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Efficacy of Thoracic Paravertebral Block (TPVB) With 0.125% Bupivacaine By Catheter Technique for Postoperative Analgesia in Breast Surgery

KEYWORDS: Thoracic Paravertebral Block ,0.125% Bupivacaine , Catheter Technique, Breast Surgery

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ABSTRACT *Objective: To study efficacy of Thoracic Paravertebral Block (TPVB) with 0.125% Bupivacaine by Catheter Technique for Postoperative Analgesia in Breast Surgery.*

Methods: This randomized controlled trial was conducted in females admitted in surgery wards for breast surgery of any type in the age group of 18-60 years, in tertiary care hospital in Western Maharashtra in India. Period of study was from January 2008 to December 2009. After obtaining informed consent and informing Visual analogue scale (VAS), cases were enrolled in two groups A and B. Sample size was 30 in each group. Group A received Thoracic paravertebral block by catheter technique with 0.125% Bupivacaine 15 ml single infusion and group B received intra muscular Diclofenac Sodium 75 mg single dose towards end of surgery.

Results: In group A at the end of 1st hour mean Visual Analogue Scale (VAS) was 0 and in group B it was 0.233 with Standard Deviation (SD) of 0.678 with p value of 0.04 which is statistically significant. At the end of 5th hour mean VAS in group A was0.266 and in group B it was 1.13 with SD of 1.43 and p value of 0.007 which is statistically significant.

Conclusions: Thoracic Paravertebral Block (TPVB) with 0.125% Bupivacaine by catheter technique is more efficacious than intramuscular Diclofenac Sodium for postoperative analgesia in breast surgery.

Introduction
Acute postoperative pain is a significant issue for significant issue for surgical patients at large. Effective pain management is associated with patient satisfaction, earlier mobilization, shortened hospital stay and reduced cost. Despite these benefits there are substantial numbers of patients who suffer from postoperative pain. The VHA/DoD Guidelines for the management of postoperative pain is intended to improve the quality of care and facilitate the management of patients with postoperative pain. The guideline focuses on the assessment, diagnosis, treatment, management and follow-up of these patients. [1]

Breast Surgery is a common procedure performed in women [2]. Nearly 60% of breast surgery patients experience severe acute postoperative pain with severe pain persisting for 6-12 months in almost 10% of patients. Interventions for postoperative pain management include both pharmacological (using the main classes of medication: opoids, non steroidal anti inflammatory drugs (NSAIDs), and local anesthetics) and non pharmacological (Cognitive and physical modalities). [3]

Thoracic Paravertebral block (TPVB) is the technique of injecting local anaesthetic adjacent to the thoracic vertebra close to the spinal nerves emerge from the intervertebral foramina. PVBs can be placed in the cervical, thoracic and/or lumbar regions. The blocks can be performed as a single injection technique or a continuous catheter technique. The technique involves anesthetizing the intervertebral nerves as they emerge from the intervertebral foramina. [4]

We report randomized, prospective study comparing thoracic Paravertebral block by continuous catheter technique with 0.125% bupivacaine vs intramuscular diclofenac for postoperative analgesia in breast surgery.

Primary Objective:
To study efficacy of Thoracic Paravertebral Block (TPVB) with 0.125% Bupivacaine by Catheter Technique for Postoperative Analgesia in Breast Surgery.

Secondary Objectives:
1) To compare effects with intramuscular Diclofenac Sodium for relieving post operative analgesia after breast surgery.

Materials & Methods
The present study is randomized controlled trial which was conducted in females admitted in surgery wards for breast surgery of any type in the age group of 18-60 years, in tertiary care hospital in Western Maharashtra in India during the period January 2008 to December 2009. The approval for the study was obtained from institutional ethical committee. Sample size was calculated at 95% level of significance, using prevalence rate of breast surgeries as p=n 16% and taking 7% precision (d). Total number of cases was 60 after fulfilling inclusion criteria. After obtaining informed consent and informing Visual analogue scale (VAS), cases were enrolled equally (30 each) in two groups A and B by computer generated randomized number table.

Pregnant women, women having empyema or kyphoscoliosis, allergy to local anesthetic drug, having systemic diseases (TB, DM,HT) and coagulopathies or with history of previous thoracotomies were excluded.

An informed written consent in local language was obtained from the patients who were enrolled in the study. Eligible patients underwent detailed history ,thorough clinical examination and necessary investigation and finding were recorded in case report form. After taking informed consent and proper counseling about study purpose and

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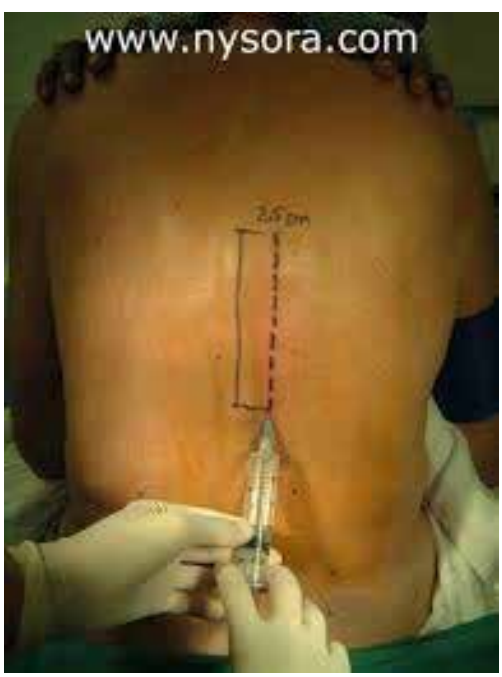
Visual Analogue Scale (VAS) patients in group A received Thoracic Paravertebral Block by catheter technique with 0.125% Bupivacaine 15 ml single infusion and group B received intra muscular Diclofenac Sodium 75 mg single dose towards the end of surgery.

Procedure of giving Bupivacaine by TPVB technique in group A and intramuscular Diclofenac sodium in group B.

The standard technique of space location is by loss of resistance. The patient can be in the lateral (usually with the side to be blocked uppermost) or sitting position. The block is given at T5 dermatomal level. Two to three centimeters lateral to most cephalad part of spinous process; a Tuohy needle as catheter is required is advanced perpendicular to the skin plane. At approximately 2-5 cm, the transverse process should be contacted. Upon bony contact, the needle is reangled inferiorly and advanced 1-1.5 cm untill loss of resistance is appreciated. A click may be appreciated as the costotransverse ligament is penetrated. The thoracic Paravertebral space is usually4-6 cm deep. Epidural catheter no 16 gauge inserted through Tuohy's needle in thoracic Paravertebral space 4-5 cm inside and 15 ml of 0.125% Bupivacaine is given at the time of reversal of neuromuscular blockade in Group A.



Procedure of giving Bupivacaine by TPVB technique

While in Group B, Intramuscular Diclofenac Sodium was given in gluteal region 75 mg single dose at the time of reversal of neuromuscular blockade.

Post operative monitoring and follow up

Patients were monitored for every 5 minutes for initial 30 minutes for immediate postoperative period for onset of pain relief. Subsequently cases were followed up hourly for 5 hours after surgery for analgesic effects of both the drugs using smiley visual analogue pain scale.

Results

The statistical analysis was done by Chi-Square test using SPSS software.

Fig.1- Onset of analgesia in TPVB and Diclofenac groups

Time Points	TPVB						Diclofenac					
	Gr 0	Gr 1	Gr 2	Gr 3	Gr 4	Gr 5	Gr 0	Gr 1	Gr 2	Gr 3	Gr 4	Gr 5
5 Minutes	0	0	0	4	26	0					30	
10 Minutes		25	5			0				2	28	
15 Minutes	30								2	6	22	
20 Minutes									4	26		
25 Minutes								24	6			
30 Minutes							20	6	4			

In Fig., In TPVB group 25 (83%) patients had grade 1 pain at 10 minutes, while in Diclofenac group 24(80%) patients had grade 1 pain at 25 minutes, so onset of action in TPVB group is statistically significant. p value is <0.05 by using chi square test.

Table 2 – Smiley Visual Analogue scale pain score at the end of first hour in TPVB and Diclofenac groups

Smiley Visual Analogue scale pain score at 1st hour	TPVB Group (n=30)	Diclofenac Group (n=30)
0	30	26
1	0	2
2	0	1
3	0	1
4	0	0
5	0	0

Table 2 shows that at the end of 1st hour all 30 (100%) patients were pain free. 26 (87%) in Diclofenac group were pain free while 2 (7%) had pain score of 1 and 1(3%) had score of 2 and 1(3%) of 3, which is statistically significant. p value 0.04

Table 3 – Smiley Visual Analogue scale pain score at the end of second hour in TPVB and Diclofenac groups

Smiley Visual Analogue scale pain score at 2nd hour	TPVB Group (n=30)	Diclofenac Group (n=30)
0	30	26
1	0	2
2	0	2
3	0	1
4	0	0
5	0	0

Table 3 shows that at the end of 2nd hour all 30 (100%) patients were pain free. 25 (83%) in Diclofenac group were pain free while 2 (7%) had pain score of 1 and 2(7%) had score of 2 and 1 (3%) had score of 3 which is statistically significant. p value 0.02. .(Mann-Whitney test)

Table 4 – Smiley Visual Analogue scale pain score at the end of third hour in TPVB and Diclofenac groups

Smiley Visual Analogue scale pain score at 3rd hour	TPVB Group (n=30)	Diclofenac Group (n=30)
0	29	24
1	1	3
2	0	2
3	0	1
4	0	0
5	0	0

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Table 4 shows that at the end of 3rd hour 29 (97%) patients were pain free and only 1(3%) had score of 1. 24 (80%) in Diclofenac group were pain free, while 3 (10%) had pain score of 1 ,2(7%) had score of 2 and 1 (3%) had score of 3 which is statistically significant. p value 0.04. .(Mann-Whitney test)

Table 5 – Smiley Visual Analogue scale pain score at the end of fourth hour in TPVB and Diclofenac groups

Smiley Visual Analogue scale pain score at 4th hour	TPVB Group (n=30)	Diclofenac Group (n=30)
0	28	21
1	2	4
2	0	2
3	0	2
4	0	1
5	0	0

Table 5 shows that at the end of 4th hour 28 (93%) patients were pain free and only 2(7%) had score of 1. 21 (70%) in Diclofenac group were pain free, while 4 (13%) had pain score of 1 ,2(7%) had score of 2 ,2 (7%) had score of 3 and 1 (3%) had score of 4, which is statistically significant. p value 0.016. .(Mann-Whitney test)

Table 6 – Smiley Visual Analogue scale pain score at the end of fifth hour in TPVB and Diclofenac groups

Smiley Visual Analogue scale pain score at 5th hour	TPVB Group (n=30)	Diclofenac Group (n=30)
0	25	17
1	3	3
2	1	5
3	1	3
4	0	2
5	0	0

Table 6 shows that at the end of 5th hour 25 (83%) patients were pain free and only 3(10%) had score of 1, 1(3%) had score of 2 and 1 (3%) score of 3, while 17(56%) in Diclofenac group were pain free, while 3 (10%) had pain score of 1 ,5(16%) had score of 2 ,3 (10%) had score of 3 and 3 (6%) had score of 4, which is statistically significant. p value 0.007.(Mann-Whitney test)

Discussion

In this study, we found that giving Bupivacaine by TPVB technique for postoperative analgesia in breast surgery patients is superior to intramuscular Diclofenac sodium in terms of duration of onset and pain reduction. These results are consistent with the study by Stephen M klein 2000, which quoted that PVB provides improved analgesia during first 24 hours after breast surgery when compared with general anesthesia.

Even after extensive literature review we do not came across comparative study between TPVB and intramuscular Diclofenac Sodium for reducing postoperative pain after breast surgery.

Conclusion

From the results of this study, we have concluded that

1. Thoracic Paravertebral Block (TPVB) with 0.125% Bupivacaine with catheter technique is more efficacious than intramuscular Diclofenac Sodium for post operative analgesia in breast surgeries.

2. In TPVB group, onset of pain relief was earlier and better quality of analgesia was present than Diclofenac group.

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Contribution- Mr.S.Agrawal statistician dept of Community Medicine conceptualized the study and supervised the statistical analysis.

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