

## Efficacy Of Thoracic Paravertebral Block Vs Thoracic Epidural Analgesia for Post Operative Analgesia in Patient Undergoing Modified Radical Mastectomy

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### Abstract

**Introduction:** Breast cancer is the most common cancer among women and most of them require surgery and surgery is conducted under general anaesthesia which is associated with post operative nausea vomiting, post operative pain and chronic pain. Acute post operative pain is an important risk factor for the development of chronic pain after breast surgery. Therefore, effective postoperative pain management after breast cancer surgery is necessary. Paravertebral block and thoracic epidural analgesia for breast surgery are considered a technique of choice for postoperative analgesia in breast surgery. **Aims and objectives:** To evaluate postoperative analgesia, incidence of postoperative nausea vomiting, requirement of rescue analgesia and to see hemodynamic changes between paravertebral block and thoracic epidural analgesia. **Material and methods:** This study comprised of 60 patients of age between 18 to 60 years of ASA grade II and III who were diagnosed case of breast cancer and scheduled for modified radical mastectomy. Patient were divided into 2 groups of 30 patients in each group. Group P received paravertebral block prior to general anaesthesia and Group E received thoracic epidural analgesia and all patients followed up 24 hr postoperatively and compared using VAS score and NRS scale. **Result:** VAS score of both the group were comparable for group P (mean sum VAS 1.51+/-3.44) and for group E (mean sum VAS 2.05+/- 2.54). Postoperative analgesia was good in both the groups. Group E had significantly higher NRS score (mean sum NRS 4.49+/-4.43) compared to group P (mean sum NRS 0.03+/- 0.18). Group P had more hemodynamic stability as compared to Group E. **Conclusion:** We conclude that Paravertebral nerve block has the potential to offer equivalent surgical condition and analgesia along with good patient satisfaction as compared to epidural anesthesia but better patient profile and tolerance and fewer postoperative side effects when used for breast surgery.

**Key words-** Paravertebral block, epidural analgesia, postoperative analgesia, postoperative nausea vomiting.

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### Introduction

Breast cancer is commonest cancer among women and most of them need breast surgery. Breast surgery usually performed under general anaesthesia is associated with nausea vomiting, postoperative pain[5] and chronic pain along with physical, mental and immunological depression. So there is a search for optimal regional techniques for breast surgeries which would reduce PONV and also provide post-operative sensory block, reducing opioids requirements of the various local and regional anaesthetic techniques evaluated in the past to decrease post-operative pain after breast surgery[6,7,8], thoracic paravertebral block (PVB) and thoracic epidural shows promising result in reduction in post-operative pain, reduced opioid consumption with reduction in PONV, drowsiness, risk of respiratory depression and cost saving[9,10]. also reduce the incidence of chronic post-surgical pain and improving wound healing.

Therefore, effective postoperative analgesia after breast cancer surgery is necessary. paravertebral block (PVB) and thoracic epidural analgesia for breast surgery, are considered a technique of choice for postoperative analgesia in breast surgery.

### Material and methods

The present study will be conducted in department of Anaesthesiology Gandhi Medical College and associated Hamidia

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Hospital, Bhopal in patients undergoing modified radical mastectomy. After approval by institutional ethics committee and written informed consent 60 patients aged 18-60 years old were randomly assigned to one of 2 groups to participate in a prospective study. Group P received paravertebral block and Group E received thoracic epidural analgesia.

### Inclusion Criteria

1. Age 18 yrs - 60 yrs
2. ASA grades II and III
3. Diagnosed case of breast cancer
4. Scheduled for modified radical mastectomy

### Exclusion Criteria

1. Age <18yrs and >60yrs.
2. ASA grades IV and more
3. Patient refusal
4. Patients having a history of significant neurological, psychiatric, or neuromuscular disorders
5. Local skin site infections.
6. Bleeding diathesis.
7. Patients on beta blocker, antidepressants, anticonvulsants, antipsychotics.
8. History of allergic reactions to local anesthetics.

Each patient in this study had a history and physical examination done prior to the paravertebral block (PVB) and thoracic epidural analgesia. Paravertebral block was performed on group P. a Touhy's needle was inserted at level of T4/T5 interspinous space, then the needle was

manipulated to walk off the superior or inferior aspect of transverse process, until loss of resistance could be elicited. Needle length was limited to 2cm beyond transverse process. Syringe was detached from needle and epidural catheter was introduced via needle. Touhy's needle was withdrawn over the catheter carefully. Catheter port connected and fixed to skin 40 ml of 0.125% bupivacaine was injected, onset of sensory anaesthesia occurred in 10-15 min after injection.

Thoracic epidural analgesia was performed on group E. A Touhy's needle was inserted at the level of T4/T5 after confirmation of loss of resistance epidural catheter was inserted via Touhy's needle and titrated dose 8-10 ml of 0.5 % bupivacaine was given. Onset of sensory anaesthesia occurred in 10-15 min after injection.

After paravertebral block in group P and thoracic epidural analgesia in group E general anaesthesia was induced. Patients were induced with Propofol 2mg/kg IV. Succinylcholine 1.5 mg/kg IV given to facilitate tracheal intubation. After intubation patient was maintained on isoflurane 0.6-1 % with 50% nitrous and 50% oxygen. Muscle relaxant was used Atracurium 0.5mg IV loading dose and maintained on 0.1 mg/kg. Heart rate, noninvasive blood pressure, oxygen saturation, end tidal CO2 and five lead ECG were monitored. Ondansetron 0.1mg/kg

IV was given 30 min. Before extubation. Residual neuromuscular blockade was antagonized with IV neostigmine 0.05mg/kg and glycopyrrolate 0.01mg/kg. After surgery patient were observed in the post operative room for 30min and then shifted to their respected wards.

**Statistical Analysis**

Data were recorded and analyzed in Microsoft Excel 2019 MSO (Version 2109 Build 16.0.14430.20292). chi-square test and student's test were applied to find significance. P value < 0.05.

**Results**

Both the groups were comparable in demographic characteristics in respect of age, weight, height and ASA grading. Baseline heart rate and mean arterial pressure in both the groups were comparable and statistically not significant. Patients of group P and group E had comparable VAS score that mean both the group had equally effective postoperative analgesia. Group E had significantly higher NRS score (mean sum NRS 4.49+/-4.43) as compared to group P (mean sum NRS 0.03+/-0.18). Patients in group P had more hemodynamic stability as compared to group E.

**Table 1: Demographic characteristics**

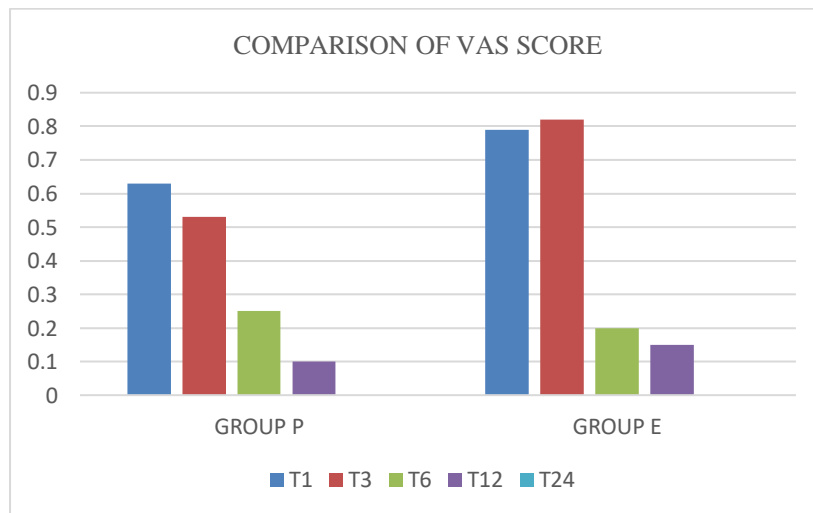
Parameter	Group	Mean	Max	Min	SD	P value	Inference
Age	Group P	52.3	60	32	5.78	0.92	Not significant
	Group E	50.33	60	30	9.76	0.92	Not significant
Height	Group P	159.3	171	148	6.59	1.79	Not significant
	Group E	158.3	174	146	6.88	1.74	Not significant
weight	Group P	59.97	81	42	8.59	2.63	Not significant
	Group E	60	86	35	71.58	2.63	Not significant

**Table 2: Baseline heart rate and mean arterial blood pressure**

Parameters	Group P		Group E		P value
	Mean	SD	Mean	SD	
Heart Rate	86.93	16.01	86.53	10.93	0.449
MAP	89.97	9.29	89.16	9.78	0.385

**Table 3: Comparison of VAS score**

VAS score	Group P		Group E		P value	Inference
	Mean	SD	Mean	SD		
VAS (T1)	0.63	0.99	0.79	1.08	0.56	Not Significant
VAS (T3)	0.53	0.90	0.82	0.30	0.63	Not Significant
VAS (T6)	0.25	0.75	0.20	0.62	0.72	Not Significant
VAS(T12)	0.10	0.80	0.15	0.54	0.62	Not Significant
VAS(T24)	0	0	0	0	>1	Not Significant

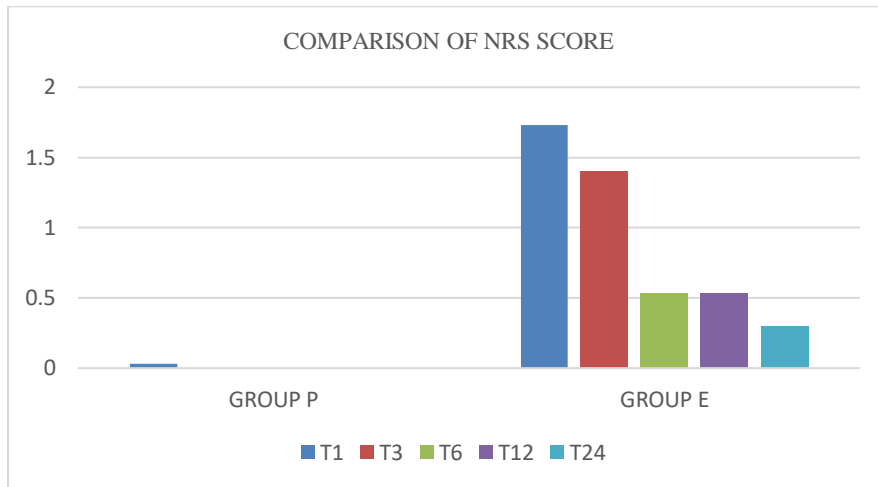


**Figure 1: Comparison of VAS score**

Patients of group P and group E had comparable VAS score that mean both the group had equally effective postoperative analgesia. P value is >0.05 hence, there was no significant difference among both the groups.

**Table 4: Comparison of NRS score**

NRS score	Group P		Group E		P value	Inference
	Mean	SD	Mean	SD		
NRS (T1)	0.03	0.18	1.73	1.11	<0.0001	Significant
NRS (T3)	0.00	0.00	1.40	1.22	<0.0001	Significant
NRS (T6)	0.00	0.00	0.53	0.73	0.0001	Significant
NRS(T12)	0.00	0.00	0.53	0.78	0.0001	Significant
NRS(T24)	0.00	0.00	0.30	0.59	0.0053	Significant

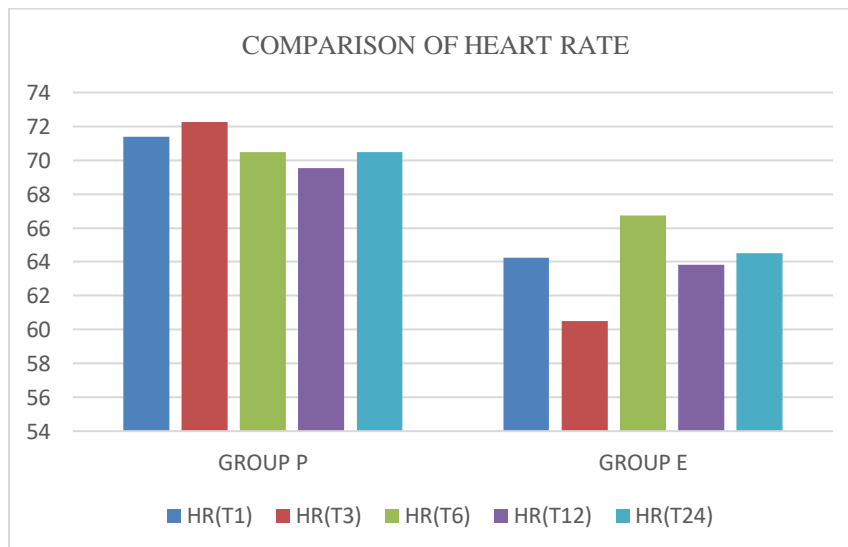


**Figure 2: Comparison of NRS score**

Group E had significantly higher NRS score (mean sum NRS 4.49+/-4.43) as compared to group P (mean sum NRS 0.03+/-0.18). P value <0.05 and it is statistically significant.

**Table 5: comparison of heart rate**

Heart rate (HR)	Group P		Group E		P value	Inference
	Mean	SD	Mean	SD		
HR 1hrs	71.40	8.72	64.25	5.94	0.0005	Significant
HR 3hrs	72.25	7.80	65.50	6.20	0.0005	Significant
HR 6hrs	70.50	8.63	66.75	6.15	0.0536	Significant
HR 12hrs	69.55	8.50	63.84	6.23	0.0044	Significant
HR 24hrs	70.50	7.75	64.50	5.87	0.0001	Significant



**Figure 3: Comparison of heart rate**

Table 6: Comparison of Mean arterial pressure

Mean arterial pressure (MAP)	Group P		Group E		P value	Inference
	Mean	SD	Mean	SD		
MAP 1hrs	89.97	9.13	74.93	11.40	0.0005	Significant
MAP 3hrs	85.27	9.19	75.00	11.07	0.0008	Significant
MAP 6hrs	84.67	9.33	75.53	11.13	0.0014	Significant
MAP 12hrs	85.33	8.85	76.73	11.71	0.0012	Significant
MAP 24hrs	86.13	8.95	77.50	11.32	0.0018	Significant

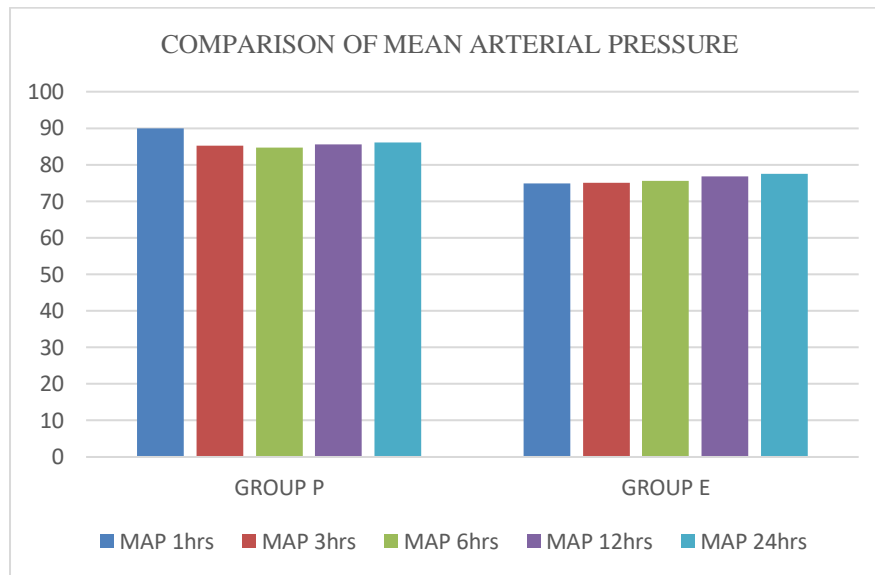


Figure 4: Comparison of Mean Arterial pressure

Group P (Mean sum of heart rate 354.2+/-41.4) shows more hemodynamic stability compare to Group E (Mean sum of heart rate 319.84+/-30.39). p value <0.05 hence, there was significant difference among the groups.

### Discussion

Breast cancer surgery is a very painful procedure which can lead acute postoperative pain, nausea and vomiting. acute pain can lead to development of chronic pain. Standard technique under which breast cancer surgery can be performed is general anaesthesia. In post operative period use of parenteral narcotic which also increase the incidence of nausea, vomiting and sedation and results in prolong stay in recovery room and hospital stay.

This study was conducted to compare the efficacy of paravertebral block and thoracic epidural analgesia for post operative pain management, postoperative nausea vomiting and hemodynamic changes. In terms of demographic variable (age, weight and height) there was no significant difference among the groups. Baseline parameter like basal heart rate and mean arterial pressure there were no significant difference among the groups.

In our study both the groups in terms of postoperative analgesia were equally effective and there no significant difference found among the both groups our study was in concordance *R.d.Davies et al (2006)* they identified 10 trial that had 520 thoracic surgery patients. There was no significant difference between paravertebral block group and thoracic epidural group for pain score 4-8, 24 and 48 h postoperatively[1].

In a meta-analysis conducted by *Xibing Ding et al (2014)* showed that paravertebral block can provide comparable pain relief to traditional epidural block and have better side effect profile and lower incidence of nausea and vomiting[2,4]. Our study is in accordance with this study.

In a study conducted by *Safaa M.Helal et al (2019)* conclude that ultrasound guided thoracic paravertebral block is an effective technique showing greater hemodynamic stability as compared epidural analgesia[3].

### Conclusions

we can conclude that thoracic paravertebral block is equally effective as compared to thoracic epidural analgesia but paravertebral block provide is more hemodynamic stability and incidence of post operative nausea and vomiting is less in paravertebral block group as compared to epidural group.

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