



## The Comparative Study of Injection Bupivacaine 0.5% Vs. injection Tramadol + Injection Bupivacaine 0.5% in Caudal Epidural Anesthesia in Infraumbilical Surgeries in Paediatric Patients

## KEYWORDS

caudal epidural, Tramadol, postoperative analgesia

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**ABSTRACT** Aims and objectives of this study are to compare

- 1) The rapidity of onset of sensory blockade.
- 2) Duration of analgesia.
- 3) The rapidity of onset of motor blockade.
- 4) Duration of motor blockade.
- 5) Complications if any.

This study was conducted to see the effect of Tramadol when used along with Bupivacaine for Caudal epidural block, regarding onset and duration of analgesia, motor blocked and complications. Total 60 cases of 2 to 12 years posted for infraumbilical surgeries were randomly divided in two groups. Patients from group I (Control Group) were received inj. Bupivacaine 0.25% caudally and group II (Study group) were received inj. Bupivacaine 0.25% + Inj. Tramadol 2 mg/kg. In both group the total volume used was 1ml/kg. Onset of analgesia in Bupivacaine group was (11.0 + 1.1 min) and in Bupivacaine + Tramadol group was (10.2 + 1.1 min), which is not significant statistically. While the duration of analgesia in Tramadol + Bupivacaine was significantly prolonged (10.9 + 0.9 hrs) as compared to plain Bupivacaine group (6.74 + 0.8 hrs).so addition of Tramadol to the local anesthetic solution to be injected in caudal block significantly increases the duration of analgesia without increasing the complication

**INTRODUCTION**

Alleviating pain in children is one of the most exciting and rewarding professional activity<sup>1</sup>. The work 'Pain' is derived from the Latin word 'PONEA' meaning punishment.

Pain is best defined as, 'an unpleasant sensory and emotional experience associated with actual or potential damage of described in terms of such damage'<sup>2</sup> Pain will also affect the psychological development especially in pediatric patients.<sup>2</sup>

In case of pediatric patients, caudal epidural block has been used as a preferable technique of regional anesthesia<sup>3</sup> for infraumbilical surgeries<sup>4</sup>. for many years. Caudal block is considered to be safe, simple and reliable technique for pediatric patients<sup>5</sup>. Also it has added advantage of postoperative analgesia. When only the local anesthetic drugs are used the duration of postoperative analgesia is limited<sup>6,7</sup>. So various drugs have been studied for central neuroaxial blockade along with local anesthetic drug alone, to improve the operative conditions and to prolong the duration of postoperative analgesia and to reduce the complication rate.

In present study, we have used injection Tramadol along with Bupivacaine for Caudal epidural block to study the intra operative and postoperative condition. Finally we believe what Francis Bacon (1561-1626) has said, 'esteem it the office of physician not only to restore health but to mitigate pain and dolors.'

**MATERIALS AND METHODS:-**

Total 60 cases, aged 2 to 12 years were studied. They were randomly divided in to two groups as, Group I and II

**Group I:** (Control group) received 0.25% Bupivacaine

**Group II:** (Study group) received 0.25% Bupivacaine + Inj Tramadol 1 mg/kg. Total volume for caudal block being 1 ml/kg in both groups.

**Selection of patients:**

- 1) ASA I and II
- 2) Age group 2\_ 12 years
- 3) Weight < 20kg.
- 4) Investigations:
  - 1) HB %
  - 2) BT, CT
  - 3) Urine Albumin and Sugar

Other investigation as per the need of case.

**Exclusion criteria:**

- 1) Local skin infection at the site of sacral hiatus.
- 2) Refusal by parents and patients.
- 3) Bleeding tendencies.
- 4) Major malformation of sacrum.
- 5) Previous history of convulsive disorder.
- 6) Vertebral osteoarthropathy.

**Surgeries done under Caudal Block:**

- 1) Herniotomy
- 2) Circumcision
- 3) Cystolithotomy
- 4) Repair of CTEV
- 5) Femur sequestration.

Informed written consent of parents was taken. Anesthesia machine and all the resuscitation trolley was kept ready. Before taking in operation theater, patients were premedicated with inj. ketamine 5 mg/kg IM, in preanesthesia room, keeping the resuscitation trolley ready. After the patient became calm, IV access was taken with appropriate

Intracath. Patient was shifted in operation theatre and then Inj. Glycopyrolate 4 mcg/Kg and inj. Midazolam 0.03 mg/kg IV was given. Pulse oximeter and NIBP cuff were applied Baseline Pulse, Blood pressure, Respiratory rate and SpO<sub>2</sub> were recorded.

Drug doses used were 1 ml/kg, according to Armitage formula<sup>8</sup> with maximum drug volume of 20 ml. The total amount of drug was injected over 60 to 90 seconds. After completing the procedure of Caudal block, patient was made supine with slight head up position approximately 5 to 10 deg.

#### Observations noted:

- 1) Onset of sensory block.
- 2) Duration of analgesia.
- 3) Onset of motor block.
- 4) Duration of motor blockade.
- 5) Complications if any

Pulse, Mean Arterial pressure, Respiratory rate, SPO<sub>2</sub> was noted every 5 min up end of surgery. Then every 15 min for 2 hrs. Then 1 hourly till wearing off of analgesic effect.

Onset of sensory block was noted as the time from injection of drug to loss of response to pin prick over suprapubic area.

Onset of motor block was noted as time from injection of drug to loss of lower limb movement to pin prick above the umbilical area.

Duration of analgesia was noted as the time from injection of drug to first complaint of pain by patient or parent or cry.

Duration of motor block was noted as the time from injection of drug to regaining of lower limb movement, spontaneously during surgery or to pin prick stimuli.

The table 1 and 2 show the demographic data of patients, and are comparable in both the groups.

#### RESULTS:-

**TABLE 1**

	Gr. I Bupivacaine	Gr. II Bupivacaine + Tramadol
Male	28	29
Female	2	1
Total	30	30

**Table 2**

Age (In years)	Gr. I Bupivacaine	Gr. II Bupivacaine + Tramadol
2 to < 6	21	18
>6 to < 10	7	8
> 10 to 12	2	4
Total	30	30

The onset of sensory and motor block and the duration of analgesia and motor block are as shown in table 3

**TABLE 3**

parameters	Bupivacaine	Bupivacaine + Tramadol	P value
Average onset time for sensory block(min)	11.0 ± 1.1	10.8 ± 1.1	P > 0.05
Average onset time for motor block(min)	15.33 ± 1.1	14.86 ± 1.0	P > 0.05
Average duration of analgesia in hrs.	6.74 ± 0.8	10.9 ± 1.9	P < 0.05
average duration of motor block( minutes)	62.4 ± 2.9	63.7 ± 3.2	p > 0.05

27 (90%) cases from Bupivacaine group have analgesia for 5 to 8 ½ hrs. 3(10%) cases from Bupivacaine group have analgesia for 8 ½ to 12 hours. While 28 (93.33%) cases from Tramadol + Bupivacaine group has duration of analgesia from 8 ½ to 12 hr.

Two cases from Bupivacaine + Tramadol group have analgesia lasting more than 12 hrs. i.e. 13 and 14 hours respectively.

The average duration of analgesia was 6.74 ± 0.8 hours in Bupivacaine group and 10.9 ± 0.9 hours in Bupivacaine + Tramadol group. Statistically the difference between the groups is highly significant (p < 0.05), indicating that analgesia was of longer duration in Bupivacaine + Tramadol group.

Pulse rate and mean arterial pressure remained within 20% of base line in all patients of both groups.

Table 4 shows post operative complications in both groups.

**Table 4; Complications**

	Bupivacaine	Bupivacaine + Tramadol
Vomiting	2 (6.67%)	4. (13.33%)
Convulsion	0	0
Respiratory Depression	0	0
Purities	0	0
Urinary Retention	0	0

The only complication occurred was vomiting and that was only in 2 cases (6.67%) from the Bupivacaine group and 4 (13.33%) cases from Tramadol + Bupivacaine group. Statistically there is no significant difference in two groups.

#### DISCUSSION:-

Pain is a common human experience as a symptom frequently encountered in clinical practice. It is usually associated with actual or impending tissue damage.

Post operative pain is an acute pain and should be treated adequately to decrease morbidity and hospital stay.

Caudal epidural block is a technique of anesthesia and an-

algia<sup>9</sup>Mainly in pediatric patients. Administration of Bupivacaine in caudal epidural is a standard method for providing analgesia<sup>10</sup> various drugs are studied in combination with Bupivacaine to prolong the duration of analgesia.

In our study, 28 cases (93.33%) in Bupivacaine group and 27 cases (90%) in Tramadol + Bupivacaine group, the onset of sensory block was 11.0 + 1.1 minutes in Bupivacaine group. Statistically the difference is not significant.

Ivani et al <sup>11</sup> studied Ropivacaine and Bupivacaine for Caudal block. Onset of sensory block in Bupivacaine group in their study was 10.4 minutes and in our study it is 11.0 + 1.1 minutes. Our study correlated with their study.

In 27 patients (90%) of Bupivacaine group analgesia lasted for 5 to 8 ½ hours; while in 28 cases (93.33%) of Bupivacaine + Tramadol group it was 8 ½ to 12 hours and in 2 cases analgesia was prolonged and it was 13 hours and 14 hours.

Average duration of analgesia in Bupivacaine group was 6.74 + 0.8 hours. While it was 10.9 + 0.9 hours in Bupivacaine + Tramadol group. Statistically, the duration of analgesia is significantly prolonged in Bupivacaine + Tramadol group. (p<0.05). Thus by adding Tramadol there was an increased in duration of analgesia in post operative period.

Ozkan S. et al <sup>12</sup> compared Bupivacaine with Tramadol in Caudal block for postoperative pain relief. They studied 20 pediatric patient randomized into two groups. After giving General anesthesia, caudal block was given. Patients from Group I in their study received 0.25% Bupivacaine 2 mg/kg while from Group II received 5% Tramadol 2 mg/kg.

They found that pain and sedation score was significantly lower in Tramadol group as compared to Bupivacaine group. Also they reported that duration of analgesia in Bupivacaine group was 6.34 + 0.8 hours. While it was 10.09 + 0.9 hours in Tramadol group.

Sanna et al <sup>10</sup> studied 60 patients. Of age group 13 to 59 months posted for infraumbilical surgery. They compared Caudal Tramadol and Tramadol + Bupivacaine for post operative pain relief. Patients were randomly divided into 3j groups. Patients from group I (B) received inj. Bupivacaine 0.25% as 0.8ml/kg + 1 ml NS, group II (B+T) received inj. Bupivacaine 0.25% as 0.8 ml/kg with inj. Tramadol 2ml/kg in 1 ml While patients from group III (T) were received inj. Tramadol 2.5ml/kg as 0.8 ml/kg + 1ml NS. In group B+T was 16.8 + 5.6 hours and in group T it was 4.2 + 1.5 hours.

A.c. Senel et al <sup>13</sup>, Studied Caudal Bupivacaine + Tramadol for postoperative analgesia in pediatric herniorrhaphy. They studied 60 cases aged 12 to 84 months, undergoing unilateral herniorrhaphy. All patients were randomly di-

vided in 3j groups. Patients from group B received 0.25% Bupivacaine, from group B+T received 0.25 Bupivacaine + Tramadol 1.5 mg/kg and from group T received Tramadol 1.5 mg/kg in NS. Volume of drug in all three groups was 1ml/kg. They found duration of analgesia in group B+T was significantly longer (13.5 + 2.2 hours) than in the other two groups.

All three studies above indicate that Tramadol when added to Bupivacaine for caudal block, increases the duration of analgesia, and our study is comparable with their study. In none of the cases respiratory depression was seen and Spo2 was above 95% in all the cases intra and postoperatively.

In none of the cases the fluctuation was more than 20 from the baseline value. Average change in pulse rate was (-1.3 + 4.4) in Bupivacaine and (-1.3+ 3.5) in Bupivacaine+Tramadol group which is statistically insignificant.

Average change in MAP was (-0.6 + 2.9) and (-0.52 + 2.7) in Bupivacaine and Bupivacaine+Tramadol group respectively, which is statistically insignificant.

Sanna et al <sup>10</sup> in their study found that there were no significant changes in HR and Blood pressure in all three groups, intra and post operatively.

Ozkan S et al <sup>12</sup>, in their study found that there was no significant difference in HR, MAP, SPO2 and RR in Bupivacaine group compared to Bupivacaine + Tramadol group.

Venden berg et al <sup>14</sup>, found the increases in incidence of emesis and nausea after IV administration of Tramadol. This increased incidence in vanden burg study may be due to the IV route of Tramadol. In our study 3 pts had nausea & vomiting.

Sanna et al <sup>10</sup>, in their study observed incidence of emesis in Bupivacaine group was slightly less than (10%) & in Bupivacaine + Tramadol group it was (25%).AC Senel et al <sup>13</sup>, in their study observed that the incidence of nausea and vomiting was not different in Bupivacaine and Bupivacaine+Tramadol group.

#### CONCLUSION:-

Tramadol prolongs the duration of analgesia when given along with Bupivacaine for caudal block in a pediatric patient for lower abdominal surgery without any hemodynamic instability or serious complications.

So, we conclude that 'Tramadol', opioids without any respiratory depressant action, is a useful drug to provide post operative pain relief in a pediatric patient, when given along with Bupivacaine Caudally.

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