

A COMPARISON OF ULTRASOUND GUIDED PARAVERTEBRAL BLOCK VERSUS SERRATUS ANTERIOR PLANE BLOCK FOR POSTOPERATIVE PAIN RELIEF IN MODIFIED RADICAL MASTECTOMY

Arulmani Ayyamperumal¹¹Assistant Professor Department of Anesthesiology, Sri Manakula Vinayagar Medical college and Hospital, Kalitheerthalkuppam, Puducherry, India

Received : 15/02/2024
 Received in revised form : 20/04/2024
 Accepted : 04/05/2024

Keywords:

Paravertebral block, Serratus anterior block, postoperative pain, mastectomy.

Corresponding Author:

Dr. Arulmani Ayyamperumal,
 Email: drarulmani375@gmail.com

DOI: 10.47009/jamp.2024.6.3.4

Source of Support: Nil,
 Conflict of Interest: None declared

Int J Acad Med Pharm
 2024; 6 (3); 14-16

**Abstract**

Background: To compare ultrasound guided paravertebral block versus serratus anterior plane block for postoperative pain relief in modified radical mastectomy. **Materials and Methods:** This is an observational comparative study done in 40 patients randomized into two equal groups planned for modified radical mastectomy with or without axillary dissection, 0.25% bupivacaine **Result:** The mean duration of analgesia for serratus group was 224.2±78.3 mins and for Paravertebral subjects was 336±147.9 mins. The mean total analgesic doses of the two groups were 3.0±0.6 and 2.1±0.8. The difference between the two groups was statistically very highly significant (P<0.001). The Numerical Rating Pain Scores (NRS) during rest (R) and during movement (M) were lesser in GROUP P than GROUP S during 2,3,8 and 16 hours. The P value is found to be less than 0.05, hence statistically significant. The time taken to perform the block 17.2±4.4mins in serratus group and 26.0±7.18 mins in Paravertebral group. The difference was statistically very highly significant (P<0.001). There was no major complication in both the groups. **Conclusion:** Paravertebral block provides prolonged duration of postoperative analgesia, reduced Numerical Rating Pain scores and reduced postoperative narcotic analgesic requirements than Serratus anterior Plane block in modified radical mastectomy surgeries.

INTRODUCTION

US-guided Thoracic Para Vertebral Block (TPVB) is an excellent analgesic technique for breast surgery because not only does it decrease pain, but also decreases post-operative nausea and vomiting (PONV) and length of hospital stay. However, the learning curve of US guided TPVB is rather steep requiring a higher degree of skill. This study compared Thoracic paravertebral Block (TPVB) with Serratus anterior plane Block (SAPB) for analgesia after modified radical mastectomy with or without axillary dissection.^[1-12]

Aim and Objective

To compare ultrasound guided paravertebral block versus serratus anterior plane block for postoperative pain relief in modified radical mastectomy.

MATERIALS AND METHODS

This is an observational comparative study done in Department of Anesthesiology, Sri Manakula

Vinayagar Medical college and Hospital, Kalitheerthalkuppam, Puducherry during the period of NOV 2021 to OCT 2023. Written informed consent was obtained from 40 patients randomized into two equal groups planned for modified radical mastectomy with or without axillary dissection. Patients in group S were received serratus anterior plane block and those in group P were received thoracic Paravertebral block. Both these blocks were performed before induction of general anaesthesia. For the ultrasound-guided thoracic paravertebral block (PVB), with the patient in the lateral decubitus, the thoracic paravertebral space was identified as a hypoechoic space between the superior costotransverse ligament and the pleura injection of 30 ml of 0.25% bupivacaine infiltrated. For the USG guided SAP block, with the following muscles were identified overlying the fifth rib, the latissimus dorsi (superficial and posterior), teres major (superior), and serratus muscles (deep and inferior). A skin wheal was raised with 1ml of 2% lignocaine. The needle was introduced in plane with respect to the ultrasound probe, targeting the plane

superficial to the serratus anterior muscle and 30 mL of 0.25% bupivacaine were injected.

Assessment of block:

Check for cold sensation at T2-T6 dermatome.

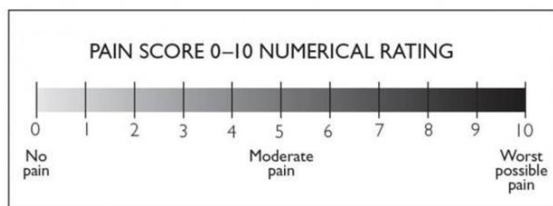
Success	Not able to perceive cold sensation at T2-T6 dermatome on the side of block
Failed	Able to perceive cold sensation at T2-T6 dermatome on the side of block

Primary Outcome: The primary outcome measure in this study is the time taken to perform the block and duration of post-operative analgesia

Secondary outcome: Secondary outcome measures include mean postoperative Numerical Rating Pain Score and the number of supplemental analgesic requirements

Procedure Time: The time interval between the start of scout scan to the identification of the injection target, needle insertion, administration of drug to the final needle removal. It includes both the time taken for sonography and injection of drugs

Quality of Analgesia: Assessed by Visual analogue scale/NRS (ranging from 0-10 with 0 no pain, 10 being severe pain and the patients were asked to mark the pain score on the scale) at 2,3 4,5, 6,8,12,16,20,24 post operative hours during rest as well as on movement (turning lateral to any one side) in PACU.



Duration of Analgesia: Time interval from completion of block to the time of first analgesia (Inj. Tramadol 100mg was given intramuscularly when VAS Score \geq 4)

Post Operative Analgesic Requirements: Number of doses of Inj. Tramadol required for 24 h.

RESULTS

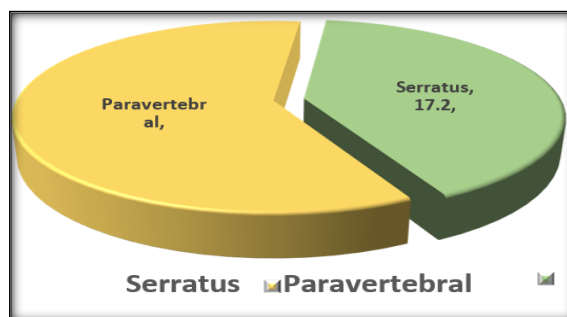


Figure 1: Comparison of mean time taken to perform the blocks between the two groups

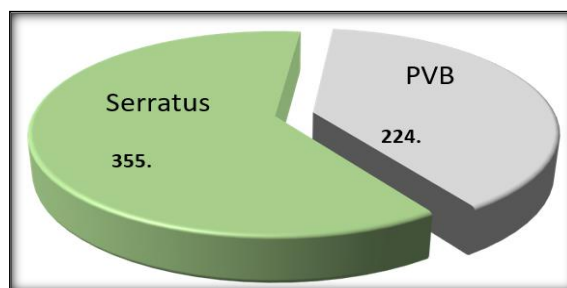


Figure 2: Comparison of average duration of analgesia between the two groups

Table 1: Comparison of time taken to perform the block between the groups

Time taken to perform block (mins)	S group		P group	
	Frequency	%	Frequency	%
10-15	4	20.0	0	0.0
15-20	9	45.0	5	25
20-25	5	25.0	2	10
25-30	2	10.0	4	20
30-35	0	0.0	6	30
35-40	0	0.0	3	15
Total	20	100.0	20	100.0
Mean± SD	17.2±4.4		26.0±7.18	
Significance	“t”=6.659, df=38 P<0.001			

The time taken to perform the block was compared in the above table-7. The mean time taken in both groups were 17.2±4.4 and 26.0±7.18. The difference was statistically very highly significant (P<0.001).

Table 2: Comparison of duration of analgesia between the two groups:

Duration of Analgesic	Serratus		Paravertebral	
	Frequency	%	Frequency	%
120-180	5	25.0	2	10
180-240	7	35.0	3	15
240-300	3	15.0	2	10
300-360	3	15.0	6	30
360-420	2	10.0	4	20
420-480	0	0.0	0	0
480+	0	0.0	3	15
Total	20	100.0	20	

Mean± SD	224.2±78.3	336±147.9
Significance	“t”=4.222, df=38 P<0.001	

DISCUSSION

This study compared Thoracic paravertebral Block (TPVB) with Serratus anterior plane Block (SAPB) for analgesia after modified radical mastectomy with or without axillary dissection in 40 patients randomized into two equal groups and found that TPVB had a longer duration of analgesia and lower tramadol consumption 24 h after surgery. The mean duration of analgesia for serratus group was 224.2±78.3 mins and for Paravertebral subjects was 336±147.9 mins. The mean total analgesic doses of the two groups were 3.0±0.6 and 2.1±0.8. The difference between the two groups was statistically very highly significant (P<0.001). The P value is found to be less than 0.05, hence statistically significant. The time taken to perform the block 17.2±4.4mins in serratus group and 26.0±7.18 mins in Paravertebral group. The difference was statistically very highly significant (P<0.001). There was no major complication in both the groups.

CONCLUSION

Paravertebral block provides prolonged duration of postoperative analgesia, reduced Numerical Rating Pain scores and reduced postoperative narcotic analgesic requirements than Serratus anterior Plane block in modified radical mastectomy surgeries. Eventhough paravertebral block is superior to serratus plane block in terms of duration of postoperative analgesia, the time taken to perform the block and the ease of block performance was better in Seratus anterior plane block.

REFERENCES

- Zhi Hu;Dan Liu;Zhi-Zhen Wang;Biao Wang;Tianyang Dai; The efficacy of thoracic paravertebral block for thoracoscopic surgery: A meta-analysis of randomized controlled trials; *Medicine*. 97(51):e13771, DECEMBER 2018
- Kai Wang;Li-jun Wang;Tong-jiu Yang;Qing-xiang Mao;Zhen Wang;Li-yong Chen; Dexmedetomidine combined with local anesthetics in thoracic paravertebral block: A systematic review and meta-analysis of randomized controlled trials; *Medicine*. 97(46):e13164, NOVEMBER 2018d
- Lawrence Law;Mingjuan Tan;Yaowu Bai;Timothy Miller;Yi-Ju Li;Tong-Joo Gan; Paravertebral Block for Inguinal Herniorrhaphy: A Systematic Review and Meta-analysis of Randomized Controlled Trials; *Anesthesia Analgesia* 2015;121:556–69
-
- Akcaboy EY, Akcaboy ZN, Gogus N. Comparison of paravertebral block versus fast-track general anesthesia via laryngeal mask airway in outpatient inguinal herniorrhaphy; *J Anesth*. 2010 Oct;24(5):687-93
- Indian J Anaesth. 2012 Jan-Feb; 56(1): 27–33. Multiple-injection thoracic paravertebral block as an alternative to general anaesthesia for elective breast surgeries: A randomised controlled trial; Sabyasachi Das, Pradipta Bhattacharya, Mohan Chandra Mandal, Soma Mukhopadhyay, Sekhar Ranjan Basu, and Bikas Kusum Mandol *Med Princ Pract* 2013;22:229–233 DOI: 10.1159/000345381
- Thoracic Paravertebral Block for Postoperative Pain Management in Percutaneous Nephrolithotomy Patients: A Randomized Controlled Clinical Trial K. Ak S. Gursoy C. Duger A.C. Isbir K. Kaygusuz I. Ozdemir Kol G. Gokce C. Mimaroglu J *Anaesthesiol Clin Pharmacol*. 2018 Jul-Sep; 34(3): 347–351.
- Single-injection paravertebral block before general anesthesia enhances analgesia after breast cancer surgery with and without associated lymph node biopsy. Kairaluoma PM, Bachmann MS, Korpinen AK, Rosenberg PH, Pere PJ. 2017 Feb;31(1):152-158.
- Ultrasound-Guided Serratus Anterior Plane Block Versus Thoracic Epidural Analgesia for Thoracotomy Pain. Khalil AE, Abdallah NM, Bashandy GM, Kaddah TABr *J Anaesth*. 2016 Sep;117(3):382-6.
- The effect of serratus plane block performed under direct vision on postoperative pain in breast surgery; Marcus Hards MB ChB ;*Journal of Clinical Anesthesia*; Volume 34, November 2016, Pages 427–431
- Ultrasound-guided modified serratus anterior plane block for perioperative analgesia in breast oncological surgery: A case series; Khemka R, Chakraborty A. Ultrasound-guided modified serratus anterior plane block for perioperative analgesia in breast oncological surgery: *Indian J Anaesth* 2019;63:231-4.
- Journal of Anesthesia & Intensive Care Medicine (JAICM)*; Ultrasound Guided Serratus Plane Block for PostMastectomy Pain Syndrome after Mastectomy with Axillary Node Dissection Matteo Bossolasco and Lucia Maria Fenogli Jadon A, Jain P. Serratus Anterior Plane Block-An Analgesic Technique for Multiple Rib Fractures: A Case Series. *American J Anesth Clin Res*. 2017;3(1): 001-004.