

CAUDAL BUPIVACAINE TRAMADOL LOW DOSE COMBINATION FOR POST-OPERATIVE ANALGESIA IN PAEDIATRIC PATIENTS

MUHAMMAD TALAT MEHMOOD*, JAVED AHMAD**, SYED NURUL HAQUE***

Department of Paediatric Surgery, Dow University of Health Sciences & Civil Hospital, Karachi*

Department of General Surgery, Dow University of Health Sciences & Civil Hospital, Karachi**

Department of Anaesthesia, KMDC & Abbasi Shaheed Hospital, Karachi***

ABSTRACT

Objective: To determine the postoperative analgesic effect and potential side effects of caudal block when bupivacaine-tramadol combination is used in low doses.

Study Design: Case series.

Setting & Duration: Imam Clinic North Nazimabad, Karachi from January 2008 to March 2009.

Methodology: All pediatric patients between the ages 1 month to 12 years, of either sex, ASA physical I and II undergoing for infra-umbilical surgeries received caudal block using combination of bupivacaine 0.25 % in a dose of 0.5ml/Kg and tramadol 1mg/Kg. Patients in whom caudal analgesia was contra- indicated or failed were excluded from the study. Postoperative pain was evaluated using observer pain scale and self report of pain by child when he is above 2 years of age. Requirements of rescue analgesia were recorded along with postoperative complications.

Results: A total of 48 undergoing different infra umbilical surgical procedures (herniotomy, hypospadias repair, PPV ligation, orchidopexy, appendectomy, circumcision, etc) received caudal block using combination of bupivacaine with tramadol. All patients were pain free for more than 12 hours. None of them required additional/rescue analgesia. Post-operative complications like respiratory depression, pruritus, and urinary retention were not noticed in any patient, while nausea/ vomiting was found in few cases.

Conclusion: Low dose combination of bupivacaine with tramadol when used caudally has an additive effect. This combination provides prolonged effective and safe postoperative analgesia with minimal side effects in paediatric patients.

KEY WORDS: Caudal Block, Bupivacaine, Tramadol, Post-operative Analgesia

INTRODUCTION

In 1933 Campbell¹ for the first time described caudal block for pediatric urological intervention, since then it has evolved to become the most effective regional anesthetic technique for use in children.

It has become a standard practice in many hospitals for providing perioperative analgesia in paediatric patients

during infra umbilical surgical procedures like inguinal hernia, and hydrocele repair, orchidopexy, circumcision, hypospadias, anorectal procedures, orthopaedic interventions on the lower limb.^{2,3,4} The ease of placing a caudal block, its safety and reliability in providing perioperative analgesia are well known.⁵

Bupivacaine, a long acting local anaesthetic agent is used worldwide for caudal block to provide safe and effective perioperative analgesia in children.^{3,4} However the analgesic effect of caudal bupivacaine lasts for short duration.^{6,7,8}

To overcome this problem, different drugs like morphine, midazolam, ketamine, clonidine, fentanyl, neostigmine, buprenorphine diamorphine, has been combined with bupivacaine to further prolong the analgesic effect of caudal block.⁸⁻¹² The results of these combinations are variable. Although in most cases they prolong the

Correspondence:

Dr. Muhammad Talat Mehmood, Professor

Department of Paediatric Surgery,

Dow University of Health Sciences & CHK, Karachi.

Phones: 0300-2054650.

E-mail: mtalatmehmood@yahoo.com

effect of caudal block but at the same time there is unacceptable increase in the number and severity of side effects.⁷⁻¹⁴

Tramadol is synthetic centrally acting drug that has an analgesic efficacy equal to that of pethidine but with out serious side effect. Different studies have shown that caudal tramadol is as effective as bupivacaine or even superior in providing perioperative analgesia in paediatric patients.^{8,9,15-17} Combination of tramadol to bupivacaine has an additive effect not only in prolonging the duration of postoperative analgesia but also significantly reduces the dose of both drugs thereby decreasing the side effects.^{8,9,17,18}

The purpose of present study is to evaluate the efficacy and safety of caudal block using low dose of bupivacaine and tramadol for postoperative analgesia in children undergoing infra umbilical surgical procedures.

METHODOLOGY

This study was conducted at Imam Clinic at North Nazimabad Karachi from January 2008 to March 2009. All Paediatric patients undergoing infra umbilical surgical procedures, aged 1 month to 12 year of either sex, ASA physical status I and II, were included. Patients suffering from local infection, neurological disorder, bleeding diathesis anti-coagulant therapy, history of allergic reaction to local anesthetic, sacral/vertebral abnormalities and inadequate/or failed block were excluded from the study.

Informed written consent is obtained from their parents. All patients received general anaesthesia after standard precaution and anesthetic preparation. Caudal block is used in all patients. After all aseptic measures, caudal block was performed in the left lateral position as described earlier.¹⁹ A combination of 0.25% bupivacaine in a dose of 0.5 ml/kg with tramadol 1mg Kg was used for caudal block in all cases.

Before transfer from recovery area to the ward, all patients were fully awake. Paracetamol in dose of 15-20 mg/kg or diclofenic sodium suppository in a dose of 1mg/kg is prescribed according to age and weight of the child and availability of the drug as postoperative analgesic to be given after 12 hours of surgery.

Post-operative pain was assessed using observer pain scale (Table I) and self report of pain when child was above 2 years of age.^{8,20} Parental observation and information regarding comfort and sleep of their children was also recorded. Additional/rescue analgesia was given when pain score was 4. Requirement of rescue

analgesia along with postoperative complications like sedation, nausea, vomiting respiratory depression, urinary retention, pruritus, motor weakness etc were also observed/noticed.

RESULTS

From January 2008 to March 2009, a total of 48 children were operated for different infra umbilical conditions received caudal block using low dose combination of bupivacaine with tramadol. Age ranged from 1 month to 12 years Maximum patients were between 1 month to 4 year (Table II). Among them them, 45 were males while 3 were females. Out of 48, 35 children were operated for inguinoscrotal conditions while, 7 were operated for urogenital diseases. Different surgical procedures performed are shown in Table III. It was found that caudal block using low dose combination of bupivacaine with tramadol, produced reliable effective postoperative analgesia in all children and none of the patient required additional rescue analgesia up to 12 hours when they received scheduled dose of either paracetamol or diclofenic sodium suppository according to age and weight of the child and availability of the drug. Even good analgesic effects was also observed in patients who underwent appendectomy.

Parents of the children were very much satisfied due to excellent postoperative analgesic effect of caudal block. Post-operative nausea and vomiting was observed in four patients. No other side effect like sedation, nausea, vomiting respiratory depression, urinary retention, pruritus, motor weakness etc was noticed in any case.

DISCUSSION

Caudal block is one of the most widely used regional block to provide intra and postoperative pain relief in

Table I. Observer pain scale²⁰

Item	Score
No Pain	
Laughing Euphoric	1
Happy Contented	2
Calm or Asleep	3
Mild-Moderate Pain	
Crying, Grimacing Restless can distract with toys or parental presence	4
Severe Pain	
Crying Screaming Inconsolable	5

Age Range	No. of Cases
> 1 Month - 1 Year	16
> 1 Year - 4 Year	17
> 4 Year - 8 Year	7
> 8 Year - 12 Year	8
Total	48

Table II. Age Distribution

children during infra-umbilical surgical procedures. The reasons for the widespread use of this block are multiple and include infra-umbilical surgical conditions make up the large bulk of everyday pediatric surgical procedures like inguinal hernia, hypospadias and hydrocele repair, orchidopexy, circumcision, anorectal procedures, orthopaedic interventions on the lower limb.²⁻⁴

It can easily be learned and mastered. Schuepfer have reported that only 32 blocks are required for an intern anaesthetist to reach the skill level of experienced colleagues.⁵ The incidence of potential complications related to the procedures like unintentional dural puncture with total spinal anaesthesia or inadvertent intra-vascular injection leading to grand mal seizures and/or cardio-respiratory arrest, perforation of the rectum, sepsis, haematoma formation, patchy block are very low and can be avoided if proper technique is used.²¹

Although it is a versatile block, the major limitation of the single shot caudal block is the relatively short duration of postoperative analgesia even with long acting local anaesthetics. The duration of analgesia by single shot caudal block with bupivacaine 0.25% as reported in different studies is variable and largely ranging from 2-6 hours to 24 hours.^{6,7,9,22,23} In most of the studies, the duration of analgesia by caudal bupivacaine epidural is reported around 7-10 hours.^{7,24}

The most frequently used method to further prolong the effect of caudal block is to add different adjunct drugs to the local anesthetic solution.⁷⁻¹² The results of these combinations are variable. Although in some cases they prolong the effect of caudal block but at the same time there is unacceptable increase in the number and severity of side effects.⁷⁻¹⁴

In the present study authors have used tramadol with bupivacaine for caudal block and found that it significantly prolongs postoperative analgesic effect of caudal block. Similar results have been reported in different studies.^{9,15-18} Batra reported that bupivacaine provides analgesia in immediate postoperative period whereas

Procedure	No. of Cases
Inguinal Herniotomy	26
Urethrosplasty	3
Appendicectomy	4
Orchidopexy	4
Ligation & Division of PPV	4
Circumcision	4
Miscellaneous (Anorectal Conditions, Torsion Testis, TEV)	3

Table III. Surgical procedures performed

tramadol provides analgesic effect in late post-operative period thereby increases the total duration of analgesia (additive effect) when combination of these two drugs are used caudally.¹⁷

Different dose combinations of bupivacaine and tramadol for caudal block have been used in these studies. Khalid used 0.25% bupivacaine in a dose of 0.8ml/kg along with tramadol 2mg/kg and reported postoperative analgesic effect up to 16+/-4 hours but with increased incidence of vomiting.¹⁵

Senel and colleagues observed postoperative analgesic effect of 13+/-2.2 hours when 0.25% bupivacaine 1 ml/Kg combined with tramadol 1.5mg/kg for caudal block.⁹ Parkash used tramadol in different doses (1, 1.5, and 2mg/kg) along with 0.25% bupivacaine in a dose of 0.7ml/kg and found prolonged analgesic effect with tramadol 2mg/kg with incidence of emesis in 10% of cases.¹⁶

Contrary to all these studies it was found that even low dose combination (Bupivacaine 0.25% in a dose of 0.5ml/kg and Tramadol 1mg/kg) is as effective in prolonging the post-operative analgesic effect as high dose combinations. More over it was found that due to low dose combination the side effects like respiratory depression, sedation, urinary retention, pruritus, motor weakness or constipation are not seen in any case.

The frequency of vomiting is minimal in this study as compared to relatively increased incidence reported by others.¹⁵⁻¹⁷ Similar results have been reported by Khan and Memon when low dose combination of bupivacaine with tramadol for caudal block was used.¹⁸

Contrary to all these studies Prosser reported that addition of tramadol 2mg/kg to caudal bupivacaine did not prolong significantly postoperative analgesic effect

of caudal bupivacaine.²⁶ There was no problem of failed caudal block in any case in contrast to other studies.²⁵ It is due to that in all patients in the study group caudal block was given by the senior experienced consultant anesthetist.

CONCLUSION

Low dose combination of bupivacaine with tramadol for caudal block provides significantly prolonged postoperative analgesia in all children with minimal side effects. It is a simple, safe and effective procedure.

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