

# Analgesic Efficacy of Ropivacaine With or Without Clonidine in Bilateral Superficial Cervical Plexus Block in Thyroid Surgeries.

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## ABSTRACT

**Background:** Bilateral Superficial cervical plexus block (BSCPb) is one method of post op analgesia given before General anesthesia as this avoids polypharmacy. **Objectives:** This prospective randomized, controlled clinical study compared the post-operative analgesic efficacy of BSCPb using Ropivacaine (0.5%) with or without Clonidine (2mcg/kg). It also evaluated the intra operative opioid dosage and hemodynamic responses in patients undergoing thyroid surgeries. **Methods:** 60 Patients undergoing thyroidectomy were randomized into 3 groups, (Group A) BSCPb using normal saline, (group B) Ropivacaine (0.5%), (group C) Ropivacaine (0.5%) with Clonidine (2mcg/kg) before GA. Intra and post-operative hemodynamic responses, fentanyl dosage and the time of rescue analgesia were assessed. Post op pain scores using VAS, nausea, vomiting and sedation were assessed for 24 hours. **Results:** The mean duration of analgesia is highly significant ( $p < 0.001$ ) in group C. Intra operative fentanyl requirement was significantly lesser in groups B and C ( $P < 0.001$ ). Intra operative hemodynamic changes were significant in Group B and C. Post operative pain scores were significantly lower in groups B and C for the first 24 hours ( $P < 0.001$ ). The time of rescue analgesia in group A was early when compared to group B and C ( $P < 0.001$ ) and in group B when compared to group C. Post operative nausea, vomiting were lower in group B and C. **Conclusion:** BSCPb performed prior to GA using 0.5% Ropivacaine with or without clonidine was effective in reducing intra and post-operative analgesic requirements. The addition of Clonidine 2mcg/kg had highest analgesic efficacy when compared to Ropivacaine alone.

**Keywords:** Superficial cervical plexus block, Thyroidectomy, Post operative analgesic requirements, Rescue analgesia.

## INTRODUCTION

Pain after thyroid surgery is of mild to moderate intensity necessitating opioid or NSAID drug usage within the first 24 hours. Opioids in addition to effective analgesia also cause unwanted side effects like nausea, vomiting, urinary retention and hypoventilation. These side effects may be attenuated by reducing the dose of opioids, but the analgesic efficacy might be less than optimal. BSCPb is a popular regional anaesthetic technique, which may reduce the opioid and NSAID requirements.

This study was conducted in patients undergoing total thyroidectomy, to compare the post operative analgesic efficacy of BSCPb performed before the induction of general anesthesia with Ropivacaine (0.5%) and Ropivacaine with Clonidine (2mcg/kg).<sup>[1]</sup>

## MATERIALS AND METHODS

This was a prospective, randomized controlled clinical study conducted among 60 patients who were undergoing total thyroidectomy under General anesthesia. The study was approved by institutional ethical committee and informed consent was obtained from all the patients. Preoperative thorough physical and clinical examination was done and all the basic investigations verified. Airway assessment was done. Patient from age group 18 to 60 years, ASA (American society of anesthesiologist) physical scoring of 1 & 2, Elective cases with Euthyroid state were included. Patients with malignant thyroid

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diseases, retrosternal goiter, coagulation disorder, other comorbidities, emergency cases, patients with difficult airway diseases are excluded from this study. Study patients were split in to 3 groups, Group A to receive isotonic saline, Group B Ropivacaine 0.5% and Group C Ropivacaine 0.5% and Clonidine 2mcg/kg. Patients were randomized by closed envelope method into Group A, B and C. Patients in all the groups were administered general anesthesia. The baseline heart rate, Blood pressure and Spo2 were recorded. All the patients were preloaded with 10 ml/kg of normal saline and pre-medicated with injection Glycopyrrolate. Induction was done with Inj. Fentanyl 2 mcg/kg, inj. Thiopentone 4mg/kg followed by inj. Atracurium 0.5 mg/kg and intubated with endotracheal tube of appropriate size, maintenance with N2O:O2,2:1 Sevoflurane 1%.. BSCPB was performed by an anaesthetist who was familiar in this technique before induction and incision. Using three point injection technique 10 ml of prepared solution was injected in each sides of neck. A 23 gauge needle was inserted at the posterior border of sternocleidomastoid muscle, 2cm above the clavicle. The depth of the needle should be less than 5 mm. 6 ml of prepared mixture was given in cephalad direction, 2 ml in the transverse direction. These two injections were for blocking the greater auricular and transverse cervical nerves. 2 ml of injection at the needle puncture site to block the supraclavicular nerves. Injection Fentanyl was given every 60 minutes and additional doses were administered for any variation in blood pressure and heart rate for group A. The duration of surgery and Fentanyl requirements were calculated. At the end of surgery patient was reversed with injection Neostigmine 40-50 mcg/kg and injection Glycopyrrolate 0.4 mg iv and extubated after adequate neuromuscular recovery. Post operative laryngoscopy was done for

assessing vocal cord movements. Post operatively the patient was shifted was shifted to PACU (Post Anesthesia Care Unit). In PACU post operative pain score was assessed using Visual analogue score and time of rescue analgesia was also assessed. All parametric data were analyzed with chi square test, student t test. All non parametric data were analyzed with one way Anova. All the data were entered into Microsoft excel software analysis was done using SPSS software version 15.0

**RESULTS**

Demographic characteristics like age were similar in all three groups, but among gender females were predominant [Table 1].

**Table 1: Demographic data.**

	Group A	Group B	Group C
Age	36.95 ±10.58	39.55 ±11.01	38.70 ±11.38
Female	19 (95%)	19 (95%)	17 (85%)
Male	1 (5%)	1 (5%)	3 (5%)

In group A 14 patients had pain at the time of admission into PACU. Mean duration of analgesia is longer in group B and group C. On comparing group C with group B, the mean duration of analgesia is statistically significant (p value <0.001). The requirement of rescue analgesia in group A was early in the post operative period when compared to group B and group C. The time of first rescue analgesia was early in group B when compared to group C. There was no requirement of second rescue analgesia in group B and group C. The dosage of fentanyl for group B and group C was less than group, A which is statistically significant. The dosage of Fentanyl in group B and group C was same [Table 2].

**Table 2: Duration of postoperative analgesia, Time of Rescue analgesia and intra operative fentanyl dosage.**

		Group A	Group B	Group C	P value
		Mean ±SD	Mean ±SD	Mean ±SD	
Duration of analgesia (min)		66 ±58.88	640.50 ±150.24	984 ±120.63	<0.0001
Time of rescue analgesia (mins)	Time of first rescue (mins)	66 ±58.88	448.50 ±127.83	996.00 ±140.91	<0.0001
	Time of second rescue (mins)	768.00±157.67	-	-	
Intra operative fentanyl dosage		133 ±13.42	100 ±00	100 ±00	

**Table 3: Post operative VAS.**

PACU Time (hours)	Group A		Group B		Group C		P-VALUE
	Mean	SD	Mean	SD	Mean	SD	
0	5.85	2.03	1.85	0.67	1.00	0.22	<0.0001
½ hr	2.15	0.93	1.90	0.64	1.00	0.22	<0.0001
1 hr	2.25	0.97	2.10	0.45	1.00	0.00	0.021
2 hrs	2.70	1.26	2.30	0.47	1.05	0.22	<0.0001
4hrs	2.95	0.60	2.95	0.60	1.15	0.37	<0.0001
6 hrs	3.70	0.57	3.20	0.83	2.10	0.85	<0.0001
10 hrs	4.45	0.51	3.75	1.12	2.75	1.07	<0.0001
14 hrs	3.60	1.43	3.05	0.39	2.35	1.36	<0.0001
18 hrs	3.75	0.91	3.45	0.60	2.35	1.85	<0.0001
22 hrs	3.75	0.44	2.75	0.55	1.80	0.41	<0.0001
24 hrs	3.95	0.22	2.90	0.45	2.00	0.32	<0.0001

During post operative period, the pain score was analyzed with Visual analog scale. On comparing Group B and Group C with Group A, VAS pain score was less in group B group C. The pain score was still lesser in group C compared to group B. The P values were statistically significant between the groups. At admission into PACU the mean pain score in group A was  $5.85 \pm 2.03$ , group B was  $1.85 \pm 0.67$ , group C was  $1 \pm 0.22$  [Table 3].

**Table 4: Side effects.**

	Group A	Group B	Group C
PONV	7(35%)	1(5%)	1(5%)
Hypotension	-	-	-
Bradycardia	-	-	1(5%)
Sedation	-	-	2(10%)

In group A seven patients had nausea and vomiting whereas only one patient in group B and group C. In group C one patient had bradycardia which was treated with injection atropine and two patients had mild sedation [Table 4].

## DISCUSSION

Post thyroidectomy pain has many components, which are related to the superficial and deep layers of the wound, neck position during the intra operative period. In different types of surgery local anaesthetics have been used as an infiltrating agent for post operative pain relief. The Demographic profile of our patients was comparable in all three groups with respect to mean age, body mass index and physical status. The results of the study showed that BSCP performed by three point technique using injection Ropivacaine 0.5% (group B) and Ropivacaine 0.5% with Clonidine 2 mcg/kg (group C) resulted in a significant increase in the duration of post-operative analgesia, reduction in intra operative Fentanyl dosage and a reduction in other post-operative analgesic requirements. The addition of Clonidine prolongs the duration of post operative analgesia with negligible side effects. Aunac S, Carlier M. reported reduction in analgesic requirement with BSCP during post-operative period for patients undergoing thyroidectomy under general anesthesia done with 0.5% Ropivacaine and 0.5% Ropivacaine with Clonidine. During surgery, the requirement of additional Alfentanil boluses were significantly reduced in Group B and Group C compared to Group A. Post operative period, the opioid and NSAID requirements were also significantly reduced in Group B and Group C during the first 24 hours. [1] This correlates with the finding of our study. Andrieu et al, at PACU admission pain scores were lower in Group B (Ropivacaine) median range 3 and RC (Ropivacaine with Clonidine) is median 3 than in Group A (control). Nefopam need during the first 24 hours after thyroidectomy were significantly reduced in

Group B and Group C compared with Group A (control). [2] In our study also post operative pain score was lower in Group B (Ropivacaine) and Group C (Ropivacaine with Clonidine) and the analgesic requirements in group B and group C were significantly reduced when compared to group A. A study by El Saied AH, Steyn MP, Ansermino JM, the Clonidine patients showed an increase in the duration of sensory loss from 489 min to 628 with a mean difference of 138 min and analgesia from 587 to 828 min with a mean difference of 241 min. There was no difference in onset time. The adjuvant of Clonidine to Ropivacaine, for brachial plexus blockade, prolongs motor and sensory block and analgesia without side effects. [3] In our study, the mean duration of analgesia in Group C (Ropivacaine with Clonidine) was significantly higher than group B (Ropivacaine). Hisham Negmi MD, et al, in PACU the Morphine consumption was significantly higher in the control group compared to BSCP group. Eighteen patients (72%) in the control group received Morphine in PACU compared to 6 patients in BSCP group (24%). In our study, we used injection Diclofenac sodium as rescue analgesia. In group A 14 patients (70%) required first rescue at the admission into PACU and none of the patient in group B and group C required rescue immediately. [4] Nausea and vomiting after neck operations can be caused by intubations, inhalation anaesthetics, perioperative analgesics, and surgical manipulation. Sonner et al. reported that 54% of their patients had nausea and vomiting after thyroidectomy, with the incidence more common in women and in those who had inhalation anaesthesia. [4] They scored postoperative nausea and vomiting (PONV) after thyroidectomy as grades 1-4 and defined severe PONV as grades 3 and 4. Our incidences of PONV in group A seven patients whereas one patient in group B and group C which correlates with higher Fentanyl dosage in group A. [5]

## CONCLUSION

Bilateral Superficial cervical plexus block performed prior to general anesthesia using Ropivacaine 0.5% along with adjuvant Clonidine 2mcg/kg had better post operative analgesic efficacy than Ropivacaine alone in patients undergoing total thyroidectomy. It also reduces the intra operative opiates requirement, post operative rescue analgesia requirement and has low VAS score with negligible side effects. We conclude that BSCP is an effective and useful method to manage post operative pain in patients undergoing thyroidectomy surgery.

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