

## Comparative Study of Epidural Bupivacaine with Buprenorphine, Pentazocine and Tramadol for Post Operative Pain Relief

Bharat Verma<sup>1</sup>, Amrita Nidhi<sup>2</sup>

<sup>1</sup>Assistant Professor, Department of Anesthesia, GMC, Datia

<sup>2</sup>Assistant Professor, Department of Anatomy, MLB Medical College, Jhansi

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Corresponding author: Dr. Bharat Verma

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### Abstract

**Introduction:** Pain is also old as evolution of life. All the definition of pain seems to be incomplete it cannot be defined completely. It is subjective sensation which varies individual. To make whole world pain free, medical research is continuing.

**Objectives:** To evaluate duration of analgesia, analgesic efficacy, and safety profile of two groups of drugs-epidural butorphanol with bupivacaine and epidural tramadol with bupivacaine.

**Materials and Methods:** A prospective, randomized controlled, double-blinded study was undertaken in 100 patients scheduled for major abdominal surgeries. Group B received epidural buprenorphine .3 mg + bupivacaine 0.125% first dose and subsequent doses, butorphanol 1 mg + bupivacaine 0.125% (total volume 10 ml). Group T received epidural tramadol 2 mg/kg + bupivacaine 0.125% first dose and subsequent doses, tramadol 1 mg/kg + bupivacaine 0.125% (total volume 10 ml).

**Results:** Visual analog scale better with buprenorphine group than tramadol ( $0.12 \pm 0.332$  and  $0.84 \pm 0.746$  for Group B and Group T) at 30 min after first dose. Onset of action ( $8.44 \pm 1.158$  min in Group B and  $12.80 \pm 1.354$  min in Group T) faster with butorphanol but duration of analgesia longer with tramadol ( $5.92 \pm 0.76$  h in Group B vs.  $7.68 \pm 0.76$  h in Group T). Sedation was seen in patients with butorphanol group. Nausea and vomiting more frequent with tramadol group.

**Conclusions:** Epidural tramadol with antiemetic is better than buprenorphine and pentazocine for its longer duration in ambulatory surgery, elderly patients, obese patients, and suitable high-risk patients.

**Keywords:** Buprenorphine, Epidural, Tramadol

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### Introduction

Pain is also old as evolution of life. All the definition of pain seems to be incomplete it cannot be defined completely. It is subjective sensation which varies individual. To make whole world pain free, medical research is continuing. Various methods have been developed to get rid of pain [1,2].

Surgical pain seems to be more intense after surgery, which involves opening the thoracic and abdominal cavities, because the respiratory muscles are constantly causing movement of the injured part, but major orthopedic procedures can also be extremely painful, pain after surgery is usually sever for

only the first 48 hours or so, in this period it is usual parenterally. Epidural block can produce a patient who is pain free, relaxed and able to cough up sputum well than a patient who is receiving a conventional analgesic regimen with drugs provided, of course there is no motor paralysis affecting the muscles of respiration [3,4]. Post operative pain following abdominal and thoracic operations was relieved by lignocaine with the disadvantage of tachyphylaxis [5].

The present study is done to evaluate the degree and duration of pain relief with Buprenorphine/Tramadol or Pentazocine when given epidurally in single dose in conjunction with Bupivacaine to patients undergoing abdominal and major orthopaedic lower limb surgery.

### Materials and Methods

The present study was carried out on 100 patients admitted in various surgical wards of M.L.B Medical College and Hospital, Jhansi.

**Selection of Cases:-** The patient of either sex selected for study were between the age group of 21-60 years of ASA grade 1 and 2, undergoing elective abdominal, perineal or lower limb surgery from faculty of general surgery, orthopaedics and obstetrics and Gynaecology.

After thorough pre-anaesthetic check up patient were subjected to routine and special investigations, if required. Uncooperative patients and patients having Local infection, neurological disorder or who have any contra-indication to epidural anaesthesia were excluded from the study.

The patients were explained, the procedures and possible risks and complications, and an informed consent was obtained. They demonstrated how to breathe, into the mouth piece of wright's peak expiratory flow meter. Sensitivity test for bupivacaine was done.

Drugs used for epidural anaesthesia:  
Bupivacaine

Drugs and for Post op-analgesia:-

1. Buprenorphine
2. Pentazocine and Tramadol

These patients were allocated randomly to four groups as follows:-

Group A- Bupivacaine 0.5%

(Control cases)

Group B- Bupivacaine 0.5% + Buprenorphine 0.3 mg

Group C- Bupivacaine 0.5% + Pentazocine 20mg.

Group D- Bupivacaine 0.5% + tramadol 100 mg.

### Premedication

Each patient received 10 mg diazepam orally a night before surgery and atropine 0.6mg intramuscular one hour before operation. No sedative, narcotics drug was given pre-intra or post operatively except by epidural injection.

The patients were re-examined before introduction of epidural block. Pulse rate, blood pressure, respiratory rate and mean of three readings of peak expiratory flow rate (by wrights' peak expiratory flow meter) were recorded. Each patient were pre loaded with crystalloid intravenous fluid (500-1000 ml)

### Technique of epidural block

Patients were placed in lateral position after establishing an intravenous line with 18 gauge I.V. canula. Taking all aseptic precautions epidural space was located at L2-3 or L3-4 intervertebral space, with the help of Tuohy's needle. Method used for detection of space was withdrawal of hanging drop of saline on hub of needle (Gutierrez's sign), (Gutierrez, 1992). 1ml of 0.5% bupivacaine was injected as a test dose. After 5 minutes 13-18 ml of 0.5% bupivacaine with or without drug was injected. Skin puncture was sealed with tincture benzoine and patient was

put in supine position. After the block was established surgery was allowed to proceed [5].

### Measurement/ Assessment

The pre post operative evaluation was done. During operation pulse, blood pressure, respiratory rate and duration of surgery, recorded. Onset of analgesia assessed at 5, 10, 20, and 30 minutes after epidural injection. Time of complete block and level of block were noted. (by pin prick method.) Assessment of pain and pain relief was analysed by present pain intensity (PPI)

### Present pain intensity (PPI) index

Present pain intensity (PPI) recorded as a number from 1 to 5, in which each number is associated with the words mild, discomfort, distressing, horrible and excruciating.

#### PPI

1. No pain
2. Mild
3. Discomforting
4. Distressing
5. Horrible
6. Excruciating

### Results

**Table 1: Age wise Distribution of Patient in Each Group**

Age In Years	Groups				Total Nos.
	A Bupivacaine N=25 No. %	B Bupivacaine N=25 No. %	C Bupivacaine N=25 No. %	D Bupivacaine N=25 No. %	
21-30	10 40	9 36	8 32	9 36	36
31-40	8 32	9 36	11 44	10 40	38
41-50	4 16	5 20	3 12	4 16	16
51-60	3 12	2 8	3 12	2 8	10
Total	25 100	25 100	25 100	25 100	100
Mean $\pm$ S.D.	35.4 $\pm$ 2.04	35.6 $\pm$ 1.79	35.44 $\pm$ 2.07	35.16 $\pm$ 1.85	

As per table 1 age wise distribution of study participants is seen. Most common age group was found to be 21- 30 years with mean age was 35.4 years.

**Table 2: Sex, Mean Weight and Duration of Surgery in Each Group**

Groups	Sex Ratio M:F	Mean Average Weight (kg) $\pm$ S.D.	Duration of Surgery (min) Mean $\pm$ S. D.
A (n=25)	14 : 11	49.22 $\pm$ 2.28	46.00 $\pm$ 4.62
B (n=25)	15 : 10	53.82 $\pm$ 2.61	44.84 $\pm$ 4.34
C (n=25)	13 : 12	50.70 $\pm$ 2.32	45.46 $\pm$ 4.90
D (n=25)	14 : 11	53.48 $\pm$ 2.46	44.74 $\pm$ 4.72
Total	56 : 44		

As per table 2 the study was male preponderance. With Male: Female ration was 56:44. Mean weight was 49.15 kg and mean duration of surgery was 45.64 minutes.

**Table 3: Distribution of Operative Procedure in Each Group**

S. No	Operative Procedures	Groups				Total
		A (Bupivacaine) n=25	B (Bupivacaine) n=25	C (Bupivacaine) n=25	D (Bupivacaine) n=25	
1.	Abd. Hysterectomy	2	3	2	3	10
2.	Appedicectomy	3	3	3	3	12
3.	Cystolithotomy	1	2	3	-	6
4.	Debridement	-	2	2	-	4
5.	Fothergill repair	6	2	2	-	4
6.	Herniorrhapy	2	-	4	2	8
7.	Hysterotomy	-	3	-	-	3
8.	Laparotomy	1	4	1	-	6
9.	Nephrectomy	4	1	2	1	8
10.	Ovariectomy	-	-	-	2	2
11.	Plating tibia	-	1	1	-	2
12.	Prostatectomy	2	2	2	6	12
13.	Prosthesis femur	1	1	1	-	3
14.	Pyelolithotomy	-	1	2	1	4
15.	Sequestrectomy	2	-	-	3	5
16.	Vag. Hysterecotomy	1	-	-	2	3
Total		25	25	25	25	100

As per table 3 the most common operative procedure was Appendicectomy and prostatectomy. Overall 16 operative procedures were done.

**Table 4: Onset of Analgesia in each Group**

Time Interval (Min.)	Groups							
	A		B		C		D	
	N=25	No. %						
0-10	5	20	4	16	6	24	7	28
11-20	20	80	21	84	19	76	17	28
21-30	-	-	-	-	-	-	-	-
Mean Onset $\pm$ S.D.	14.08 $\pm$ 1.71		13.84 $\pm$ 1.63		13.46 $\pm$ 1.83		13.36 $\pm$ 1.63	

As per table 4 the onset of analgesia is mostly from 11-20 minutes and it was earliest in Group D and it was statistically significant.

### Discussion

Opioids as epidural adjuvants to LA improve the quality of the block and provide a dose-sparing effect. Butorphanol is a synthetic, lipid-soluble opioid with strong kappa-receptor agonist activity. Kaur *et al* [2] compared epidural butorphanol and fentanyl as adjuvants to bupivacaine in the lower abdominal surgery. They concluded that with the addition of butorphanol to bupivacaine, the duration of analgesia was found to be 7.64  $\pm$  1.41 hours.

Bhagwat [3] reported duration of analgesia with 1mg of epidural butorphanol to be around 4 hours. Gupta [6] reported duration of 5.35  $\pm$  0.292 hours with 2mg of epidural butorphanol. Various studies using epidural butorphanol for post-operative analgesia have reported the duration of analgesia to be 4-6 h, 5 h and 5.35 h with 0.5mg, 1mg, and 2mg and respectively [7-9].

The pain scores as assessed on the VAS were low and remained low for a significant time in the post-operative period with epidural butorphanol. The quality of analgesia as assessed by VAPS was excellent in 75% and good in 25% of patients. This correlates with

other studies on epidural butorphanol [2,3,10,11].

None of the patients developed respiratory depression consistent with other studies. Although no clinical evidence of respiratory depression with epidural butorphanol has been reported thus far, a transient depression of the carbon dioxide response curve was observed by Bharti after 1.5 hours in patients receiving two to 4 mg of epidural butorphanol [7]. Ackerman [12] showed that 60% of patients receiving epidural morphine and 46.7% of patient receiving epidural fentanyl developed pruritus as compared with only 6.7% of patients in the epidural butorphanol group.

### Conclusions

Buprenorphine given by epidural route of the administration in the doses of 0.3 mg are effective in producing sufficient intensity of analgesia for sufficient length of time which covers intra-operative as well as immediate post-operative period without any undesirable side effects of clinical significance.

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