



# ORIGINAL RESEARCH PAPER

# Anaesthesiology

## POST OPERATIVE ANALGESIA IN CHILDREN - COMPARISON OF CAUDAL ROPIVACAINE VERSUS CAUDAL ROPIVACAINE WITH TRAMADOL

### KEY WORDS:

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### ABSTRACT

Caudal analgesia is one of the most popular regional anesthetic technique employed in children. Addition of tramadol to local anesthetic agents in caudal block enhances the duration of analgesia with less risk of respiratory depression. To compare stress response (heart rate, blood pressure, respiratory rate and SpO<sub>2</sub>) after epidural administration of caudal Ropivacaine and caudal Ropivacaine mixed with Tramadol. It is a preoperative randomized double blind study done at L.L.R & Associated Hospitals, Kanpur from December 2010 to July 2012 after being approved by ethical committee of the institution. The study included 60 children, of either sex, age group of 5-10 years, ASA grade I and II posted for elective infra-umbilical surgeries. Patients were randomly divided into two groups of 30 each: A 0.2% ropivacaine and B 0.2% ropivacaine(2mg/kg)+ tramadol(2mg/kg). Patients were given general anesthesia followed by caudal block in left lateral Sim's position under strict aseptic condition. Quality of block and hemodynamic parameter were recorded at 5, 10, 15, 30 min and 1, 2, 3, 4, 6, 12 and 24hrs following recovery. Post operative analgesia assessed using CHEOPS scale at 5, 10, 15, 30 min. And 1, 2, 3, 4, 6, 12, 24hrs following recovery. All demographic variables were comparable. Student's unpaired t-test for continuous variables and chi-square test for categorical variables. It is concluded that addition of tramadol to ropivacaine is found to be superior in providing post operative analgesia in comparison to the use of ropivacaine 0.2% alone.

### INTRODUCTION

Pain management is an essential component of care provided by paediatric anesthesiologists. Most obvious, of course, is the integration of a pain management plan into the overall peri-operative plan. The use of regional anesthetic techniques in infants and children has become increasingly accepted as standard of care during final decades of 20th century. Caudal analgesia is one of the most popular regional anesthetic techniques employed in children. It is a relatively simple technique with a predictable level of blockade, and is by far the most common regional technique used in paediatric surgery for lower abdominal, urological and lower limb operations. Addition of tramadol to local anesthetic agents in caudal block enhances the duration of analgesia with less risk of respiratory depression (Prosser DP et al (1997). Though there are many studies showing efficacy of caudal bupivacaine and tramadol for post operative analgesia, there is dearth of literature about efficacy of ropivacaine and tramadol in caudal analgesia. So, more evidence is required before its use can be recommended universally.

### AIM

The present study named "Post operative analgesia in children - comparison of caudal ropivacaine versus caudal ropivacaine with tramadol" has been undertaken to compare Ropivacaine (0.2%) 2mg/kg and Ropivacaine (0.2%) 2mg/kg with Tramadol 2mg/kg as single shot caudal block in infra-umbilical surgeries in children 5-10 years of age with respect to the following parameters:

1. Duration of post-operative analgesia
2. Hemodynamic changes:
3. Incidence of side effects

### MATERIALS AND METHODS

This study was conducted at Lalajpat Rai Hospital, Kanpur from December 2010 to July 2012. The study included 60 children, of either sex, coming for various elective infra-umbilical surgical procedures such as herniotomies, circumcision, orchidopexy, perineal surgeries and minor lower extremity procedures. Inclusion criteria were Age group of 5-10 years, ASA grade I and II and Patient coming for elective infra-umbilical surgeries. Exclusion criteria were ASA grade III and IV, Infection at the site of injection, Coagulopathy or other bleeding diathesis, Congenital abnormalities of lower spine and meninges, Active disease of CNS, Neuromuscular diseases, Severe hypovolemia, Ingestion of aspirin

in the preceding week and history of allergy to local anesthetic

### Methods:

All patients were premedicated with syrup promethazine 1mg/kg once on the night before the surgery and another dose in the morning, 1 hr prior to surgery. An intravenous line was secured and infusion of Ringer's lactate was started and fluid was administered according to the calculated requirements. Inj Atropine 0.02mg/kg was given intravenously. Patients were induced with oxygen, nitrous (50:50) and propofol using Jackson Reis circuit. Patient was gently placed in left lateral Sim's position. After identifying sacral hiatus, caudal block was performed with a 23G hypodermic needle. The patients were randomly divided into 2 groups of 30 each. GROUP A received 0.2% Ropivacaine 2mg/kg. GROUP B received 0.2% Ropivacaine 2mg/kg with Tramadol 2mg/kg. No analgesia was given by any route pre-operatively or intra-operatively. Anesthesia was maintained with oxygen nitrous (50:50) through a face mask with patient on spontaneous ventilation throughout the surgery.

### Monitoring:

Monitoring included, pre-cordial auscultation, pulse oxymetry (SPO<sub>2</sub>), heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), respiratory rate (RR) and ECG, every 4 minutes intra-operatively. The time of caudal block and the duration of surgery were noted.

The SBP, DBP, HR, SPO<sub>2</sub> and were recorded at 5, 10, 15 and 30 minutes, 1, 2, 3, 4, 6, 12 and 24 hrs following recovery of anesthesia.

### Post-operative analgesia:

Post-operative analgesia was assessed by Modified Children's Hospital of Eastern Ontario Pain Scale (mCHEOPS). The assessment was done for a period of 24 hrs after caudal block. A pain score <6 was considered adequate analgesia. If the pain score was 6 or more than 6 for two consecutive intervals of 10 minutes, then supplementary analgesia with rectal paracetamol (15mg/kg) was given. These assessments were made at 1, 2, 3, 4, 8, 12 and 24 hrs after caudal block.

### Side effects:

Patients were monitored for intra-operative and post-operative complications. Nausea and vomiting, Bradycardia,

Hypotension, respiratory depression, urinary retention and sedation.

# STATISTICAL ANALYSIS:

The results of continuous variables are given as mean  $\pm$  SD and proportion as percentage. The difference between the two groups was assessed by student's unpaired t-test for continuous variables and chi-square test wherever applicable. For all the tests a 'p' value of 0.05 and less was considered for statistical significance.

# OBSERVATION

The two groups did not differ significantly with respect to their age, sex, weight, ASA classification. In both the groups the mean baseline heart rate increased at 5 min and gradually decreased at 180 min. The mean baseline systolic blood pressure increased at 5 min and then gradually decreased 180 min in both groups. At all time intervals the p value was greater than 0.05 and hence the differences in systolic blood pressure were insignificant. The mean baseline diastolic blood pressure increased to a maximum at 15 min and then gradually decreased at 180 min in both groups. At all time intervals the p value was greater than 0.05 and hence the difference in diastolic blood pressure were insignificant. The differences in respiratory rate and spo2 between the two groups were insignificant. The mean duration of analgesia in group A was 238 $\pm$ 35.27 with a range of 180-300 and in group B the mean duration of analgesia was 302 $\pm$ 42.62 with a range of 240-380. The difference in the mean duration of analgesia was highly significant with a p value of <0.0001. The sedation score difference was not found statistically significant at any of time intervals. The incidence of vomiting was seen in 2(6%) children in group A against 3(10%) in group B. this was not statistically significant. There was no incidence of hypotension, bradycardia, dural or vessel puncture and respiratory depression in the two groups.

# DISCUSSION

Caudal epidural blockade is one of the most popular regional blocks used in pediatric anesthesia. In our study we used 0.2% ropivacaine (1ml/kg) i.e. 2 mg/kg as dose for caudal analgesia, which provides better quality of analgesia when compared to lower concentrations and preventing unwanted effects like motor block when higher concentration was used. Inj tramadol in dose of 2mg/kg for caudal analgesia as an additive to caudal ropivacaine. This too was very well tolerated and produced significant prolongation of analgesia in group B. without any significant side effects.

There was no significant difference in the heart rates between the two groups at any time interval. Similarly, there was no significant difference in the blood pressure (both systolic and diastolic) between the two groups at any time interval. In the present study, no significant difference in the respiratory rate between the two groups was observed. There were no cases of respiratory depression in patients of either group. Ertugrul F et al; in 2004 did a study for Comparison of caudal ropivacaine and ropivacaine plus tramadol administration for postoperative analgesia in children. There were no any significant changes in hemodynamics and the patients remained stable throughout the observation period, though the duration of analgesia was prolonged significantly on ropivacaine plus tramadol group.

In our study the duration of analgesia was significantly prolonged with the addition of tramadol to ropivacaine thus reducing the frequency of supplementary analgesia administration. This is in agreement with the study of Kerem Inanoglu et al, done in 2010 aimed to compare the effects of ropivacaine alone and ropivacaine plus tramadol administered epidurally for postoperative analgesia in children undergoing major abdominal surgery. The duration of analgesia was significantly longer in group RT than in group R (298.6  $\pm$  28 and 867.9  $\pm$  106.8 min in group I and II, respectively) (P<0.05).

There was no significant sedation in the post-operative period leading to respiratory depression. Complications: In our study, 2 of the children in group A and 3 of them in group B had an episode of vomiting which did not require any treatment except reassurance. The incidence of vomiting was comparable in both the groups, 6%

and 9% in group A and B respectively. The addition of tramadol to ropivacaine in our study, did not result in an increase in the incidence of side effects. The main side-effects of epidurally administered tramadol are bradycardia, hypotension and sedation. In our study, bradycardia or hypotension warranting treatment did not occur.

# Conclusion

We are able to provide sufficient data by our study that mixture of caudal ropivacaine with tramadol significantly increases analgesia effects with minimal side effects. We would strongly recommend this combination although more randomized trials are needed to support our effort.

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