Journal of Chemical Health Risks

www.jchr.org

JCHR (2023) 13(6), 3626-3630 | ISSN: 2251-6719

Comparison between Bilateral Superficial Cervical Plexus Block & Local Infiltration with 0.5 % Ropivacaine for Postoperative Analgesia in Thyroidectomy Patients

Dr. Vishnuvanditha Vuppuluri[1*], Dr. Vaishnavi Cheruvu[2], Dr. Aejaz Ahmad[3], Dr. Vasantha O.T[4], Dr. Krishna Prasad[5]

1. Postgraduate, Department of Anesthesiology, Saveetha Medical College, Chennai
2. Senior Resident, Department of Anesthesiology, Saveetha Medical College, Chennai
3. Assistant professor, Department of Anesthesiology, Yenepoya Medical College, Mangalore
4. Professor, Department of Anesthesiology, Yenepoya Medical College, Mangalore
5. Associate Professor, Department of Anesthesiology, Yenepoya Medical College, Mangalore

*Corresponding author
Dr. Vishnuvanditha Vuppuluri, Department of Anesthesiology, Saveetha Medical College, Chennai

(Received: 07 October 2023 Revised: 12 November Accepted: 06 December)

KEYWORDS
thyroid surgeries, ultrasound guided, Bilateral Superficial Cervical Plexus block, ropivacaine, wound site infiltration

ABSTRACT:

Background: Thyroid surgery is a quite painful procedure performed in a sensitive skin area of the human body. Local anaesthetic wound infiltration, Bilateral Superficial Cervical Plexus Block are examples of regional anaesthesia. Present study was aimed to compare bilateral superficial cervical plexus block versus local infiltration with 0.5 % ropivacaine for postoperative analgesia in thyroidectomy patients.

Material and Methods: Present study was single-center, Prospective, double blinded, randomized controlled study., conducted in adult patients of either gender, ASA physical status II, undergoing elective thyroid surgeries under general anaesthesia, Patients were randomly divided into Group A (Wound infiltration) & Group B (bilateral superficial cervical plexus block - BSCPB).

Results: A total of 60 consecutive patients posted for thyroidectomy were enrolled. In this study female gender has comparatively undergone thyroidectomy more when compared to male. 76.7% had no pain during extubation in Group A whereas 46.7% had no pain during extubation. 73.3% study participants had no PONV in Group A and 50.0% study participants had no PONV in Group B. Patients from bilateral superficial cervical plexus block (BSCPB) required rescue analgesia later (655.67 ± 171.840) as compared to Wound infiltration group (332.67 ± 127.548), difference was statistically significant (0.005) Patients from Wound infiltration group required less rescue analgesia (3.10 ± 0.960) as compared to bilateral superficial cervical plexus block (BSCPB) (3.60 ± 1.102), difference was not statistically significant (0.066).

Conclusion: In thyroid surgeries ultrasound guided Bilateral Superficial Cervical Plexus block using 0.5% Ropivacaine 10 ml on either side after induction of general anaesthesia provided better postoperative analgesia when compared to wound site infiltration with 0.5% Ropivacaine.

1. INTRODUCTION

Thyroidectomy is a classic procedure that is used to excise the thyroid gland, which is considered as the treatment for benign, malignant or hormonal disease that is unresponsive to medical management.[1] Incisional discomfort is mild to moderate after thyroid surgery. In addition, general anaesthesia or the surgery itself can cause difficulty in deglutition, a burning sensation in the throat, nausea, and vomiting. [1] These affect a majority of patients, especially within the first 24 hours of surgery. Various methods of care, such as opioids and nonsteroidal anti-inflammatory medications (NSAIDs), or extra loco regional anaesthetic procedures, have been used by surgeons and anaesthetists to try to prevent or treat these difficulties.[2] Local anaesthetic wound infiltration, Bilateral Superficial Cervical Plexus Block are examples of regional anaesthesia. Thyroid surgery patients may benefit from a combination of bilateral superficial and deep cervical plexus blocks to minimize postoperative pain.[1,2]

In spite of the difficult anatomy, compact space with vital

Journal of Chemical Health Risks
www.jchr.org
JCHR (2023) 13(6), 3626-3630 | ISSN: 2251-6719

structures and complicated nerve supply, Bilateral Superficial Cervical Plexus Block (BSCPB) is being used for many head and neck surgeries to ensure anaesthesia and or analgesia.[3,4] USG has increased the scope for CPBs being performed more accurately and safely under guidance.[2,3] Present study was aimed to compare bilateral superficial cervical plexus block versus local infiltration with 0.5 % ropivacaine for postoperative analgesia in thyroidectomy patients.

2. MATERIAL AND METHODS

Present study was single-center, Prospective, double blinded, randomized controlled study., conducted in department of anaesthesiology at Yenepoya Medical College and hospital, Mangalore, India. Study duration was of 1 year 4 months (December 2019 to March 2021). Study approval was obtained from institutional ethical committee.

Inclusion criteria

- Adult patients of either gender, ASA physical status II, undergoing elective thyroid surgeries under general anaesthesia, willing to participate in present study

Exclusion criteria

- Patients with clinically significant cardiovascular, respiratory, hepatic, renal, neurologic, psychiatric or metabolic disease.
- Patients with retrosternal extensions of thyroid or large thyroid swellings.
- ASA physical status III and IV.
- Pregnant
- Patients with known allergy to the drugs.

Thorough pre-anaesthetic evaluation and routine investigations were carried out before taking up the patient for surgery. An informed and written consent was taken from the patients enrolled for the study and patients were explained regarding the Visual Analogue Scale (VAS)in detail. Then the patients were divided into two groups chosen at random, using a table of random numbers:

- Group A (Wound infiltration)
- Group B (bilateral superficial cervical plexus block - BSCPB)

Premedication –

- Tab. Ranitidine 150mg at night before surgery and two hours prior to induction.
- Tab. Alprazolam 0.5mg at night before surgery were given to all the 60 patients.
- Patients asked to continue if they are on any thyroid medications like Thyroxine or Anti – thyroid drugs on the day of surgery

On arrival to the operating room, routine monitoring was done for Heart Rate, Non-invasive blood pressure, Electrocardiogram, Oxy-haemoglobin saturation. A peripheral cannula 18 G was secured, intravenous infusion of Crystalloid (either Ringers lactate or Normal Saline) was started, intravenous Midazolam 1mg, intravenous Fentanyl 1.5mcg/kg was given. After pre-oxygenation with 100% oxygen for three minutes, the patient was induced with intravenous Propofol 2mg/kg and endotracheal intubation facilitated by Vecuronium 0.1mg/kg was done and End Tidal CO2 monitor also attached. Anaesthesia was maintained with Isoflurane 1 MAC and Nitrous Oxide & Oxygen (70:30).

After intubation, regional anaesthesia tray with sterile towels, gloves and gauze packs, two 10 ml syringes containing the anaesthetic mixture were arranged. A 2.5-in., 23-gauge needle was attached to extension tube.

In group A local wound infiltration with 10 ml 0.5 % Ropivacaine at the incision line was administered

In Group B the block was performed with the patient lying supine and head turned to the contralateral side. Ultrasound machine with linear probe (7-12HZ) was used to perform the block. After skin sterilization the probe was placed transversely over the lateral aspect of the patient's neck, at the middle of the posterior edge of the sternocleidomastoid (SCM). After negative aspiration, 10 ml of 0.5%Ropivacaine was deposited in this plane, just behind the posterior border of SCM in group B. The local anaesthetic spread was witnessed in the right plane. The same procedure was repeated on the contralateral side.

At the end of the surgery, residual neuromuscular paralysis was antagonised with Neostigmine 0.05mg/kg ad Glycopyrrolate0.1mg/kg. After satisfactory recovery is achieved, the patient was extubated and shifted to the post anaesthesia care unit. Assessment of pain on arrival to the post anaesthesia care unit (time 0) was done by a 10 cm visual analogue scale (VAS); 0 – No pain & 10 – Worst imaginable pain. Pain was reassessed six, twelve and twenty fours post-surgery and PONV was also assessed. Rescue analgesia with intravenous Morphine 2mg was provided if VAS is more than 4.

Data was collected and compiled using Microsoft Excel, analyzed using SPSS 23.0 version. Frequency, percentage, means and standard deviations (SD) was calculated for the continuous variables, while ratios and proportions were calculated for the categorical variables. Difference of proportions between qualitative variables were tested using chi- square test or Fisher exact test as applicable. P value less than 0.5 was considered as statistically significant.

3. RESULTS

A total of 60 consecutive patients posted for thyroidectomy were enrolled. All patients received the allocated treatment and were observed throughout the

Journal of Chemical Health Risks
www.jchr.org
JCHR (2023) 13(6), 3626-3630 | ISSN: 2251-6719

study period. In present study, significant number of thyroidectomies have been observed in the age group 31-40 years. (36.7% in Group A and 33.3 % in Group B). In this study female gender has comparatively undergone thyroidectomy more when compared to male, Percentage ranging from 93.3% and 6.7% in Group A and 80.0% and 20.0% in Group B respectively.

Table 1- General characteristics

Age group	Wound infiltration	BSCPB	Total
≤30	2 (6.7 %)	5 (16.7 %)	7 (11.7 %)
31-40	11 (36.7 %)	10 (33.3 %)	21 (35.0 %)
41-50	7 (23.3 %)	7 (23.3 %)	14 (23.3 %)
51-60	5 (16.7 %)	5 (16.7 %)	10 (16.7 %)
≥ 60	5 (16.7 %)	3 (10.0 %)	8 (13.3 %)
Gender			
Male	2 (6.7 %)	6 (20.0 %)	8 (13.3 %)
Female	28 (93.3 %)	24 (80.0 %)	52 (86.7 %)

76.7% had no pain during extubation in Group A whereas 46.7% had no pain during extubation. Here the p value is 0.01 and is statistically significant.

Table 2: Pain during extubation

Pain during extubation	Wound infiltration	BSCPB	Total
No	23 (76.7 %)	14 (46.7 %)	37 (61.7 %)
Yes	7 (23.3 %)	16 (53.3 %)	23 (38.3 %)
p value - 0.017			

73.3% study participants had no PONV in Group A and 50.0% study participants had no PONV in Group B.

Table 3: PONV in both the groups for 24 hours

PONV for 24 hrs.	Wound infiltration	BSCPB	Total
No	22 (73.3 %)	15 (50.0 %)	37 (61.7 %)
Yes	8 (26.7 %)	15 (50.0 %)	23 (38.3 %)
p value - 0.017			

Patients from bilateral superficial cervical plexus block (BSCPB) required rescue analgesia later (655.67 ± 171.840) as compared to Wound infiltration group (332.67 ± 127.548), difference was statistically significant (0.005)

Table 4: Time for first dose of rescue analgesia

	Time for first analgesic		Mean difference	p value*
Study Group	Mean	Std. Dev		
Wound infiltration	332.67	127.548	115.000	.005
BSCPB	655.67	171.840		

Patients from Wound infiltration group required less rescue analgesia (3.10 ± 0.960) as compared to bilateral superficial cervical plexus block (BSCPB) (3.60 ± 1.102), difference was not statistically significant (0.066)

Table 5: Total amount of rescue analgesia given

Study Group	Total rescue analgesia given		Mean difference	p value*
	Mean	Std. Dev		
Wound infiltration	3.10	.960	-.500	.066
BSCPB	3.60	1.102		

As per the measurement of VAS score in both the groups for postop analgesia in both the groups show a statistically significant value for a better postop analgesia in Group B than Group A and less amount of rescue analgesia usage in Group B compared to Group A.

Table 6: VAS score in both the groups.

Groups	VAS score	Mean	Std. Dev	p value
Wound infiltration	After 6 hours	3.93	.785	

Journal of Chemical Health Risks
www.jchr.org
JCHR (2023) 13(6), 3626-3630 | ISSN: 2251-6719

	After 12 hours	4.30	.794	0.07
	After 24 hours	7.00	1.232	
BSCPB	After 6 hours	3.67	.758	0.001
	After 12 hours	6.13	.730	
	After 24 hours	8.50	.820	

4. DISCUSSION

Thyroid surgery is a quite painful procedure performed in a sensitive skin area of the human body. Unless pain is treated adequately thyroid surgery may cause severe postoperative pain and discomfort for the patients. Opioids used to treat postoperative pain cause potential side effects like nausea and vomiting that contributes to patient discomfort and even delayed discharge from the hospital. Regional techniques may help to alleviate postoperative pain and reduce systemic analgesic requirement. Cervical plexus block and wound infiltration techniques are the main regional techniques that can be performed to provide postoperative analgesia following thyroid surgery.

The study of Suh et al.,[5] has shown that superficial cervical plexus block (SCPB) alone is a more effective technique than combining superficial and deep cervical plexus block. Local anaesthetics like Bupivacaine, Ropivacaine, Levobupivacaine and adjuvants like Clonidine, Dexamethasone and Dexmeditomidine have been administered as superficial cervical plexus block.

In the present study we observed that there was significant post-operative analgesia with pre- operative administration of block among the patients. We found that there was significant prolongation of duration of analgesia postoperatively in the first 24 hours in patients receiving Ropivacaine as the local anaesthetic.

Senapathi et al.,[6] found that Ultrasound-guided bilateral superficial cervical plexus block is more effective in reducing pain both intra- and postoperatively compared with landmark technique in patients undergoing thyroidectomy. In our study we have used the ultrasound technique due to its advantage over landmark technique in terms of reduced dose requirement, the ability to witness the anaesthetic mixture diffuse in the right intermuscular plane that has been targeted and to avoid injury of important nearby structures. We also found a decrease in postoperative analgesic requirement among the subjects.

Junca et al.,[7] concluded that in the Bupivacaine group, visual analog scale scores were lower at 2 and 3 hrs, and the delay before paracetamol administration was prolonged compared to the Ropivacaine group. In our study we found a significant difference in mean VAS comparison between two groups from 30mins to 4hours. There was significant difference in the meantime of rescue analgesic between the two groups.

In study by Gurkan et al.,[8] postoperative morphine consumption was lower in SCPB group compared to control group at postoperative period. In our study we used 10ml of 0.5% Ropivacaine for SCPB on each side and 10 ml of 0.5%Ropivacaine for local wound infiltration.

Kokofer et al.,[9] noted that use of 0.375% Ropivacaine provided similarly effective analgesia as 0.75%, but resulted in significantly lower plasma concentrations. In our study we used 10ml of Ropivacaine of 0.5% concentration on each side without any side effects and satisfactory analgesia. However, we did not measure plasma concentration of the drug.

In a meta-analysis of randomized controlled trials (RCT), Warschkow et al.,[10] noted that the combination of BSCPB and general anesthesia has a significant benefit in reducing pain 6 and 24 hours after thyroid surgery. However, in the present study, we observed a significant reduction in median VAS score and prolonged duration of analgesia. We observed a steady increase in VAS score. However, all patients received rescue analgesics once they complained of mild pain (VAS $\geq$ 4).

Cai et al.,[4] compared the incidence of postoperative nausea and vomiting and postoperative pain in thyroidectomy patients undergoing general anaesthesia, with or without bilateral superficial cervical plexus block among 135 patients. They concluded that BSCPB with 0.5% Ropivacaine administered before surgery can significantly reduce the incidence of PONV and early postoperative pain and also reduce perioperative opioid requirements[63]. But in our study there was no significant difference in Side effects distribution between the two study groups.

The present study has few limitations as well. We followed up the patient only for first 24 hours after administering the drug, hence the analgesic effect of drug and the total rescue analgesic requirement after 24 hours could not be studied. Future studies should assess the effects of this block on long-term benefits of pain relief and assess whether the reduced anaesthetic consumption reflects the recovery pattern of the patients.

5. CONCLUSION

In thyroid surgeries ultrasound guided Bilateral Superficial Cervical Plexus block using 0.5% Ropivacaine 10ml on either side after induction of general anaesthesia provided better postoperative

Journal of Chemical Health Risks

www.jchr.org

JCHR (2023) 13(6), 3626-3630 | ISSN: 2251-6719

analgesia when compared to wound site infiltration with 0.5% Ropivacaine. The amount of rescue analgesia is less in patients who received BSCPB when compared to Local wound infiltration. Although the PONV had no statistically significant difference in both the groups. Combination of Local wound infiltration and BSCPB can be given without exceeding the lethal dose local anaesthetic for better analgesia.

Conflict of Interest: None to declare
Source of funding: Nil

REFERENCES

1. Marhofer P, Schr6gendorfer K, Wallner T, Koinig H, Mayer N, Kapral S. Ultrasonographic Guidance Reduces the Amount of Local Anesthetic for 3-in-1 Blocks. Vol. 23, Regional Anesthesia and Pain Medicine. 1998.
2. Stoneham MD, Stamou D, Mason J. Regional anaesthesia for carotid endarterectomy. Vol. 114, British Journal of Anaesthesia. Oxford University Press; 2015. p. 372–83.
3. Senapathi TGA, Widnyana IMG, Aribawa IGNM, Wiryana M, Sinardja IK, Nada IKW, et al. Ultrasound-guided bilateral superficial cervical plexus block is more effective than landmark technique for reducing pain from thyroidectomy. J Pain Res. 2017 Jul 14;10:1619–22.
4. Cai HD, Lin CZ, Yu CX, Lin XZ. Bilateral superficial cervical plexus block reduces postoperative nausea and vomiting and early postoperative pain after thyroidectomy. J Int Med Res. 2012;40(4):1390–8.
5. Suh YJ, Kim YS, In JH, Joo JD, Jeon YS, Kim HK. Comparison of analgesic efficacy between bilateral superficial and combined (superficial and deep) cervical plexus block administered before thyroid surgery. Eur J Anaesthesiol. 2009 Dec;26(12): 1043–7.
6. Senapathi TGA, Widnyana IMG, Aribawa IGNM, Wiryana M, Sinardja IK, Nada IKW, et al. Ultrasound-guided bilateral superficial cervical plexus block is more effective than landmark technique for reducing pain from thyroidectomy. J Pain Res. 2017 Jul 14;10:1619–22.
7. Junca A, Marret E, Goursot G, Mazoit X, Bonnet F. A Comparison of Ropivacaine and Bupivacaine for Cervical Plexus Block. Anesth Analg. 2003 Aug 1;97(2):409–11.
8. Gürkan Y, Taş Z, Toker K, Solak M. Ultrasound guided bilateral cervical plexus block reduces postoperative opioid consumption following thyroid surgery. J Clin Monit Comput. 2015 Oct 14;29(5):579–84.
9. Koköfer A, Nawratil J, Felder TK, Stundner O, Mader N, Gerner P. Ropivacaine 0.375% vs. 0.75% with prilocaine for intermediate cervical plexus block for carotid endarterectomy: A randomised trial. Eur J Anaesthesiol. 2015;32(11):781– 9.
10. Warschkow R, Tarantino I, Jensen K, Beutner U, Clerici T, Schmied BM, et al. Bilateral superficial cervical plexus block in combination with general anesthesia has a low efficacy in thyroid surgery: A meta-analysis of randomized controlled trials. Thyroid. 2012;22(1):44–52.