



A COMPARATIVE STUDY BETWEEN THORACIC EPIDURAL BLOCK AND PARAVERTEBRAL BLOCK USING SINGLE DOSE ROPIVACAINE FOR INTRA-OPERATIVE HEMODYNAMIC PARAMETERS AND POST-OPERATIVE ANALGESIA IN PATIENTS UNDERGOING BREAST SURGERY UNDER GENERAL ANESTHESIA.

Anaesthesiology

Dr. L. S. Mishra	Professor Department of anesthesia and critical care, S.R.N hospital, M.L.N medical college, Prayagraj.
Dr. Dharmendra Yadav	Assistant professor Department of anesthesia and critical care, S.R.N hospital, M.L.N medical college, Prayagraj.
Dr. Vaibhav Singh	Assistant professor Department of anesthesia and critical care, S.R.N hospital, M.L.N medical college, Prayagraj.
Dr. Akansha Pandey*	Junior Resident Department of anesthesia and critical care, S.R.N hospital, M.L.N medical college, Prayagraj. *Corresponding Author

ABSTRACT

Introduction:Breast cancer is one of the most commonly seen cancers among females in our country. In India, it accounts for 25%–32% of all female cancers. Conventionally general anaesthesia (GA) is the most frequently used technique. We have included thoracic epidural anaesthesia (TEA) and thoracic paravertebral (PVB) block in our study. **Material And Method:**In our study,60 patients were selected, 30 patients in each group, belonging to ASA grade I and II in the age group of 15-60 years of either sex. They were given block with 0.2% ropivacaine 12ml followed by general anaesthesia. **Results:** In this study, there were no statistical difference between Epidural Block group and Paravertebral Block group with respect to demographic data. The fall in MAP in thoracic epidural block group was significant as compared to paravertebral block. The mean heart rate and Visual Analog Scale scoring was comparable between the two groups($p>0.05$). **Conclusion:**We concluded that both Thoracic Epidural Block and Thoracic Paravertebral Block provide comparable analgesia after breast surgery but Thoracic epidural is associated with higher fall in MAP as compared with Paravertebral block.

KEYWORDS

Thoracic Epidural, Paravertebral, Ropivacaine, General Anesthesia

INTRODUCTION

Pain continues to be a significant problem for majority of patients after major surgeries. Enhanced perioperative pain control can not only improve patient satisfaction but also clinical outcomes.

Breast cancer is one of the most commonly seen cancers among females in our country. In India, it accounts for 25%–32% of all female cancers.^[1] It requires various surgical interventions, conventionally general anaesthesia (GA) is most frequently used technique, but it is associated with inadequate pain control, various side-effects^[2] and depression of immune system.^[3] We have included thoracic epidural anaesthesia (TEA) and thoracic paravertebral (PVB) block in our study.

Clinical benefits associated with epidural anaesthesia include an effective postoperative analgesia, lower incidence of pulmonary complications, stabilization of endothelial coronary function, earlier return of bowel function, preservation of immunocompetence, early ambulation and a reduction in the costs of perioperative care^[4-7]. During combined general epidural anaesthesia (CGEA) the noxious stimulus originating from the surgical site is blocked at the spinal level, reducing the requirements of general anaesthetics^[8].

Paravertebral block is a technique creating unilateral somatic and sympathetic nerve block as a result of Local Anaesthetic (LA) injection close to the spinal nerves along the vertebral column. For breast surgery, the blocks are performed between T2 and T6 with either multiple injections or single shot/continuous technique that can be performed in sitting, lateral or prone positions^[9-10].

Paravertebral blockade, offer the advantages of providing unilateral analgesia with lower side-effect profiles; thus, these techniques have gained popularity. Paravertebral blocks provided comparable pain relief and were associated with less nausea and vomiting, urinary retention, failed blocks, hypotension, and pulmonary complications compared with TEA in patients undergoing thoracic surgery.^[11-12]

MATERIAL AND METHODS

Our study was carried out in Swaroop Rani Nehru hospital associated with Moti Lal Nehru medical college, Prayagraj, the study is a randomized prospective single blinded study.

60 patients were selected, 30 patients in each group, belonging to

American Society of Anaesthesiologists (ASA) physical status I – II in the age group of 15-60 years of either sex, they were given block with 0.2% ropivacaine 12ml followed by general anaesthesia.

Inclusion criteria were- Age :15-60 years, both the sex were included, ASA grade I and II, Patients undergoing elective unilateral breast surgeries, BMI < 35.0

Exclusion criteria were- Patient's refusal for surgery, ASA Class >II, If surgery duration exceeds >90 minutes, Cardiovascular diseases, Pulmonary diseases, Renal disease, Coagulation disorder, Psychiatric disorders, Any neurological deficit / disorder, Any anatomical deformity of vertebrae, Contraindications to central or peripheral neuraxial blocks.

OBSERVATION AND RESULTS

Table 1: Demographic details

Characteristics	paravertebral block (N=30)	thoracic epidural block (N=30)
Age	44.63 ± 12.72	40.30 ± 9.48
Gender		
Male	1 (3.3 %)	0
Female	29(96.7%)	30 (100%)
ASA Grade		
1	12(40%)	13 (43.3%)
2	18 (60%)	17 (56.7%)
Weight	55.93 ± 9.55	57.47 ± 5.81
Time between block and extubation	73.00 ± 13.93	66.50 ± 12.26
Mean duration of analgesia	175.50 ± 14.82	170.00 ± 19.43

Table 2: Comparison of mean MAP between the two groups at different time intervals

MAP	Group 1 [Mean ± SD]	Group 2 [Mean ± SD]	't' value	P value
Preoperative	87.37 ± 4.90	83.97 ± 8.24	1.943, df=58	0.057, NS
1 minute	83.43 ± 9.43	78.3 ± 9.72	2.076, df=58	0.042*
5 minutes	82.5 ± 9.21	77.23 ± 8.35	2.321, df=58	0.024*
15 minutes	82.53 ± 6.22	78.90 ± 7.45	2.054, df=58	0.045*
30 minutes	83.77 ± 6.21	79.10 ± 8.0	2.515, df=58	0.015*
45 minutes	83.23 ± 5.03	79.53 ± 7.49	2.246, df=58	0.029*

60 minutes	82.86 ± 8.93	80.30 ± 6.53	-1.229, df=54	0.112, NS
75 minutes	84.5 ± 8.81	81.13 ± 6.28	-1.117, df=27	0.136, NS
90 minutes	86.33 ± 8.31	82.03 ± 5.29	0.833, df=10	0.211, NS

Table 3: Comparison of mean Pulse Rate between the two groups at different time intervals

Pulse Rate	Group 1 [Mean ± SD]	Group 2 [Mean ± SD]	't' value	P value
Preoperative	74.9 ± 7.97	78.7 ± 9.36	-1.693, df=58	0.096, NS
1 minute	85.4 ± 11.63	87.47 ± 9.64	-0.749, df=58	0.457, NS
5 minutes	84.53 ± 7.01	85.7 ± 8.39	-0.584, df=58	0.561, NS
15 minutes	84.33 ± 6.2	85.10 ± 8.16	-0.410, df=58	0.684, NS
30 minutes	85.03 ± 7.23	85.80 ± 7.59	-0.401, df=58	0.690, NS
45 minutes	85.6 ± 6.71	84.17 ± 8.9	0.704, df=58	0.484, NS
60 minutes	86.89 ± 5.23	87.29 ± 8.08	-0.216, df=54	0.830, NS
75 minutes	87.67 ± 4.68	91.18 ± 5.44	-1.847, df=27	0.076, NS
90 minutes	89.78 ± 5.4	90.67 ± 3.06	-0.265, df=10	0.796, NS

Table 4: Comparison of VAS between the two groups at different time intervals

VAS	Group 1 [Mean Rank]	Group 2 [Mean Rank]	Z Statistics	P value
1 minute	30.93	30.07	-0.212	0.832, NS
15 minutes	30.10	30.90	-0.203	0.839, NS
30 minutes	29.20	31.80	-0.681	0.496, NS
60 minutes	28.70	32.30	-1.081	0.280, NS
90 minutes	27.50	29.50	-0.530	0.596, NS
120	14.50	14.50	0.000	1.000, NS

DISCUSSION

The aim of our study is to compare single dose thoracic epidural block and paravertebral block using ropivacaine in elective breast surgeries. In our study we have taken the concentration of ropivacaine to be 0.2%, Upadhyay R et al¹³ used similar concentration.

In our study, there were no significant difference between Epidural Block group and Paravertebral Block group with respect to demographic data.

We found out that the mean pulse rate preoperatively was 74.9 ± 7.97 per minute in paravertebral group and 78.7 ± 9.36 per minute in thoracic epidural block. The mean pulse rate at 90 minutes was higher than the preoperative pulse rate. Helal et al¹⁴ found the mean pulse rate in paravertebral group was 85.40±2.28 and in thoracic epidural group was 85.30±2.45. Sundarathiti et al¹⁵ found mean pulse rate in thoracic epidural patient was 72.64±9.86. The mean heart rate was comparable between the two groups at all the time intervals (p>0.05).

The mean MAP in our study preoperatively was 87.37 ± 4.90 mm Hg in paravertebral group and 83.97 ± 8.24 mm Hg in thoracic epidural group. The mean MAP at 90 minutes was lower than the preoperative mean MAP. The fall in MAP in thoracic epidural block patients was significant as compared to paravertebral block. So, as the blood pressure decreased the MAP decreased so in order to correct it fluids were given to the patient and as a result the blood pressure increased and MAP also increased. Helal et al¹⁴ found the mean MAP in paravertebral block group was 86.47±2.64 while in thoracic epidural block group it was 85.97±3.56. Moawad et al.¹⁶ found the mean MAP of 94.60 ± 5.17 in epidural block and 94.80± 5.82 in paravertebral block.

In our study, the mean VAS score was 0.93 ± 0.78 and 0.97 ± 0.67 at 1 minute in paravertebral block and thoracic epidural group respectively, and it continued to rise till the end of 120 minutes. The mean rank of VAS at all the time intervals was comparable between the two groups.

In the study by Helal et al¹⁴ the mean VAS score at 0 min was 0.5±0.68 in paravertebral block group and 0.4±0.67 in thoracic epidural block group. There was no statistical difference among the groups with respect to VAS score and post-op analgesic efficacy. This means that both epidural and paravertebral block are comparable in terms of VAS. All patients were given rescue analgesia when VAS score was more than 4 and after that our study concluded.

In our study we did not have any complications.

CONCLUSION

In our study we concluded that both Thoracic Epidural Block and Thoracic Paravertebral Block provide comparable post-operative

analgesia after breast surgery when single dose Ropivacaine is used but Thoracic epidural is associated with higher fall in MAP as compared with Paravertebral block because of bilateral sympathetic blockade in Thoracic epidural block while in Paravertebral block usually there is only unilateral sympathetic blockade.

Thus, Thoracic Paravertebral Block was found to be advantageous over Thoracic Epidural Block as it provides comparable analgesic effect with greater hemodynamic stability, improved respiratory function and reduction in complications.

REFERENCES

- [1] Population Based Cancer Registry. National Cancer Registry Programme (NCRP), Indian Council of Medical Research (ICMR). Available From: <http://www.ncrpinidia.org>. [Last Accessed On 2017nov 21].
- [2] Rüschi D, Eberhart Lh, Wallenborn J, Kranke P. Nausea And Vomiting After Surgery Under General Anaesthesia: An Evidence-based Review Concerning Risk Assessment, Prevention, And Treatment. *Dtsch Arztebl Int* 2010;107:733-41.
- [3] Stollings Lm, Jia Lj, Tang P, Dou H, Lu B, Xu Y, Et Al. Immune Modulation by Volatile Anaesthetics. *Anesthesiology* 2016; 125:399-411.
- [4] Andreas M, Norbert R, Hugo V. Thoracic Epidural Anaesthesia And The Patient With Heart Disease: Benefit, Risks And Controversies. *Anesth Analg* 1997; 85: 517-28.
- [5] Stevenson Gw, Hall Sc, Rudnick S, Seleny Fl, Stevenson Hc. The Effect Of Anesthetic Agents On The Human Immune Response. *Anesthesiology* 1990; 72:542-52
- [6] Edwards Mj, Broadwater Jr, Bell Jj, Ames Fc, Balch Cm. Economic Impact Of Reducing Hospitalization For Mastectomy Patients. *Ann Surg* 1988; 208: 330-6
- [7] Lui S, Carpenter Rl, Neal Jm. Epidural Anaesthesia And Analgesia: Their Role In Postoperative Outcome. *Anesthesiology* 1995; 82: 1474-506
- [8] Hodgson Ps, Liu Ss (2001) Epidural Lidocaine Decreases Sevoflurane Requirement For Adequate Depth Of Anaesthesia As Measured By The Bispectral Index Monitor. *Anesthesiology* 94: 799-803.
- [9] Coveney E, Weltz Cr, Greengrass R, Iglehart Jd, Leight Gs, Et Al. (1998) Use Of Paravertebral Block Anaesthesia In The Surgical Management Of Breast Cancer. Experience In 156 Cases. *Ann Surg* 4: 496-501.
- [10] Beyaz Sg, Ergöncü T, Altıntoprak F, Fuaterdem A (2012) Thoracic Paravertebral Block For Breast Surgery. *Dicle Med J* 39: 594-603.
- [11] Davies Rg, Myles Ps, Graham Jm: A Comparison Of The Analgesic Efficacy And Side-effects Of Paravertebral Vs Epidural Blockade For Thoracotomy: A Systematic Review And Metaanalysis Of Randomized Trials. *Br J Anaesth* 2006; 96:418-26
- [12] Daly Dj, Myles Ps: Update On The Role Of Paravertebral Blocks For Thoracic Surgery: Are They Worth It? *Curr Opin Anaesthesiol* 2009; 22:38-43
- [13] Upadhyay R, Godwin Rb, Setiya M. Comparative Study Of Ropivacaine And Levobupivacaine Given Paravertebrally In Breast Cancer Surgeries. *Int J Sci Stud* 2017;5(4):212-218.
- [14] Helal S, Aziz A, Gab-allah K, Ramadan E Comparative Study Between Thoracic Epidural And Ultrasound-guided Thoracic Paravertebral Block In Perioperative Pain Management For Mastectomy. *Menoufia Medical Journal* 2019, 32:1191-1196
- [15] Sundarathiti P*, Asutharnchat, P, Kongdan, Y, Suranutkarin P Thoracic Epidural Anesthesia (TEA) With 0.2% Ropivacaine In Combination With Ipsilateral Brachial Plexus Block (BPB) For Modified Radical Mastectomy (MRM) *J Med Assoc Thai* 2005; 88(4): 513-20
- [16] Moawad HE, Mousa SA, El-hefnawy AS. Single Dose Paravertebral Blockade Versus Epidural Blockade for Pain Relief After Open Renal Surgery: A Prospective Randomized Study. *Saudi J Anaesth* 2013; 7:61-7.