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Caudal Bupivacaine vs Bupivacaine plus Tramadol in Post-operative Analgesia in Children

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ABSTRACT

Background: Caudal analgesia with bupivacaine is used commonly for pain relief in children and extradural administration of tramadol seemed to be a safe method of analgesia. The aim of the study is to compare the analgesic efficacy of caudal bupivacaine and bupivacaine and tramadol mixture for postoperative analgesia and to observe for side effects.

Methods: Fourty children, aged between 1- 6 years undergoing infra umbilical surgeries were selected for this randomized, control trial. They were randomly divided into two groups. Group A (n = 20) received 0.5 ml/kg of 0.25 % bupivacaine and Group B (n = 20) 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 heart rate, respiratory rate, pain score, recovery to first analgesic time, total number of analgesics required in 24 hours and side effects were noted and analyzed.

Results: It was observed that the mean duration of pain relief was significantly longer in Group B (8.8 hrs Vs 7 hrs). Nausea and vomiting was observed in 25% of the patients in group B and 20 % of the patients in group A. None of the patients in both the groups had complication 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 analgesic in the postoperative period compared to bupivacaine.

Key words: caudal analgesia, bupivacaine, tramadol

INTRODUCTION

The Society of Pediatric Anesthesia, on its 15th annual meeting at Louisiana, defined the alleviation of pain as a basic human right, irrespective of age, treatment, primary service responsible for the patient care.[1]

Caudal block with bupivacaine is a common anesthetic technique in pediatric anaesthesia.[2] The administration of opioids into the epidural space prolongs the duration of caudal analgesia. Tramadol, a synthetic analogue of codeine, is a racemic mixture of two enantiomers: The (+) enatiomer has a moderate affinity for the μ receptor and also inhibits serotonin uptake, while the (-) enantiomer is a norepinephrine inhibitor.[3] These properties result with an analgesic potency equal to that of pethidine, but without any respiratory depressant effect.[4]

The aim of the study was to compare caudal analgesia with bupivacaine and bupivacine plus tramadol, and asses if tramadol can be effective adjuvant to bupivacine for postoperative analgesia in children undergoing infra umbilical surgeries.

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METHODS

A prospective randomized control trial, single blinded study was conducted at Dhulikhel Hospital, Kathmandu University Hospital from April 2009 to April 2010. Institutional approval was taken. A written informed consent was received from parents. Forty male pediatric patients, ASA grade I, of age group 1- 6 years, scheduled to undergo infraumbilical surgeries like herniotomy and penile surgery under general anesthesia were enrolled into the study. Children in whom caudal block was contraindicated (infection at the site of block, bleeding diathesis, preexisting neurological or spinal disease, or abnormalities of the sacrum) were excluded from the study.

On the day prior to the surgery preoperative visit to the patient was done which included detail history. No premedication was administered. Inhalational induction of anesthesia was done with halothane in oxygen via facemask. Intravenous cannulation was done with 22 gauge cannula. Patients were randomly allocated into two groups. Group A received single shot caudal block with 0.5 ml/kg of 0.25 % bupivacaine and Group B received 0.5 ml/kg of 0.25 % bupivacaine plus tramadol 1 mg/kg after induction of anesthesia. The block was given in left lateral position by a 22 gauge needle under full aseptic precaution. Then the surgery was continued under inhalational anesthesia via mask. Intraoperatively heart rate, respiratory rate, blood pressure and oxygen saturation was monitored. At the end of the surgery, Inhalational agent was discontinued and after recovery from general anesthesia the patient was shifted to PACU (Postanaesthetic Care Unit) and his vitals and pain was scored with reference to six point scale (none/ insignificant pain 1-2; moderate pain 3- 4; severe pain 5 -6) according to the modified pain discomfort scale (Table 1).

Table 1. Modification of pain / discomfort scale

Observation	Criteria	Points
Crying	Not Crying	1
	Crying but responds to tender loving care	2
	Crying and does not responds to tender loving care	3
Posture	No Special posture	1
	Flexing legs and thighs	2
	Holding/Covering incision site	3

In the surgical ward assessment were done every 15 minutes for 30 minutes, hourly for next 5 hours and after 24 hours of recovery from general anesthesia. The time at which first analgesia received (recovery to first analgesic time) and total number of analgesia in 24 hours were recorded. Side effects such as motor weakness (unable to stand unaided after 3 hours from recovery from anesthesia), nausea/ vomiting, urinary retention were observed.

All the data were analyzed by using paired t- test. P value <0.05 was regarded as statistically significant. The statistical analysis were done in statistical package for social sciences (SPSS) version 13 for windows.

RESULTS

Both the groups were comparable for age, weight and operative time with no statistical difference between the two groups as shown by student's t- test (Table 2).

Recovery to first analgesic time was longer in group B than in Group A however it was not statistically significant (Table 3).

Fifty five percent of the patients in Group B did not require any analgesic in 24 hours period, whereas in Group A it was forty percent (Table 4).

Table 2. Patient data and duration of anesthesia

	Group A (mean ±SD)	Group B (mean ±SD)	P value
Age(years)	3.1±1.5	3.2±1.7	0.837
Weight (kg)	10.8±2.6	12.2±2.5	0.101
Surgery Duration (mins)	45.8±3.4	49.5±13.0	0.204

P value < 0.05 is considered to be significant

Table 3. Time interval of caudal and analgesics

Time Interval of caudal and first dose of analgesic (Hrs)	Group A	Group B
No	8	10
5	3	-
6	3	1
7	1	1
8	3	3
9	-	1
10	2	3
12	-	1
Total	20	20

Table 4. Frequency of analgesia administered in 24 hours

Frequency	Group A	Group B
No	8	11
1	5	5
2	6	3
3	1	1
Total	20	20

Table 5. Incidence of adverse effects in two groups

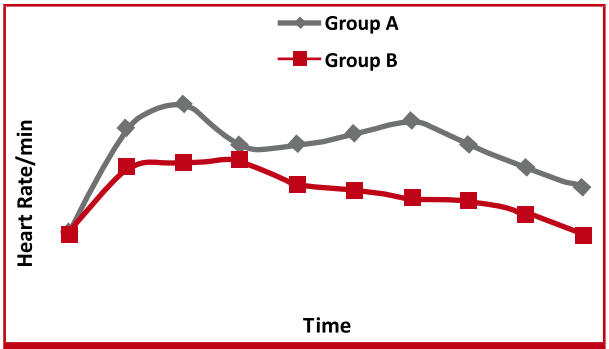
Incidence of adverse effects	Group A	Group B
Motor Weakness	-	-
Urinary Retention	-	-
Nausea and vomiting	4	5

There was no statistically significant difference in heart rate among the two groups in 24 hours postoperative period except at 30 mins, 3 hours, 4 hours and 5 hours interval where it was statistically significant (Figure1).

There was no statistically significant difference in the respiratory rate among the two groups in the 24 hours postoperative period except at 6 and 24 hours interval where it was statistically significant (Figure 2).

There was no statistically significant difference in the level of pain score observed in the 24 hours postoperative among the two groups (Figure3).

Postoperative vomiting occurred in 20 % and 25 % of the patients in Group A and Group B respectively. However other complications like motor weakness, urinary retention were not observed in any of the groups (Table 5).



Figures 1. Heart rate in 24 hours in postoperative period

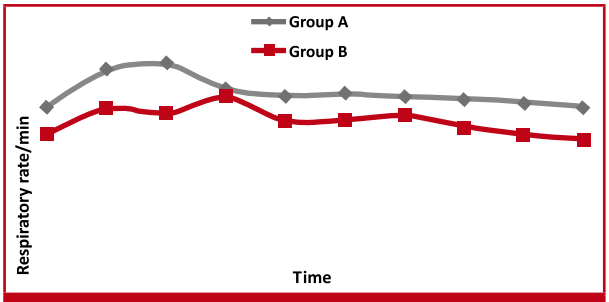


Figure 2. Respiratory rate in 24 hours in postoperative period

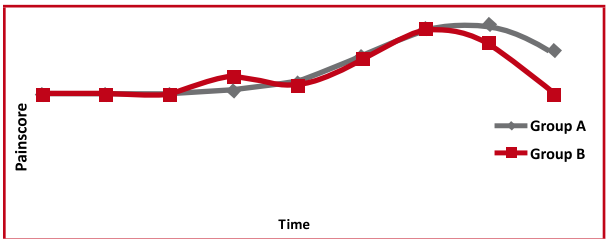


Figure 3. Pain score in 24 hours in postoperative period

DISCUSSION

An important goal of modern anesthesia is not only to provide balanced anesthesia but also to provide quality control of postoperative analgesia. Ease of performance and reliability make caudal block the most commonly performed block in children. Caudal administration of bupivacaine is a widespread regional analgesic technique for intra and postoperative analgesia during infra-umbilical surgeries in children.[2, 5, 6] Several workers have used bupivacaine in combination with a variety of drugs e.g. dimorphine [8], clonidine [8], tramadol [9-12] etc and claimed to achieve longer lasting analgesic when a combination of these drugs were used.

In our study we found that adding tramadol 1 mg/kg to caudal bupivacaine (0.25%) 0.5 ml/kg in children undergoing infraumbilical surgeries, increased the duration of pain free period postoperatively. Similar results were reported by Gunes [13] during a study of children undergoing hypospadias repair showed that caudal tramadol provides better and longer lasting postoperative analgesia than intravenous tramadol. Majority of patients (30 out of 34 patients) receiving tramadol intravenous needed supplementary analgesia, whereas no boys given caudal tramadol required postoperative analgesia during the 24 study period.

The data from Murthy [14] suggested that installation of tramadol in the epidural space appears to act only as a depot for immediate and delayed systemic absorption. It is of interest to note that tramadol is one of the few drugs that is administered in the same dose both epidurally and intravenously.

Senel [10] in a study on children undergoing herniorraphy showed that caudal administration of bupivacaine with the addition of tramadol resulted in superior analgesia with a longer period without demand for additional analgesia compared with caudal bupivacaine and tramadol alone without an increase of side effects.

The most frequently reported side effects of epidural tramadol are nausea and vomiting. We found a mild increase of emesis when tramadol was mixed with bupivacine. Similar results were reported by Senel and colleagues [10] who found that addition of tramadol 1.5 mg/kg to bupivacaine resulted in mild increase in the incidence of emesis.

None of the patients in either group have either motor weakness or urinary retention. Similar results were reported by Prakash [12] in his study on the efficacy of three doses of tramadol with bupivacaine for caudal analgesia in pediatric inguinal herniotomy; but our study is contradictory to the study done by Doda [11] on the comparative study between caudal bupivacaine and bupivacaine plus tramadol where 13.3 % patients in bupivacaine group and 6.6 % patients in bupivacaine tramadol group developed motor weakness whereas the incidence of postoperative urinary retention was 20 % in bupivacaine group and 13.3 % in bupivacaine tramadol group.

Thus, use of tramadol as a caudally administered analgesic along with bupivacaine is a safe and useful alternative to the established opioids.

The small sample size was the limitation of our study.

CONCLUSION

Our study concluded that caudal administration of tramadol along with bupivacaine increased the duration and quality of postoperative analgesia in children undergoing infra-umbilical surgeries, without producing significant adverse effects.

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