

# Comparison of postoperative analgesic efficacy of caudal block versus dorsal penile nerve block with bupivacaine for circumcision in children

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## Abstract

**Background:** Circumcision is a frequently performed surgery in pediatric patient.

**Objective:** Our aim is to compare postoperative analgesia of caudal block versus dorsal penile nerve block (DPNB) and to compare sedation score and complication associated with caudal block and DPNB in children undergoing circumcision.

**Materials and Methods:** This prospective randomized study was performed for more than 50 patients of ASA grade I, aged 3–12 years, scheduled for elective circumcision. Patients were divided into two groups: DPNB for group I and caudal block for group II, using 0.25% 1 mL/kg (2 mg/kg) bupivacaine. Postoperative analgesia was evaluated for 6 hours with the FLACC Pain Scale for five categories: (F) face, (L) legs, (A) activity, (C) cry, and (C) consolability. Sedation was evaluated with Ramsey sedation score. For every child, supplementary analgesic amount and times and probable local or systemic complications were recorded.

**Results:** No significant difference between both the groups was found in mean age, body weight, and surgery duration and sedation scores. Initially, for 2 hours, FLACC pain score was also insignificant; however, on subsequent measurements, a significant difference of FLACC pain score was noted in both the groups. No major complication was found when using either technique.

**Conclusion:** Duration of postoperative analgesia is more in caudal group than that of DPNB. Supplementary analgesic need is also minimized.

**KEY WORDS:** Circumcision, caudal block, dorsal penile nerve block, bupivacaine

## Introduction

Pain after surgery leads to an agitated, noncooperative, and restless child. Circumcision<sup>[1]</sup> is a frequently performed surgery in pediatric patient. It is very painful, and child may manipulate the painful operative site, resulting in postoperative hemorrhage or infection. Regional techniques<sup>[2]</sup> provide excellent postoperative pain relief with preservation of consciousness and ventilatory control. Caudal block,<sup>[3]</sup> a very

reliable, safe, cheap, easy, and effective method, with low incidence of negative side effects such as motor blockade and postoperative nausea and vomiting, is used in pediatric surgery as a postoperative analgesia. Another safe and effective method for circumcision is dorsal penile nerve block (DPNB).<sup>[4]</sup> Our aim is to compare postoperative analgesia of caudal block versus DPNB and to compare sedation score and complications associated with caudal block and DPNB in children undergoing circumcision.

## Materials and Methods

This prospective randomized study was performed for more than 50 patients of ASA<sup>[5]</sup> grade I, aged 3–12 years, scheduled for elective circumcision surgery. Informed consent was taken from the parents. They were randomized into two groups. Group I (n = 25) patients were given DPNB and group II (n = 25) patients were given caudal block. Patients were

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**Table 1:** FLACC pain evaluation scale<sup>[6]</sup>

Categories	0	1	2
Face expression	No special expression	Slight frowning, grimace	Mop, teeth clenching
Feet	Normal position	Tight, stressful	Kick at anybody
Activity (movements)	Calm	Turn around	Hop off, jerk
Crying	No cry	Groan, moaning	Shouting, cry
Condolence	Relaxed	Consoled with hug or touch	Never consoled

excluded if they had a severe systemic disease, preexisting neurological or obvious spinal disease, bleeding diathesis, a history of seizure disorder, or a known hypersensitivity to amide-type local anesthetics. Intravenous cannula was inserted in the premedication room if the child permits.

**Procedure:** The patients were taken to the operating room. Children were monitored for blood pressure, heart rate with a 3-lead electrocardiogram, and peripheral oxygen saturations. Anesthesia was delivered with an intravenous bolus of propofol (2 mg/kg) until loss of eyelash reflex. If the intravenous cannula could not be inserted, inhalational induction was performed with a facemask using 6% sevoflurane in 50% N<sub>2</sub>O + 50% O<sub>2</sub>. Sevoflurane was used for maintenance. After induction, a laryngeal mask, appropriate to the children's age and weight, was put in place. In group I patients, after painting and draping in supine position, the penis was retracted downward and fixed with leucoplast. The markers for injection were symphysis pubis. At 0.5 to 1 cm lateral to the midline, the needle was inserted vertically (medially-caudally) until penetrating fascia scarpa. Bupivacaine [0.25%, 1 mL/kg (2 mg/kg)] was injected on each side at 10 o'clock and 2 o'clock positions. All blocks were performed with 23-G needle.

Group II patients received a caudal block using a 23 G needle in the lateral decubitus position, with 0.25% bupivacaine [1 mL/kg (2 mg/kg)]. Skin incision was performed 20 min after block in each group. Intraoperatively, patients were monitored for ECG, heart rate, blood pressure, and SPO<sub>2</sub>.

After completion of the surgery, LMA was removed; patients were transferred to recovery room. All children were observed and recorded for pain, sedation, and side effects (nausea, vomiting, agitation, penile hematoma, bleeding, motor block, and urinary retention) at 5, 15, and 30 min and then at hourly interval for 5 hours. The first analgesic demand time was noted. For follow-up of postoperative pain, the FLACC Pain Scale (FLACC: A behavioral scale for scoring postoperative pain in young children) (Table 1) was used, and for the sedation follow-up, the Ramsey sedation scale (Table 2) was used. If the FLACC pain score was 5 or over, 2 mg/kg of diclofenac sodium suppository as a supplemental analgesic was administered. Probable local or systemic complications were recorded.

## Results

Two patients from groups I and one patient from group II needed extra analgesic immediately at the beginning of the postoperative period. Therefore, their blocks were considered

**Table 2:** Ramsey sedation scale<sup>[7]</sup>

1	Fully awake and oriented
2	Awake, sleepy
3	Asleep but easily awoken by verbal command
4	Asleep but easily awoken by motor stimulation
5	Asleep and cannot be awoken by verbal or motor stimulation

**Table 3:** Comparison of groups according to age, weight, and duration of anesthesia

	Group I (n = 23)	Group II (n = 24)	P
Age (yr)	6.26 ± 3.36	5.62 ± 2.6	NS
Weight (kg)	22.04 ± 9.56	20.06 ± 7.12	NS
Duration of surgery (min)	22.86 ± 8.45	20.04 ± 2.49	NS
The first analgesic demand time (min)	120.91 ± 4.098	204.16 ± 12.24	S

The values are given as mean ± standard deviation. NS, not significant,  $P > 0.05$ ; S, significant,  $P < 0.05$ .

No significant differences existed between the groups with respect to age, weight, or duration of surgery.

as unsuccessful. The remaining 47 patients were divided into group I (n = 23) and group II (n = 24).

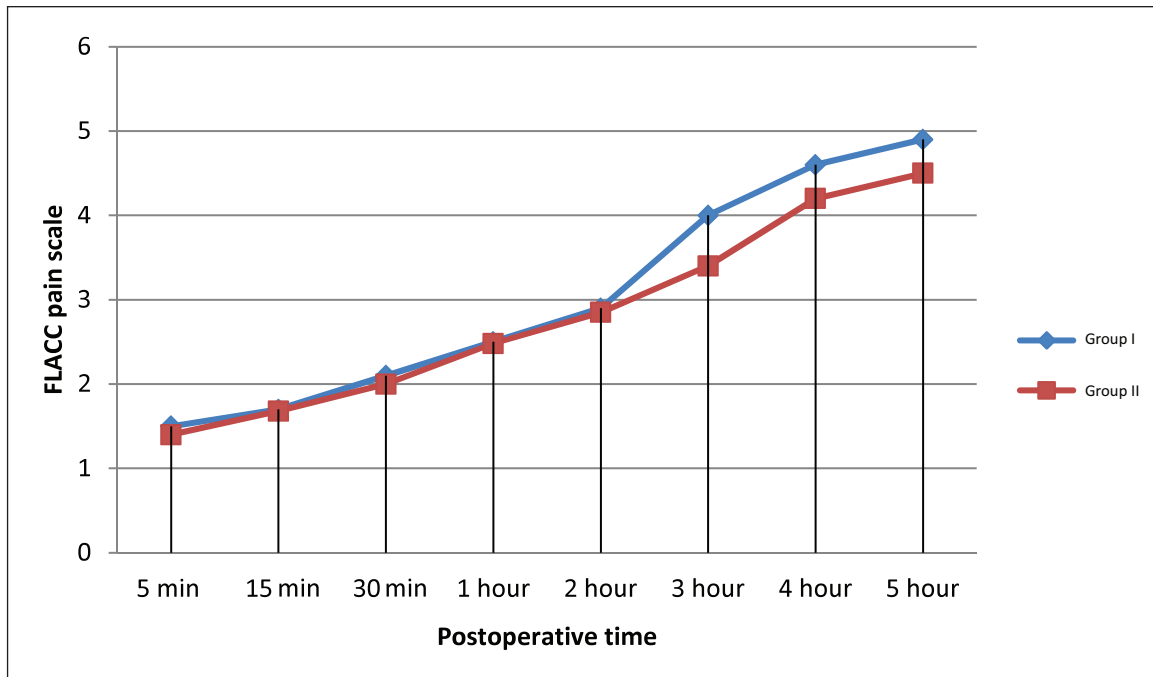
No significant difference was found between the groups. Initially for 2 hours, the FLACC pain score was also insignificant; however, on subsequent measurements, a significant difference of FLACC pain score was noted in both the groups ( $P < 0.05$ ).

The first analgesic demand time of the groups was 120.91 ± 4.098 min for group I and 204.16 ± 12.24 min for group II. Analgesic demand time is earlier in group I than in group II, which is statistically significant ( $P < 0.05$ ).

In group I, blood was aspirated in one patient before local anesthetic injection, and minor bleeding was detected in another patient from the injection site. Edema was found in six patients in group I, but it subsided within few minutes. No hematoma and hypotension were seen in either group during anesthesia. No postoperative agitation or urinary retention was seen.

## Discussion

In this study, we compared the efficacy of DPNB and caudal block using bupivacaine<sup>[8]</sup> for postoperative analgesia in circumcision surgeries. No significant differences existed

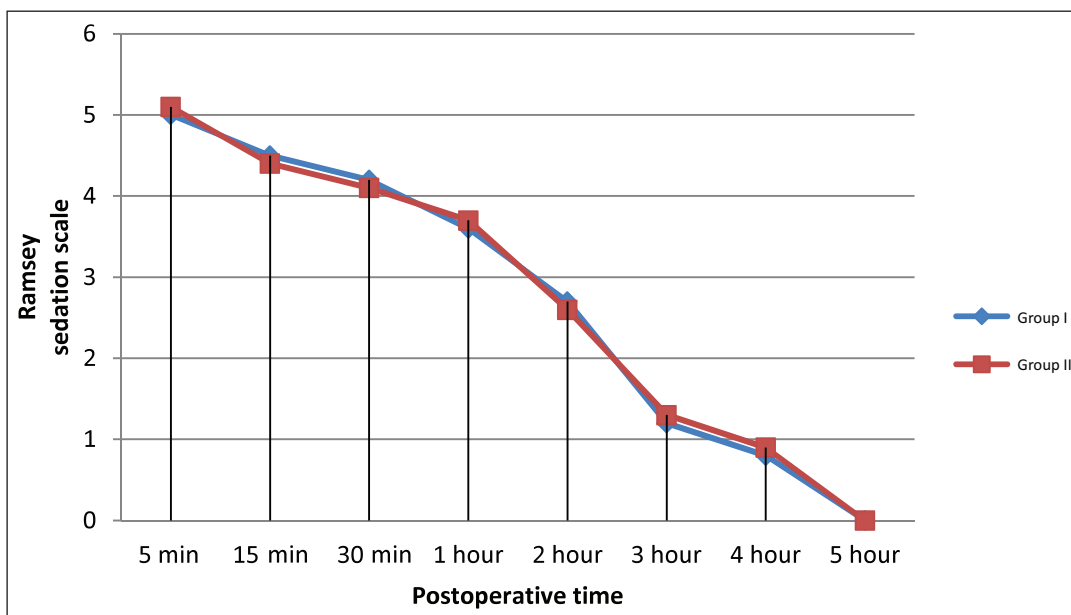


**Figure 1:** Comparison of FLACC pain scores at different time intervals.

between the groups with respect to age, weight, or duration of surgery. In postoperative time, for initial 2 hours, there was no significant difference between the two groups, after which group I had significantly higher pain scale.

Penile block is a safe, easy, and effective intervention used to reduce postoperative pain.<sup>[9]</sup> Caudal block was performed

with bupivacaine (0.25%, 1 mL/kg) also provides sufficient postoperative analgesia. In our study, postoperative pain scores were same for 2 hours in both DPNB and caudal block groups. Duration of analgesia in group I (FLACC pain scores  $\leq 5$ ) was (mean  $\pm$  standard deviation)  $120.91 \pm 4.098$  min and, in group II,  $204.16 \pm 12.24$  min. But, after 2 hours, there was



**Figure 2:** Comparison of Ramsey sedation scores versus time revealed that sedation scores decreased significantly over time ( $P < 0.05$ ).

significant difference between the groups, which is not similar to the studies of Seyedhejazi *et al.*<sup>[10]</sup> and Beyaz *et al.*<sup>[11]</sup> They studied the same for bupivacaine and levobupivacaine,<sup>[12]</sup> respectively, but the duration of analgesia was similar in both the groups in their studies. No significant difference was found in sedation scores in the recovery room between the groups. We did not encounter any difficulties or complications during both the procedures. Edema occurred in six patients in group I but subsided within few minutes.

## Conclusion

Caudal block using bupivacaine (0.25%, 1 mL/kg) is a better alternative for postoperative analgesia than DPNB in circumcision.<sup>[13]</sup>

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