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Original Research Article

Comparing Analgesic Efficacy of Paravertebral Block And Local Anaesthetic Infiltration in Patients Undergoing Modified Radical Mastectomy- A Prospective Randomized Study

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ABSTRACT

Background: Breast cancer is common in developing countries. Surgery is the mainstay of the treatment in breast cancers. Paravertebral block (PVB), pectoral nerve (pecs) block and local anaesthetic (LA) infiltration are three modalities for post operative analgesia following breast surgery. **Aims & objective**: This study compares the analgesic efficacy of PVB and LA infiltration techniques for post operative analgesia in modified radical mastectomy (MRM). **Materials & Methods**: This prospective study was conducted in Department of Anesthesiology NSCB Medical College, Jabalpur (M.P). We have enrolled 60 patients divide into two Group (30 each), Group A received general anaesthesia along with PVB and Group B received local anaesthetic infiltration. We have compared post operative analgesic efficacy of both the groups. **Results:** Out of total 63.3% of patients belong to 41-50 years age group. The post operative visual analogue scale scores were lower in PVB group compared with LA group. PVB provide longer duration of analgesia (Mean 42.53 +/- 23.59 h) with lesser rescue analgesic consumption up to 24 h as compared to LA group.

Conclusion: Paravertebral block provides better analgesia, reduces post operative pain scores and decreases demands for rescue analgesics in the first 24 h of post operative period compared to local anaesthetic infiltration.

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Key words: Paravertebral block (PVB), local anaesthesia (LA), post-operative pain, modified radical mastectomy (MRM)
Study Design: Prospective Randomized Study.

1. INTRODUCTION

Breast cancer is the most common female cancer worldwide, according to statistics by World Cancer Research Fund in 2018. Consequently, mastectomy is one of the most common oncological surgeries performed in women around the world [1,2]. Breast surgery is frequently associated with post operative nausea and vomiting (PONV), pain, and painful restricted movements, which reduces the quality of life [3]. Many different modalities were used for pain control is usually provided with a combination of oral and intravenous analgesics, in addition to local and regional techniques such as local anesthetic infiltration, intercostal block, paravertebral block and thoracic epidural anesthesia [4]. Adequate pain relief can help improve the quality of recovery [2] and reduce the risk of chronic post operative pain [5]. Thoracic paravertebral block (PVB) has been considered the gold standard for analgesia for breast cancer surgery. PVB has the potential to offer long lasting pain relief because it can uniquely eliminate cortical responses to thoracic dermatomal stimulation. Recently, PVB has been used for post operative analgesia as well as sole anesthetic in patients undergoing breast surgery by several workers [6,7]. Benefits of PVB include a reduction in PONV, prolonged post operative pain relief, and potential for ambulatory discharge it has also found to be effective in preventing chronic pain following mastectomy and it has been suggested that the risk of recurrence or metastasis is reduced in patients undergoing radical mastectomy (MRM) for breast cancer under PVB [8]. Regional anaesthesia has emerged as an important adjunct in improving patient care and satisfaction [9]. Local anaesthetic infiltration is a very old and proven method for analgesia. Its use is associated with a decrease in opioid requirement. Patients receiving local infiltration for thoracotomy have better respiratory outcomes. Continuous infusion of local anesthetic at the incision site following MRM has been found to be useful [10].

Our main objective of the study is to compare the efficacy and post operative outcomes of paravertebral block and local anaesthetic infiltration in modified radical mastectomy.

2. MATERIAL & METHODS

The present study was conducted in Department of Anesthesiology NSCB Medical College, Jabalpur (M.P).
After getting approval from institutional ethics committee a total 60 enrolled patients underwent thorough pre anaesthetic assessment including detailed history, clinical examination and necessary investigations depending upon associated disease. A detailed informed consent was taken from all the patients.

Inclusion criteria

Adult patients aged between 18-70 yrs.

ASA I and ASA II physical status.

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Exclusion criteria

Bleeding disorders.

Allergy to amide type local anesthetics.

Infection at the thoracic paravertebral injection site.

Pregnancy or breast feeding females.

Psychiatric disorders.

60 Patients were randomly allotted in two groups, containing 30 patients in each group. **Group A:** Patients in group A received general anaesthesia along with ropivacaine 0.5% (0.3ml/kg) with fentanyl 25 mcg in thoracic paravertebral block. **Group B:** Patients in Group B received local anaesthetic infiltration of ropivacaine 0.2% (0.5 ml/kg) post operatively through drains, For post operative analgesia in modified radical mastectomy.

Both the group was compared on the basis of following outcomes:

1. General characteristics (age & weight)

2. Post operative pain: Visual analog score (VAS) score was used to assess the pain scores[11]

3. Duration of analgesia and total consumption of rescue analgesic agent

4. Post operative nausea and vomiting (PONV)

5. Patient satisfaction score at 24 h (Very unsatisfied/Somewhat satisfied/Acceptably satisfied/Very satisfied)

Data was analysed using SPSS software and a p value of <0.05 was taken as, statistically significant.

In the study Group A general anaesthesia along with paravertebral block (ropicacaine 0.5%, 0.3 ml/kg with 25 microgram fentanyl) were given. In Group B total volume of drug 0.5 ml/kg of 0.2% ropicacaine was divided in equal volume and given through each drain. After instillation of the drug, drains were clamped for 10 minutes. After a dwell time of 10 minutes the clamp was released to allow the drug into the negative pressure suction drain. Patient was transferred to the Post anaesthesia care unit (PACU) for further monitoring. Pain score at '0' h was noted after extubation and subsequently every 4th h for 12 h then for next 12 h for total 24 h. Post operative pain was assessed by VAS using a 10 cm VAS scale. If the VAS exceeded '4' at any point of time rescue analgesic with injection tramadol 1mg/kg intravenous was given and study terminated at that time.

The duration of analgesia was defined from the time of instillation of the LA for group B and from applying PVB with general anaesthesia for group A, to the time for the first demand of analgesia.

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The number of demands and the total cumulative analgesic requirement was noted for 24 h.

3. RESULTS

Both the groups were comparable in terms of age, weight and other demographic parameters.

The outcome of each group was evaluated after surgery on certain criteria's.

Table 1: Distribution Based on Age Group

Age Group	Groups			
	A		B	
	N	%	N	%
Upto 20 yrs	3	10.0%	1	3.4%
21 - 30 yrs	3	10.0%	5	16.6%
31 - 40 yrs	8	26.7%	6	20%
41 - 50 yrs	10	33.3%	9	30%
51 - 60 yrs	6	20.0%	4	13.4%
61 - 70 yrs	0	0.0%	5	16.6%

Mean +/- S.D.	**40.97+/-12.69**	**42.53+/-13.21**

P value= >0.05 (statistically not significant)

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Table 2: Weight wise distribution of both the groups

Weight (Kg.)	Groups			
	A		B	
	N	%	N	%
upto 40 kg	3	10.0%	5	16.7%
41 -50 kg	19	63.3%	15	50%
51 - 60 kg	8	26.4%	9	30.0%
above 60 kg	0	0.0%	1	3.3%
Mean $\pm$ Sd	48.9 $\pm$ 5.762		50.1 $\pm$ 6.645	

P value= >0.05 (statistically not significant)

Table 3: Comparison of median on visual analogue scale (VAS)

VAS score (at hours)	Group	
	Group A	Group B
	Median VAS score	Median VAS score
0	2	0

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2	2	1
4	2	1
8	2	1
12	2	4
24	3	8

P value= >0.05 (statistically not significant)

Pain score was high on visual analogue scale among PVB group as compared to LA group in first 12 h after surgery and it was statistically insignificant. In next 12 h, the score was High among LA group as compared to PVB group.

Table 4: Comparison between times duration of analgesia

Duration of analgesia	N	Mean + S.D. (In Hrs)	Comparison between the groups
Group A	30	42.53+13.59	P<0.005 (Significant)
Group B	30	12.8 ±1.63	

Duration of analgesia is significantly prolonged in PVB group as compared to LA group.

P value < 0.05

Table 5: Comparison of Rescue analgesic consumption within 24 hours

Analgesia consumption	**No.**	**Mean+/ - sd**	**P value**
Group A	**30**	**55.2**	**0.001**
Group B	**30**	**87.4**	

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LA group required more analgesic consumption than PVB group.

Table 6: Comparison of post operative nausea and vomiting (PONV)

PONV	Group A	Group B
No	28 (93.1%)	27 (90%)
Yes	2 (6.9%)	3 (10%)
Total	30	30

P value > 0.05% (statistically not significant)

Post operative nausea and vomiting was more in PVB group as compared to LA group. But it was statistically insignificant.

4. DISCUSSION

The study compared the two techniques (PVB and LA) for providing analgesia after MRM.
The major drawback of PVB is that this technique require technical skill and may be associated with some serious complications like: vascular puncture, hypotension, pleural puncture and pneumothorax, has been described in literature after blind PVB[12].

In our study majority of the patients belong to 41-50 years age in both the groups accordance to the Ahmed et al [13] and mean weight were 48-51 kg in both the groups, there was no statistically significant difference was seen in both the groups

Our study observed post operative VAS scores were better (less than 4) in the thoracic PVB group for 24 h compared to the LA groups (P>0.05 not significant). In LA group VAS score is better than PVB group in first 12 h that means post operative analgesia and patient satisfaction was much better than patients of PVB group, and in next 12 h VAS score was much better in PVB group than the LA group. Our finding was comparable with the Kitowski NJ *et al* [15] and Thavaneswaran P *et al* [16].

In present study more tramadol was required in LA group than required in PVB group for rescue of analgesia. LA group patients required more amount of rescue analgesic tramadol as compared to PVB group [14].

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The duration of post operative analgesia was significantly (P <0.05) prolonged in PVB group compared to the LA group patients, similar finding were observed by Syal and Chandel *et al* [17].

Present study found incidence of post operative nausea and vomiting (PONV) was low in PVB as compared to LA group but statistically not significant (P>0.05) which was in concordance with the Bansal *et al* [18].

Overall PVB method is the best analgesic technique as compared to LA group.

5. CONCLUSION

To conclude, PVB with general anesthesia is associated with better post operative analgesia/ patient satisfaction, less post operative pain scores and decreased demand of rescue analgesics in the first 24 h postoperatively. The technique needs expertise in placing the block. Whereas LA infiltration technique has good analgesic efficacy for initial 12 h, without any need of expertise.

Conflict of Interest: None

Financial Support: Nil.

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