

POSTOPERATIVE ANALGESIA;

Comparison of caudal bupivacaine and bupivacaine - tramadol in children with inguinal hernia repair.

Dr. Asma Samee, Dr. M. Shafique Tahir, Dr. Nadeem Ahmad Khan, Dr. Muhammad Masood, Dr. Muhammad Yousaf, Dr. Salman Waris

ABSTRACT... Objective: To compare the effects after caudal bupivacaine alone and bupivacaine-tramadol in young children with inguinal hernia repair. **Setting:** Department of Paediatric Anaesthesia, Children Hospital Complex, Multan. **Period:** August 2008 to May 2009. **Material and methods:** A total of 100 children aged between 2-5 years were included in the study. **Results:** The duration of analgesia was significantly prolonged in group-A patients ($P=0.001$). A low frequency of postoperative vomiting was observed in both groups i.e. 10% in group-A and 6.7% in group-B ($P=0.64$). No respiratory depression, flushing and pruritis were observed. **Conclusions:** Low dose combination of bupivacaine and tramadol, when administered caudally, had an additive effect and provided prolonged and effective postoperative analgesia with minimal side effects.

Key words: Bupivacaine, Inguinal hernia, Tramadol.

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INTRODUCTION

Caudal block is the most common regional anaesthetic technique performed in children¹. It is very reliable, safe and has a low failure rate. It can be used in children with general anaesthesia for intra- and postoperative analgesia in all procedures below the umbilicus including herniotomy, orchidopexy and penile surgeries².

Administration of a single agent for caudal block with a high dose may provide a satisfactory analgesia but may cause side effects i.e. hypertension, respiratory depression etc³. To overcome this problem, two agents with low dose may prove superior in achieving effects i.e. prolonged effect and minimal side effects. Ketamine, clonidine and various opioids have been combined with bupivacaine with varied degrees of success.

Tramadol is a synthetic analogue of codeine that has an analgesic potency approximately equal to that of pethidine but without respiratory depressant effect⁴. It has been shown to be as effective as bupivacaine in providing postoperative analgesia when administered caudally in children⁵.

The aim of this study was to compare the combination of 0.125% (0.6 ml/kg) bupivacaine and tramadol (1 mg/kg) with bupivacaine 0.25% (0.6 ml/kg) administered caudally in young children with inguinal hernia repair for reduction in dose of both agents and extension of the duration of analgesia.

MATERIAL AND METHODS

This study was carried out in the Department of Paediatric Anaesthesia, Children Hospital Complex, Multan from August 2008 to May 2009. A total of 100 children aged between 2-5 years, divided into two groups were included in the study. The patients in group-A received 0.125% bupivacaine 0.6 ml/kg with tramadol 1 mg/kg body weight caudally. Group-B patients received bupivacaine 0.6 ml/kg body weight caudally. Anaesthesia was discontinued after completion of surgery. A modified Toddler preschool postoperative pain scale (TPPPS) is a behavioural pain scale used to assess pain in infants and pre-school children⁶.

RESULTS

During the study period, 100 boys were enrolled. 50 in each group. The demographic features i.e. age and weight of children in both groups are shown in Table-II.

Variable	Score-0	Score-1	Score-2
Verbal complaint/cry	None	1	>1
Groan/moan/grunt	None	1	>1
Facial expression	Neutral	1	Grimace >1
Restless motor behaviour	None	1	>1
Rub/touch/painful area	None	1	>1

Table-I. Modified TPPS pain score

Feature	All patients	Group-A	Group-B	P-value
Age (months)	37.72 ±11.67	38.57 ±12.762	36.87 ±10.61	0.577
Weight (Kg)	17.38 ± 2.38	17.31 ±2.62	17.45 ±2.15	0.831

Table-II. Mean age and weight

The mean duration of analgesia in both groups was compared using modified TPPPS. It was 10.4 + 1.69 hours in group-A and 7.93 + 1.52 hours in group-B (P=0.001).

Mean hourly pain scores were similar upto 5 hours in both groups, but the scores were higher in group-B from 6-10 hours after surgery (P=0.05). In group-A, 56.7% patients did not require rescue analgesia upto 12 hours postoperatively, while in group-B all patients required rescue analgesia within 12 hours. After 12 hours, oral paracetamol was given to all patients who were awake, by ward nurses as a protocol.

There were no significant differences between the groups in mean hourly respiratory rate. Emesis occurred in 3 patients in group-A and 2 patients in group-B with no statistically significant difference (P=0.064). No pruritis and flushing were observed in both groups.

DISCUSSION

Ease of performance and reliability makes caudal block the most commonly performed block in children. 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 children⁷.

Unintentional intravascular injection of bupivacaine during caudal block placement may cause life threatening cardiovascular and central nervous system complications⁸. There have been reports of death attributable to bupivacaine induced cardiotoxicity in adults after accidental I/V injection⁹. Even an epidural test dose containing epinephrine does not reliably produce hemodynamic responses in children during inhalation anaesthesia¹⁰.

To overcome this problem as well as to increase the duration of analgesia, combining local anaesthetic agents with other drugs as adrenaline, clonidine, ketamine or various opioids have met with varying degrees of success^{3,11}.

In this study, caudal block was performed in 60 children, 13-53 months of age, to compare the effects of bupivacaine alone with a low dose combination of bupivacaine with tramadol for inguinal hernia repair. The incidence of failed block is 2.8% in a study done².

The effectiveness of the block was 100% in both groups. In one study, the effectiveness of caudal bupivacaine 0.25% (0.6 ml/kg) was 94% in patients undergoing sub-umbilical surgery¹³. As we used a volume of 1 ml/kg for penile surgery, this much of volume is sufficient to block all the sacral, lumbar and lower thoracic segments¹⁴ and the block regresses slowly.

The duration of analgesia was longer and statistically significant in group-A patients. In a comparative study,

caudal bupivacaine 0.25% (.6 ml/kg (-1) with the addition of tramadol 1.5 mg/kg (-1) resulted in significantly longer postoperative analgesia duration of 13 + 2.2 hours¹⁵. The difference in their duration of analgesia as compared to the present study is due to the low concentration of both agents. The combination of bupivacaine and tramadol was chosen for caudal block because caudal bupivacaine provides analgesia in the immediate postoperative period, whereas caudal tramadol provides analgesia in the late postoperative period thereby increasing the total duration of analgesia (additive effect)⁶.

The mean duration of action of caudal bupivacaine in this study is longer than that found in previous studies¹⁶. Differences in the operations performed, method of pain scoring, bupivacaine dose and volume and calculation of analgesia time probably account for this discrepancy.

The overall frequency of vomiting seen in this study is 8.3% in both groups, 10% in group-A and 6.7% in group-B. the reason is unclear and may depend more upon other factors, such as the selection of sedatives or anaesthetic agents, rather than upon the agents used in caudal block.

If by 12 hours additional analgesia had been required, it was assumed for the sake of comparison that the duration of analgesia was 12 hours, although it is possible that useful analgesia may have continued for longer time in group-A patients. However, logistic problems dictated that further observations were impracticable and after 12 hours observations were completed, there was a tendency for prophylactic paracetamol analgesia to be given by the ward nurses to any patient who was still awake. All patients were managed successfully with paracetamol alone after this time.

All patients were catheterized during surgery, so urinary retention was not seen in both groups. No

flushing and pruritis were observed in any patient in either group. The reason could be the low dose or tramadol.

CONCLUSIONS

Low dose combination of 0.125% bupivacaine and tramadol 1 mg/kg body weight injected caudally for inguinal hernia repair in young children had an additive effect and provided effective postoperative analgesia with minimal side effects. The duration of postoperative analgesia was significantly prolonged as compared to 0.25% bupivacaine.

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REFERENCES

1. Gill P, Kiani S, Victoria BA, Atcheson R. **Pre-emptive analgesia with local anaesthetic for herniorrhaphy.** *Anaesth* 2001; 56: 414–7.
2. DeBeer DA, Thomas ML. **Caudal additives in children: solutions or problems.** *Br Anaesth* 2003; 90: 497-8.
3. Bernard JD. 7th ed. Churchill Livingstone Co; 2010. **Regional Anesthesia in Children.** In: Miller Anesthesia; pp. 2532–34.
4. Zeidan A, Kassem R, Nahleh N, Maaliki H, El-Khatib M, Struvs MM et al. **Intraarticular tramadol bupivacaine combination prolongs the duration of postoperative analgesia after outpatient arthroscopic knee surgery.** *Anaesth Analg* 2008; 107(1): 292-9.
5. Choudhuri AH, Dharmani P, Kumar N, Prakash A. **Comparison of caudal epidural bupivacaine with bupivacaine plus tramadol and bupivacaine plus ketamine for postoperative analgesia in children.** *Anaesth Intensive Care* 2008; 36(2): 174-9.
6. Prosser DP, Davis a, Booker PD, Murray A. **Caudal tramadol for postoperative analgesia in paediatric inguinal hernia surgery.** *Br J Anaesth* 1997; 79: 293-6.
7. Sajedi P, Yaraghi A, Zadeh MTD. **Comparison of pre- vs. post-incisional caudal bupivacaine for postoperative analgesia in unilateral pediatric herniorrhaphy.** *Saudi J Anaesth* 2011; 5(2): 157-61.

8. Ong CK, Lirk, Seymour RA, Jenkins BJ. **The efficacy of preemptive analgesia for acute postoperative pain management: a meta-analysis.** *Anaes Analg* 2005; 100(3): 757-73.
9. Senel AC, Akyol A, dohman D, Solak M. **Caudal bupivacaine tramadol combination for postoperative analgesia in pediatric herniorrhaphy.** *Acta Anaesth Scand* 2001; 45(6): 786-9.
10. Ozcengiz D, Gunduz M, Ozbek H, Isik G. **Comparison of caudal morphine and tramadol for postoperative pain control in children undergoing inguinal herniorrhaphy.** *Paediatr Anaesth* 2001; 11: 459-64.
11. Fischer S, Troidl H, MacLean AA, Koehler L, Paul A. **Prospective double-blind randomised study of a new regimen of pre-emptive analgesia for inguinal hernia repair: Evaluation of postoperative pain course.** *Eur J Surg* 2000;166:545-51.
12. Gunday M. **A comparison of single dose caudal tramadol, tramadol plus bupivacaine & bupivacaine administration for post-operative analgesia in children.** *Pediatr Anaesth* 2001; 11(3): 323-26.
13. Senel.AC. **Caudal bupivacaine-tramadol combination for postoperative analgesia in pediatric herniorrhaphy.** *Acta Anaesth Scand* 2001 ; 45(6) : 786-89.
14. Locatelli B, Ingelmo P, Sonzogi V. **Randomized, double blind, phase-III, controlled trial comparing levobupivacaine 0.25%, ropivacaine 0.25% and bupivacaine 0.25% by the caudal route in children.** *Br J Anaesth* 2005; 94: 366-71.
15. Armitage EN. **Regional anaesthesia in paediatrics.** *Clin Anaesthesiol* 1985; 3: 553-8.
16. Hong JY, Han SW, Kim WO, Cho JS, Kil HK. **A comparison of high volume/low concentration and low volume/high concentration ropivacaine in caudal analgesia for pediatric orchiopexy.** *Anesth Analg* 2009;109:1073-8.

AUTHOR(S):

1. **DR. ASTHMA SAMEE**
Assistant Professor Anaesthesiology,
Children Complex, Multan
2. **DR. M. SHAFIQUE TAHIR**
Assistant Professor
Department of Anaesthesiology,
Nishtar Medical College/Hospital, Multan.
3. **DR. NADEEM AHMAD KHAN**
Senior Registrar
Department of Anaesthesiology,
Nishtar Medical College/Hospital, Multan.
4. **Dr. Muhammad Masood**
Consultant Anaesthetist
Department of Anaesthesiology,
Nishtar Medical College/Hospital, Multan.

5. **Dr. Muhammad Yousaf**
Associate Professor
Department of Anaesthesiology,
Nishtar Medical College/Hospital, Multan.
6. **Dr. Salman Waris**
Professor
Department of Anaesthesiology,
Nishtar Medical College/Hospital, Multan.

Correspondence Address:

Dr. Asthma Samee
Assistant Professor Anaesthesiology
Children Complex, Multan

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