

CAUDAL ANALGESIA IN CHILDREN; COMPARISON BETWEEN BUPIVACAINE AND BUPIVACAINE PLUS TRAMADOL

ORIGINAL
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ABSTRACT... Background: Caudal analgesia with bupivacaine is used commonly for pain relief in children and extradural administration of tramadol seems to be a safe method of analgesia. The aim of the study was to compare the analgesic efficacy of caudal bupivacaine and bupivacaine and tramadol mixture for postoperative analgesia and to observe for the side effects. **Setting:** Department of Anesthesia and Intensive Care Unit, Bahawal Victoria Hospital, Bahawalpur. **Period:** 01-12-2010 to 30-11-2011. **Methods:** Eighty children, aged between 2 to 12 years of age undergoing infra umbilical surgeries were selected for this randomized, controlled trial. They were randomly divided into two groups A and B. Group A (n = 40) received 0.5 ml/kg of 0.25 % bupivacaine and Group B (n = 40) received 0.5 ml/kg of 0.25 % bupivacaine with 1 mg/kg of tramadol as a single shot caudal block. In the postoperative period, duration of analgesia, pain score, nausea, vomiting and side effects were noted and analyzed. **Results:** Patients in both groups were comparable for age and weight. It was observed that the mean duration of analgesia in group A patients was 6.23+0.68 hours while in group B, it was 9.33+0.72 hours (p<0.05). Nausea and vomiting was present in 20% (n=8) patients in group A, while in group B, 27.5% (n=11) had nausea and vomiting in the post operative period (p<0.05). None of the patients in both the groups had complications like motor weakness, urinary retention in the postoperative period. **Conclusions:** The addition of tramadol to bupivacaine in the caudal analgesic technique provides longer analgesia and lesser need for rescue analgesia in the postoperative period compared to bupivacaine alone.

Key words: Caudal analgesia, bupivacaine, tramadol.

INTRODUCTION

Caudal anesthesia is one of the commonly used regional blocks in children. This technique is a useful adjunct during general anesthesia and also for postoperative analgesia after infra-umbilical operations^{1,2}. The quality and level of the caudal blockade is dependent on the dose, volume, and concentration of the injected local anesthetic agent³. Although it is a versatile block, one of the major limitations of the single-injection technique is the relatively short duration of postoperative analgesia. The most frequently used method to further prolong postoperative analgesia following caudal block is to add different adjunct drugs to the local anesthetic solutions⁴.

Over the years, various regional anesthetic procedures have gained popularity for postoperative analgesia because in addition to providing effective postoperative pain relief, they also reduce the requirement of general anesthesia intraoperatively without significant side-effects^{5,6}. Caudal block has proved useful in a variety of infra-umbilical operations in children for providing both intra operative and post operative analgesia. Objective of

the present study was to compare the quality and duration of analgesia, after a single shot caudal block with bupivacaine alone and bupivacaine plus tramadol and thereby to find out whether tramadol can be an effective adjuvant to bupivacaine for providing postoperative analgesia in children undergoing infra-umbilical surgeries.

MATERIALS AND METHODS

After obtaining approval from the hospital ethical committee and parental written informed consent, eighty children aged between 2 to 12 yrs, weighing between 10-30 Kg and of ASA I and II physiologic status were enrolled for the study. The study was conducted in Department of Anesthesia and Intensive Care Unit, Bahawal Victoria Hospital, Bahawalpur from 01-12-2010 to 30-11-2011. These patients were scheduled for infra-umbilical surgeries like herniotomy and penile surgery under general anaesthesia. The patients were randomly allocated in two groups.

Group A received single shot caudal block with 0.25%

bupivacaine 0.5ml/kg and Group B received 0.25% bupivacaine 0.5ml/kg plus tramadol 1mg/kg, after induction of anaesthesia. Any children having allergy to bupivacaine or any contraindication to neuraxial blockade were excluded from the study.

Patients were not given any pre-medication. The patients were induced with sevoflurane and 50% nitrous oxide in oxygen inhalation via face mask. Intubation was facilitated by giving injection Rocuronium 0.6 mg/Kg body weight. After intubation, caudal block was given in right lateral position by a 22G needle under aseptic conditions. Syringes containing an equal volume of 0.25% bupivacaine 0.5ml/kg or 0.25% bupivacaine 0.5ml/kg plus tramadol 1 mg/kg were prepared and given to the investigator who was blinded to the identity of drug(s). He gave the caudal blocks. Then the surgery was continued under general anaesthesia using sevoflurane and nitrous oxide 60% in oxygen.

Intraoperative heart rate, respiratory rate, blood pressure (NIBP) and oxygen saturation (SpO₂) was monitored. After extubation and recovery from general anaesthesia, the patients were shifted to recovery room and their vitals and pain was assessed using a 10-point TPPS score (Table I) by a blinded investigator. The children's pain scores and any side-effects were also noted. Assessment for pain score was done at 2 hrs and then at 4, 6, 8, 10, 12 hr by the same blinded investigator. A pain score of more than 3/10 resulted in administration of rescue analgesia i.e. either intravenous nalbuphine 100 µg/kg or oral paracetamol 20 mg/kg, as deemed appropriate. The time from injection of the caudal block to administering additional analgesia was considered as the analgesia time.

The data was analysed by SPSS version 16. T-test was used to compare variables between the two groups. Chi square test was used for non-parametric data. $p < 0.05$ was regarded as statistically significant.

RESULTS

We enrolled a total of eighty patients in this study, with 40 patients in each group. The mean age of study patients in group A was 6.10 ± 2.45 while in group B, it was 5.75 ± 2.44 years (p -value being 0.74). The mean weight of patients

Table-I. Pain assessment in children: Toddler-Preschool Postoperative Pain Scale(TPPS Score)

Variable	Score 0	Score 1	Score 2
Verbal complaint / cry	None	One Only >once	>once
Groan / Moan / Grunt	None	Once Only	>once Facial
Expression	Neutral	One Grimace	Grimace>1
Restless Motor behavior	None	One episode	> One episode
Rub / touch painful area	None	Once only	?Once

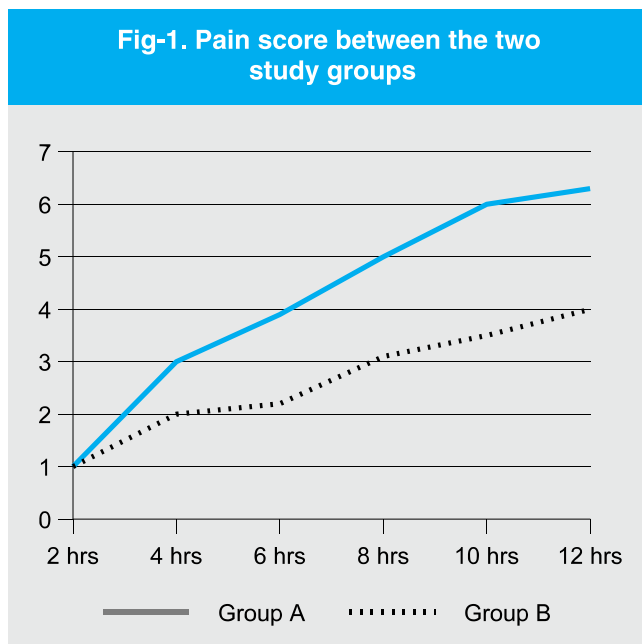
Table-II. Variables between study groups

Variable	Group A	Group B
Age in years \pm SD	6.10 ± 2.45	5.75 ± 2.44
Gender		
Male (n)	31	34
Female (n)	09	06
Weight in kg \pm SD	12.80 ± 4.87	12.68 ± 5.06 kg
Duration of surgery (minutes)	60 ± 14	62 ± 16
Duration of analgesia (hours)	6.23 ± 0.68	9.33 ± 0.72

in group A was 12.80 ± 4.87 while in group B, it was 12.68 ± 5.06 kg (p -value being 0.135). In group A, 77.5% of patients ($n=31$) were male, while 22.5% ($n=9$) were females. While in group B, there were 85% ($n=34$) male and 15% ($n=6$) females. Duration of the surgery in the study groups is shown in table II.

Duration of analgesia in group A patients was 6.23 ± 0.68 hours while in group B, it was 9.33 ± 0.72 hours ($p < 0.05$). Nausea and vomiting was present in 20% ($n=8$) patients in group A, while in group B, 27.5% ($n=11$) had nausea and vomiting in the post operative period ($p < 0.05$). No patient in either group had any other complications like motor weakness, urinary retention in the postoperative period.

Pain score was assessed at 2, 4, 6, 8, 10 and 12 hours after recovery from anesthesia. The mean pain score among the study patients is shown in Fig 1.



While comparing the quality of postoperative analgesia between the two groups it was seen that the Group A started having mild pain after 4 hrs and the pain was significant after 6 hrs while in Group B, the child started having significant pain after 8 hrs which needed analgesic supplementation. When pain score was plotted against time in a graph, it was seen that the score was 0 till 2 hrs after recovery and then started to increase and reached a score of 3 only after 8 hrs in Group B, where as in Group A the pain score started to reach 3 after 4 hrs.

DISCUSSION

Caudal block is the most commonly performed block in children due to ease of performance and reliability⁷. Caudal administration of bupivacaine is a widespread regional anaesthetic technique for intra- and postoperative analgesia during lower limb, anoperineal, penoscrotal and abdominal surgical procedures in children. Tramadol is a centrally acting opioid analgesic, used for the control of moderate to severe pain. The most commonly reported adverse drug reactions are nausea, vomiting, sweating and constipation. Drowsiness is reported, although it is less of an issue

than for opioids^{8,9,10}.

In our study, we found that by adding tramadol 1mg/kg to caudal bupivacaine (0.25%) 0.5ml/kg in children undergoing infra-umbilical operation, significantly increased the duration of pain free period post-operatively. Similar results were reported by Choudhuri et al during a study of children undergoing inguinal hernia repair showed that caudally administered bupivacaine 0.25% plus tramadol 1 mg/kg provided significantly longer duration of analgesia, without an increase in the adverse effects when compared to bupivacaine alone¹¹. Duration of analgesia was (mean±SD) 6.5±4.1 h in the group having bupivacaine only, and 8.5±3.1 h in group Bupivacaine and Tramadol (P <0.05) which is comparable to our results. Gunduz et al¹² in a study on children showed that, caudal administration of bupivacaine with the addition of tramadol resulted in superior analgesia with a longer period without demand for additional analgesics compared with caudal bupivacaine and tramadol alone without an increase of side effects. Khan et al in a study on children with hypospadias repair showed that low dose combination of bupivacaine and tramadol, when administered caudally, had an additive effect and provided prolonged and effective postoperative analgesia with minimal side effects¹³. The risk of toxicity from bupivacaine decreased when combined with tramadol in low doses. Laiq et al also showed that caudal tramadol with bupivacaine provides prolonged and good quality postoperative analgesia compared to plain bupivacaine in children undergoing hypospadias surgery¹⁴.

Mean duration of postoperative analgesia with caudal bupivacaine was 6.3 hrs whereas with addition of tramadol, it increased up to 9.1 hrs, without increasing the dose as well as the side effects of bupivacaine as it was shown in various studies^{5,9,15}. These results are comparable with our present study.

CONCLUSIONS

Our study concluded that caudal administration of tramadol 1mg/kg along with 0.25% bupivacaine 0.5ml/kg significantly increased the duration and quality of postoperative analgesia in children undergoing infra-

umbilical operations, without producing significant adverse effects.

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