

# Comparison of intravenous paracetamol and caudal block in terms of analgesic effects in patients at pediatric surgery

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## Abstract

**Aim:** In our study, we aimed to evaluate retrospectively the efficacy of postoperative analgesia in patients with caudal block versus paracetamol in 67 cases, between the ages of 2-8 years who had undergone elective inguinal hernia and circumcision surgery after induction of general anesthesia.

**Material and Methods:** In this study, we evaluated retrospectively the files of 67 cases between 2-8 years old patients who had caudal block or I.V. paracetamol who undergone inguinal hernia and circumcision operation between September 2017 and September 2018. The files of the cases, anesthesia follow-up forms and nurse observation forms were examined; demographic data, vital signs, duration of surgery, postoperative analgesic requirement and recorded complications were evaluated.

**Results:** The mean age was  $3.2 \pm 2.35$  years in the caudal group and  $4.3 \pm 2.15$  years in the paracetamol group, the mean body weight was  $15.1 \pm 4.51$  kg in the caudal group and  $19.4 \pm 6.4$  in the paracetamol group. The surgical period of patients in the caudal group was  $51 \pm 12.2$  minutes and it was  $37.8 \pm 15.8$  in the paracetamol group. The mean duration of postoperative analgesia was  $8.1 \pm 1.42$  hours in the caudal group and  $1.05 \pm 1.0$  hours in the paracetamol group. There were no complications in any of the patients in the postoperative period. No significant results were found in the vital signs of both groups. While VAS values were statistically significant at 6th and 12th hours, VAS value at 24th hour was not statistically significant.

**Conclusion:** Caudal epidural anesthesia may be a simple and safe method of anesthesia effective in postoperative pain control. May it ensure serious patient comfort with reduced analgesic requirements after surgery. It may be recommended to use pediatric surgery under umbilicus for high success rates and low complication rates.

**Keywords:** Caudal block; analgesia; circumcision; inguinal hernia; paracetamol.

## INTRODUCTION

Caudal Block; It is the most popular pediatric regional anesthesia technique that provides both intraoperative and postoperative analgesia, especially after induction of general anesthesia in children undergoing surgery below the umbilical region. (1-3) The incidence of caudal block complication is the lowest determined in all central blocks with 7/10.000. (3). The stress response to the surgical procedure and the amount of inhalation and intravenous anesthetic agent applied during the operation decrease and provide a quiet and rapid recovery. (4). For many years, the most widely used local anesthetic drug in the caudal block is bupivacaine, which has a long duration of action. Although there is no consensus on the dosage of the drug,

the administration of bupivacaine at a dose of 0.5-1 ml/kg at different concentrations (0.125-0.25%) provides approximately 5-9 hours analgesia in the postoperative period. (5-7). Most childhood pediatric surgeries are performed as daily surgery. (3). The anesthesia method applied to this patient group should provide short recovery time, effective postoperative analgesia and high level of patient satisfaction. For this purpose, regional anesthesia techniques are used in such operations, thus reducing the dose of general anesthetic agent needed during operation. Peripheral block methods such as ilioinguinal, iliohipogastric, penile, paravertebral block or central blocks such as caudal epidural block may be preferred. Paracetamol; It is widely used for symptomatic treatment

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of fever and acute pain in children. It is very important to ensure effective analgesia in patients who will undergo an elective pediatric surgery for early recovery and discharge. Nowadays it has been shown that paracetamol is effective in moderate to severe postoperative pain with inhibition of central cyclooxygenase enzyme and peripheral anti-inflammatory effects and an increase in the quality of analgesia with decreasing postoperative opioid consumption (8-10). In addition, it has been reported that paracetamol does not cause complications associated with binding of opioids to receptors and gastric irritation and bleeding which can be observed by NSAID use. (11,12).

## MATERIAL and METHODS

Harran University School of Medicine Ethics Committee approval (04.10.2018 and 10/09 decision) was taken. Then we performed retrospective analysis of vital signs and postoperative analgesia in patients who underwent caudal block and IV paracetamol without caudal block. In the 67 patients between the ages of 2-8 years who had undergone elective inguinal hernia and circumcision surgery in the last 1 year. Those who were allergic to the drugs in the study, who had bleeding diathesis, neuromuscular and spinal deformity, infection in the caudal area, a neurological disease, mental and growth disorder were excluded from the study. Visual Analogue Scale (VAS) was used to determine the need for analgesia. We divided the cases into 2 groups;

Group 1 (n=31) patients underwent caudal anesthesia in addition to general anesthesia Group 2 (n=36), in addition to general anesthesia 10 mg / kg paracetamol administered pediatric patients.

After the patients were monitored, induction was applied with propofol and laryngeal mask (LMA) was placed. Once the airway has been established, to the first group the left lateral decubitus position is given and caudal blocks were made with 20, 22 or 25 Gauge caudal epidural needles under sterile conditions. Local anesthetics 0.8ml / kg of 0.25% bupivacaine (Marcaine®, Astra-Zeneca, Turkey) were used. Sevoflurane (Sevorane® Liquid 100%, Abbott, UK) and fentanyl citrate (Fentanyl Janssen®, Johnson & Johnson, Belgium) administered with 50-50% O<sub>2</sub>-air for the maintenance of anesthesia in patients with airway control, muscle relaxant was not used. 10 mg / kg paracetamol was administered to patients without caudal block. Intraoperative 5th, 10th, and 15th minutes pulse and saturation values and pulse and saturation values at 5. to 10. Minutes postoperatively were recorded. In order to determine the need for analgesia, the VAS values were evaluated during the hours 6.12.24 postoperatively.

SPSS 23th edition is used. Chi square crosstabs, student t test is used as a statistical analysis.

## RESULTS

The mean age was 3.2±2.35 years in the caudal group, in the paracetamol group were 4.3±2.15 years. The mean body weight was 15.1±4.51 kg in the caudal group and

19.4±6.4 in the paracetamol group. Surgical duration of patients in the caudal group was 43±12.2 minutes while in the paracetamol group it was 37.8±15.8. Postoperative analgesia duration was found to be 1.05 ± 1.0 hours in the paracetamol group and 8.1±1.42 hours in the caudal group. Table 1 (1). There were no complications in any of the patients in the postoperative period. No significant results were found in the vital signs of both groups. While VAS values were significant at 6th and 12th hours, VAS value at 24th hour was not statistically significant Table 2.

**Table 1. Demographic features**

	GROUP C (n=31)	GROUP P (n=36)	P*
Age (year)*	3.2±2.35	4.3±2.15	0.55
Gender ( M/F )	28/3	32/4	0.69
Weight (kg)*	15.1±4.1	19.4±6.4	0.17
Surgery duration (minute)*	51±12.2	37.8±15.8	0.30
Analgesic need (hour)*	8.1±1.42	1.05±1.0	0.00

**Table 2. Hemodynamic values**

	GRUP C (n=31)	GRUP P (n=36)	P
Intraoperative			
5th min. pulse	125.96±19.5	112.2±17.3	0.016
10 th min. pulse	119.9±15.6	105.8±26	0.022
15 th min. pulse	118±12.6	108.26± 16.1	0.025
Postop 5 th min. pulse	117.56±11.5	105±22.5	0.025
5 th min. SpO <sub>2</sub>	99.4±1	98.4±1.5	0.011
10 th min. pulse	115±10.6	105 ±17.4	0.031
10th min SpO <sub>2</sub>	99.4±0.8	98.8±1.16	0.029
Postop 6th hour VAS score	3±1.2	1.8 ±0.7	0.000
12th hour VAS score	2.5± 0.7	2±0.5	0.003
24th hour VAS score	4.5± 1	2.1±0.4	0.379

\*Values are expressed as Mean ± Standard Deviation. Group C: Caudal block, Group, P: Paracetamol

## DISCUSSION

Caudal epidural anesthesia was first described in 1933 as the first epidural anesthesia technique, but its use became widespread in the 1960s (19). It is a block done passing through sacrococcygeal ligament and applied local anesthetic agent to the sacral canal. It is the most preferred regional anesthesia method in lower extremity, pelvis and below umbilicus surgery in pediatric patient group. (20). It is known that caudal block method is an effective method to relieve postoperative pain. This feature, which is very important in day surgeries, provides a more frequent use of caudal block in these cases. As it is known in the pediatric patient group, especially in preschool children, the crying and uneasiness of the children in the service follow-up period is not only caused by pain. Various factors such as hunger, thirst, being in a hospital environment, fear of

surgery area and agitation from general anesthesia can also lead to this picture. However, families, nurses or even physicians often think that this is caused by pain. For this reason, patients can be given analgesics, sometimes without indication. Since caudal anesthesia minimizes the need for analgesics, oral intake of patients starts earlier and discharge is earlier. This contributes positively to the satisfaction of the relatives of the patients.

On the other hand, the fact that the patient does not feel the pain in the first urine after the operation and it is under the influence of the block contributes to the surgeon satisfaction. It provides 80-90% effective analgesia in inguinal surgeries and circumcision. (13-15). Dreesen et al. reported that the quality of analgesia achieved in 98% of the cases was very good and was a suitable method for patients to be sent home after the operation. (16). Bupivacaine is the most preferred local anesthetic in caudal anesthesia in pediatric patients. (17). Recommended bupivacaine concentration when used in ml / kg; If the block is to be done before the surgery, it is 0.25% and then it is 0.125% . (14,17). Thus the incidence of complications is reduced when used at a concentration of 4-6 hours. (14). The analgesic effect is achieved. We used bupivacaine at a concentration of 0.25% to be 0.8 ml / kg as recommended. The patients who had caudal block had better tolerated the operation in the early postoperative period and they did not observe agitation caused by intense pain during waking and intervention of patients in the operation area. (18).

## CONCLUSION

In conclusion, caudal epidural block method may be recommended in the pediatric patient group who had surgery below the umbilical region because of high success rate, low complication rate, early discharge rate, low amount of anesthetic agent used and low amount of systemic analgesic drug needed.

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