

# Comparison of Caudal Bupivacaine and Bupivacaine-tramadol Combination for Postoperative Analgesia in Children Undergoing Lower Abdominal Surgeries

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## ABSTRACT

**Objective:** The aim of current study is to determine the effectiveness of caudal bupivacaine and bupivacaine-tramadol combination for postoperative analgesia in children undergoing lower abdominal surgeries.

**Study Design:** Randomized Control trial

**Place and Duration:** Department of Anesthesiology Surgical ICU & Pain Management Ghulam Muhammad Mahar Medical College, Sukkur and Lahore General Hospital, Lahore, during the period from March 2021 to August 2021.

**Methods:** There were 110 children of both genders with ages 2-8 years undergoing lower abdominal surgery were included in this study. A detailed demographics of enrolled patients, including age, sex, and weight were computed after obtaining informed written consent from each individual. Patients were equally divided in two groups. Group I had 55 patients and received combination of tramadol (1 mg/kg) and bupivacaine (0.5 ml/kg of 0.25%) and group II received only bupivacaine 0.5 ml/kg of 0.25% after induction of anesthesia in caudal epidural space. Post-operatively pain score, requirement of rescue analgesia and sedation score was assessed and compared among both groups. SPSS 24.0 was used to analyze complete data.

**Results:** There majority males 35 (63.6%) in group I and 32 (58.2%) in group II. In group I mean age of the patients was 5.9±4.61 years and in group II mean age were 4.8±9.44 years. Mean weight of the patients in group I was 17.6±4.52 kg and in group II mean weight was 19.5±7.34 kg. During the first 24 hours, we noticed a reduced pain score in the bupivacaine-tramadol group. When it comes to postoperative analgesia, the bupivacaine-tramadol group had much longer analgesia durations and a significantly lower need for rescue analgesia with p value <0.003. Postoperative frequency of adverse effects in group II was greater found in 4 (7.3%) cases as compared to group I in 1 (1.8%) patients.

**Conclusion:** In children having abdominal surgery, we found that caudal tramadol with bupivacaine provided more extended and better quality postoperative analgesia than plain bupivacaine.

**Keywords:** Tramadol, Bupivacaine, Abdominal Surgery, Pain Score, Rescue Analgesia

## INTRODUCTION

Perioperative paediatric anaesthesia's primary responsibility is to manage acute pain in children undergoing surgery. Some analgesics have synergistic or additive effects, thus they can be combined to provide balanced analgesia. This approach to pain management is commonly used.[1] For little children having anoperineal, inguinal, and urogenital surgery, caudal analgesia is the most suitable and acceptable method of postoperative analgesia. [2,3]

While neuraxial methods have a long history in paediatric anaesthesia, regional anaesthesia is an essential part of the discipline. Among the reasons for this increase was an awareness of the need for improved modalities of pain treatment in children, and a demonstration of the safety of peripheral regional anaesthetic in children.[4]

Analgesia for juvenile patients undergoing surgery on the lower extremities, pelvis, or lower abdomen can be achieved with the use of caudal block, which was initially reported in 1933 [5].

Caudal anaesthesia has the drawback of having a limited duration of effect, hence adjuvants such midazolam, bicarbonate, ketamine, opioids, neostigmine, and clonidine are being tested to extend the duration and improve the quality of analgesia. Is one better than the other? Extradural delivery of tramadol has been proven to give long-lasting analgesia in both adults and children [6-8].

The length of analgesia is measured in hours starting with the caudal block and ending with the first postoperative dosage of analgesic. Getting rid of pain after surgery should be as simple as possible, with the least amount of negative side effects, and for the least amount of money feasible. Postoperative pain may be best managed with a medication cocktail. Children with moderate to severe acute or chronic pain may benefit from the use of tramadol,

a relatively mild opioid. Postoperative pain can be managed with Tramadol in children. [9] Caudal block has been found to be effective in a wide range of surgeries involving the lower abdomen. [10]

To determine whether tramadol is an effective adjuvant to bupivacaine for providing better postoperative analgesia in children undergoing lower abdominal surgeries, this study compared the duration of analgesia following a single shot caudal block with bupivacaine alone and bupivacaine plus tramadol.

## MATERIAL AND METHODS

This randomized study was conducted at the department of Anesthesiology Surgical ICU & Pain Management Ghulam Muhammad Mahar Medical College, Sukkur and Lahore General Hospital, Lahore during the period from March 2021 to August 2021. The study was consisted of 110 children. A detailed demographics of enrolled patients, including age, sex, and weight were computed after obtaining informed written consent from each individual. Affected children were eliminated if they had congenital heart disease, any type of coagulation issue, sepsis, uncorrected hypovolemia, parental refusal, abnormalities of the sacrum (such as myelomeningocele or spina bifida), or infection at the injection site.

ASA I and II children, ranging in age from 2 to 8 years old, undergoing lower abdominal operations were recruited in the research. Children of both sexes were included. In the surgery room, pulse, NIBP, SpO<sub>2</sub>, and an ECG were all introduced as a means of patient monitoring. Every infant has a 22G cannula attached to an intravenous line. Propofol 2.5 mg/kg was used to produce anaesthesia, as was sevoflurane in oxygen and nitrous oxide inhalation. Succinylcholine 2 mg/kg of body weight was used for tracheal intubation. Equally divided patients in two groups.

Group I had 55 patients and received combination of tramadol (1 mg/kg) and bupivacaine (0.5 ml/kg of 0.25%) and group II received only bupivacaine 0.5 ml/kg of 0.25% after induction of anaesthesia in caudal epidural space. Caudal injection of 1 ml/kg solution was administered to each group in equal quantities. Following completion of the wound's dressing, anaesthetics were turned off.

Post-operatively pain score, requirement of rescue analgesia and sedation score was assessed and compared among both groups. SPSS 24.0 was used to analyze complete data.

**RESULTS**

There majority males 35 (63.6%) and 20 (36.4%) females in group I and 32 (58.2%) males and 23 (41.8%) females in group II.(fig 1)

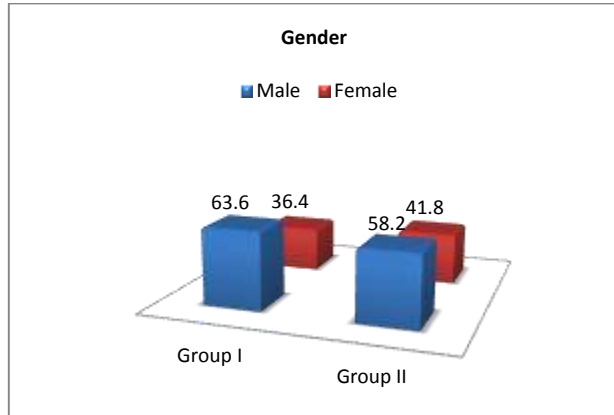


Figure 1: Comparison of gender among both groups

In group I mean age of the patients was 5.9±4.61 years and in group II mean age were 4.8±9.44 years. Mean weight of the patients in group I was 17.6±4.52 kg and in group II mean weight was 19.5±7.34 kg. Majority of the patients 60 (57.1%) had ASA class-II among all cases.(table 2)

Table 2: Characteristics of children

Variables	Group I	Group II
Mean age (years)	5.9±4.61	4.8±9.44
Mean Weight (kg)	17.6±4.52	19.5±7.34
ASA Class		
I	30 (28.6%)	30 (28.6%)
II	25 (23.8%)	25 (23.8%)
Mean Duration of Surgery (minutes)	48.1±2.25	45.4±6.43

During the first 24 hours, we noticed a reduced pain score in the bupivacaine–tramadol group as compared to group II with p value <0.002.(table 2)

Table 2: Comparison of pain score among both groups

Variables	Group I	Group II
Post-operative Pain score		
1 hour	0	0
3 hour	0	0
6 hour	0	3.2±2.14
12 hour	1.3±5.41	4.1±1.33
24 hour	3.5±4.62	7.6±5.42

Table 3: Comparison of rescue analgesia among both groups

Variables	Group I	Group II
Rescue Analgesia		
1 hour	0	
3 hour	0	
6 hour	0	17 (30.9%)
12 hour	0	40 (72.7%)
24 hour	15 (27.3%)	51 (92.7%)

When it comes to postoperative analgesia, the bupivacaine–tramadol group had much longer analgesia durations and a

significantly lower need for rescue analgesia with p value <0.003.(table 3)

Postoperative frequency of adverse effects in group II was greater found in 4 (7.3%) cases as compared to group I in 1 (1.8%) patients.(fig 2)

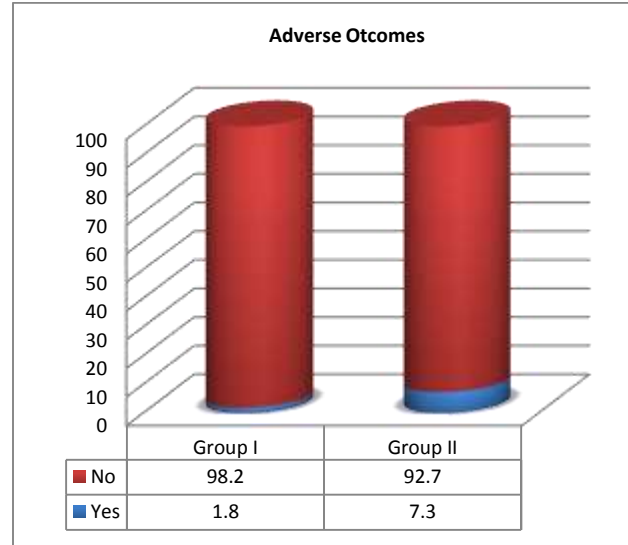


Figure 2: Comparison of adverse outcomes among both groups

**DISCUSSION**

The use of caudal analgesia in children having urogenital surgery is becoming more common. For its long-lasting effects, bupivacaine, a long-acting local anaesthetic, is utilised. For a variety of children's surgical procedures, bupivacaine has recently been supplemented with numerous adjuvants to enhance the quality and duration of analgesia. [2] The most effective strategy to alleviate postoperative pain is to use a combination of medications with varying mechanisms of action. Tramadol, a mild opioid opioid, is commonly used to treat moderate to severe acute pain in children. Tramadol can be administered to children following surgery to alleviate discomfort. [5]

In current study 110 children undergoing abdominal surgery were presented. Half patients received bupivacaine+tramadol and other half received bupivacaine only. Majority of the patients were males 35 (63.6%) in group I and 32 (58.2%) in group II. In group I mean age of the patients was 5.9±4.61 years and in group II mean age were 4.8±9.44 years. Mean weight of the patients in group I was 17.6±4.52 kg and in group II mean weight was 19.5±7.34 kg. Majority of the patients 60 (57.1%) had ASA class-II among all cases. These findings were comparable to the previous studies.[11,12] During the first 24 hours, we noticed a reduced pain score in the bupivacaine–tramadol group as compared to group II with p value <0.002. When it comes to postoperative analgesia, the bupivacaine–tramadol group had much longer analgesia durations and a significantly lower need for rescue analgesia with p value <0.003. The findings were in line with earlier research. Post-operative analgesia was greatly extended in Samad and Shah's study,[13] using bupivacaine and tramadol. Tramadol and bupivacaine were shown to give long-lasting analgesia for children having various surgeries. [14-16] Analgesia lasted longer with 0.25 percent Bupivacaine and 0.25 percent ketamine or ketamine and tramadol when delivered caudally, compared to bupivacaine alone, according to Choudhuri and colleagues. This was a considerable improvement over 0.25 percent Bupivacaine alone. [17]

Ozcengiz et al. found that tramadol–bupivacaine combinations in caudal blocks were effective in reducing postoperative pain in children having inguinal operations. [18]

Using the caudal route, Batra et al. discovered that tramadol-bupivacaine provided long-lasting and adequate analgesia in children who had had surgery for hypospadias. [19] Postoperative pain management with epidural tramadol was shown to be more successful than with intravenous tramadol, according to Murthy and colleagues. [20] Epidural tramadol provided effective postoperative analgesia following abdominal procedures, and the systemic tramadol concentration was much lower than with intravenous treatment, according to Chrubasik. [21] No significant effects of tramadol on the analgesic effects of bupivacaine when delivered caudally were detected by Professor DP and his colleagues in the epidural block procedure.

Postoperative frequency of adverse effects in group II was greater found in 4 (7.3%) cases as compared to group I in 1 (1.8%) patients. [22,23] For epidural anaesthetic, the use of tramadol as an adjuvant with bupivacaine is supported by the vast majority of studies. Analgesia is protracted and safe in children after surgery on the lower abdomen with the administration of 2 mg/kg tramadol caudally with bupivacaine, according to the results of this comparative investigation.

## CONCLUSION

In children having abdominal surgery, we found that caudal tramadol with bupivacaine provided more extended and better quality postoperative analgesia than plain bupivacaine.

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