesia was comparable between the two groups (Fig. 1). Vocal cord movement and the incidence of sore throat was comparable between the two groups. None of the patients in both the two groups had any episode of nausea or vomiting.

**Table 1:** Demographic Parameters

Variables	Group W	Group I	p value
Height (cm)	155.66 ± 7.34	157.6 ± 5.73	0.221
Weight (kg)	57.06 ± 6.99	56.89 ± 6.37	0.915
Age (yrs)	38.63 ± 10.51	38.37 ± 9.20	0.941

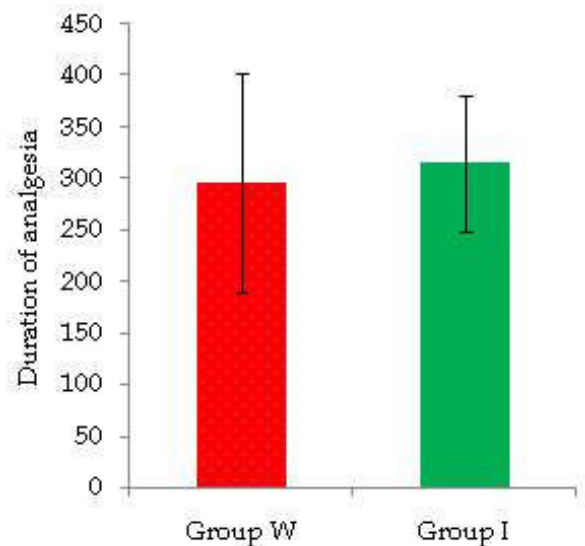
Female	34 (97.1%)	30 (85.7%)	0.198
Male	1 (2.9%)	5 (14.3%)	
Duration of surgery	90.29 ± 26.84	88.43 ± 24.79	0.765

**Table 2:** Total dose of PCT/Total dose of tramadol in two groups of patients studied

	Group W (n=35)	Group I (n=35)	p value
<i>Tot dose of PCT</i>			
• 0	18 (51.4%)	13 (37.1%)	0.218
• 1000	15 (42.9%)	20 (57.1%)	
<i>Total dose of tramadol</i>			
• 0	3 (8.6%)	3 (8.6%)	0.448
• 50	22 (62.9%)	17 (48.6%)	
• 100	10 (28.6%)	15 (42.9%)	

**Table 3:** VAS Score-A Comparison in two groups of patients studied in different time points

VAS Score	Group W	Group I	p value
30 minutes Extubation	2.54 ± 1.20	2.57 ± 1.20	0.921
2 hr	2.14 ± 1.03	2.77 ± 1.17	0.020
4 hr	3.37 ± 1.24	3.63 ± 1.21	0.384
8 hr	3.63 ± 1.46	4.23 ± 1.59	0.105
12 hr	3.23 ± 1.00	3.97 ± 1.54	0.020
24 hr	4.00 ± 1.31	4.91 ± 1.84	0.019



**Fig. 1:** Showing the duration of Analgesia between the two groups.

**Discussion**

Bilateral superficial cervical plexus block has been used as an effective analgesic option for patients undergoing thyroidectomies. The technique is simple and has the least amount of complications, without palsy of the phrenic nerve

in comparison to deep cervical plexus block. There have been various studies which have compared the use of BSCP and other analgesics and have found the reduced requirement of opioids. The post-thyroidectomy pain seems to last for a period of 24 hours after which duration most patients are able to tolerate the pain. In a study conducted by Gozal *et al.*<sup>5</sup> the mean pain score was 6.9 and there was requirement of morphine in the first 24 hrs. Traditionally post-thyroidectomy pain has been treated with opioids or non steroidal anti inflammatory drugs. Supplementation with wound infiltration or BSCP has been found to reduce the requirement of opioids substantially. It has been hypothesised that this is mainly because of the large superficial component of the surgery. In our study we have tried to compare the effectiveness of incision line infiltration and BSCP as analgesic modalities. Since both these techniques involve superficial infiltration of the local anaesthetic we have assumed that there is not much of a technical bias. Also, we have used the same cumulative dose of local anaesthetic in our study. Shih *et al.* in their study found that the median time to first analgesic requirement was 360.8 minutes, but they had used 0.5% bupivacaine for administration of the block. Their study was under powered to detect any difference 3 in the incidence of PONV and did not show any increase in intraoperative anaesthetic requirements. In our study we have administered only a single dose of opioid analgesic at the time of induction of anesthesia.

## Conclusion

A study conducted by Aysenur *et al.*<sup>8</sup> showed that the duration of analgesia was longer in the wound infiltration group in comparison to the group which received BSCP but we found no such difference. They even found a statistically significant difference in the requirement of morphine unlike our study. They added adrenaline 1:2,00,000 in order to prolong the duration of action of 0.25% bupivacaine whereas we administered only 0.25% bupivacaine.

Eti *et al.*<sup>9</sup> have found that there is no significant difference in the duration of analgesia or opioid requirement with the two techniques.

In conclusion, we found that both BSCP and incision line infiltration are effective methods for

providing analgesia for thyroid surgeries. There is no difference between the requirement of analgesics or postoperative pain scores over a 24 hr period.

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