



A comparison of Dorsal penile nerve block vs. Caudal block for circumcision in children in a rural setup.

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ABSTRACT

Introduction: One of the commonly performed urological procedures in children is Circumcision. Although a simple procedure, it is associated with lot of pain. Regional techniques like dorsal penile nerve block (DPNB) and caudal block are low cost and simple methods to provide effective analgesia for circumcision.

The purpose of this article was to analyze the outcome of DPNB and caudal block in terms of analgesic adequacy and post operative pain scores in patients undergoing circumcision.

Methodology: A randomized, double-blind, trial was performed at B.K.L. Walawalkar hospital, Dervan. 40 children aged 3 to 12 years of ASA physical status I or II for elective circumcision under general anaesthesia, were randomized to have a DPNB (Group A = 20) or to undergo Caudal epidural block (Group B = 20) with 0.5 ml/kg of 0.25% Bupivacaine. These patients in addition received standard analgesic comprising 2 mg/kg of Diclofenac sodium suppository postoperatively. Each patient was assessed at 0 and 30 min and then at hourly intervals for 6 hours postoperatively by an independent observer for pain using FLACC Pain Scale (A behavioral scale for scoring postoperative pain in young children), total analgesic consumption and time for the first rescue analgesic request. Oral Paracetamol (15mg/kg) was given to patients as rescue analgesia when FLACC score was 5 or above.

Results: The results showed that both DPNB and Caudal block were equally effective in providing post operative analgesia. No significant difference was found in FLACC scores between the groups. The mean time for first rescue analgesia was comparable (Group A = 270 min, Group B = 300 min, P = 0.589) and both the groups required similar doses of paracetamol as rescue analgesic in the first 6 hours after surgery (Group A = 112.11, Group B = 114.27, P = 0.651)

Conclusion: Both DPNB and caudal block provide for comparable pain scores and post operative analgesia.

KEYWORDS : Circumcision, Caudal block, Dorsal penile nerve block (DPNB)

Introduction:

Circumcision, although a painful intervention, is one of the most commonly performed urological procedures in children.¹⁻³ Pain makes the child agitated, restless and non cooperative leading to significant morbidity and delayed recovery time.⁴ Thus pain relief has become an important aspect of post operative care.⁵

Regional techniques like dorsal penile nerve block (DPNB) and caudal block are found to be more effective than systemic opioids, non-steroid anti-inflammatory drugs, and acetaminophen for postoperative analgesia in circumcision. They provide excellent postoperative pain relief with preservation of consciousness and ventilator control.⁶⁻⁹

For decades, penile block was efficiently used for various types of penile reconstructive surgery. Recently it has been replaced by caudal anaesthesia as the most used and accepted regional blocks for children.¹¹ Caudal anaesthesia is approved for many a surgical procedures below the umbilicus e.g. inguinal hernia repair, urinary and digestive tract surgery and procedures that involve the pelvic girdle and lower extremities.¹⁰ But the literature suggests variable findings with respect to the efficacy of these two methods.

Therefore the purpose of our study was to analyze both dorsal penile nerve block and caudal block in terms of their analgesic efficacy and post operative pain scores in patients undergoing circumcision.

Materials & Methods:

The present study was conducted at B.K.L. Walawalkar Hospital & Diagnostic Centre, Dervan from January 2016 to December 2017. This randomized, double-blind study was authorized by the institutional research ethical board. After informed written consent from the parents, 40 children, aged 3 -12 years, belonging to American Society of Anesthesiologists (ASA) physical status I or II and scheduled for elective circumcision surgery were included in

the study.

Patients who were (ASA) classification III-IV, patients with contraindications to spinal anesthesia, history of allergy to amide-type local anesthetics, patients with a severe systemic disease, preexisting neurological disease or bleeding condition were not included in the study.

For the purpose of study children were randomly allocated by envelope method into two groups of 20 each. Those in group A received the Dorsal penile nerve block while Group B received the Caudal epidural block with 0.5 ml/kg of 0.25% Bupivacaine. The surgeon, nursing staff and the parents involved in direct care of the child were unaware of the study group allocations. In all the patients involved in our study, the blocks (penile nerve block and caudal block) were given by two anesthetists who were experts and had no involvement in the data collection.

The patients were transferred to the operating room and observed for vitals like systolic, diastolic and mean blood pressure, heart rate and peripheral oxygen saturation. With the help of a face mask, they were induced with 8% Sevoflurane in 50% air and 50% O₂. A 22/ 24 G (gauge) intravenous catheter was then inserted into a dorsal vein of the hand, through which 2mg/kg Propofol was injected to increase the depth of anaesthesia. Further a laryngeal mask, appropriate to the child's age and weight, was put in place and Sevoflurane was continued to be used for maintenance..

After painting and draping, the DPNB was performed in the supine position. First, the arch of the lower border of the symphysis pubis was palpated, then the base of the penis was gently pulled down, and a 30-G needle was inserted in the midline at an angle of 75° to the plane of the skin, at the base of the penis, until bony contact was made with the symphysis pubis. The needle was withdrawn partially and re-inserted towards the right side, where 0.25 ml/kg of 0.25% Bupivacaine was injected subcutaneously, to spread the infiltrate in

a fan-shaped manner. The procedure was then repeated on the other side. All caudal blocks were performed in the left lateral decubitus position with a 26- G needle and 0.5 ml/kg of 0.25% Bupivacaine was administered from the sacral hiatus.¹¹

Skin incision was performed 20 min after the block in each of the groups. No analgesic drug was used during the surgery. After the skin incision, if the heart rate or blood pressure increased by more than 20% of the baseline, it was to be recognized as a failed block and Fentanyl (2ug/kg) was to be given for intraoperative analgesia. Such patients were instructed to be excluded from the study.

After completion of the surgery, 2 mg/kg of Diclofenac sodium suppository was administered, the LMA was removed and then the patient was transferred to the recovery room. All children were monitored and their pain, sedation and side effects if any were recorded. The time of first rescue analgesic and total analgesic consumption was noted. For follow-up of postoperative pain, the FLACC Pain Scale¹² (A behavioral scale for scoring postoperative pain in young children) (Table 1) was used, If the FLACC pain score was 5 or over, Paracetamol (15mg/kg) was given as a supplemental analgesic. An independent investigator assessed the patients at 0 and 30 min and then at hourly intervals for 6 hours postoperatively.

Table: 1 FLACC Pain Evaluation Scale

Category	0	1	2
Face (F)	No Expression	Slight frowning, grimace	Mop, teeth clenching
Legs (L)	Normal position	Tight, stressful	Kick at anybody
Activity (L)	Calm	Turn around	Hop off, jerk
Cry (C)	No cry	Groan, moaning	Shouting cry, with screams
Consolability (C)	Relaxed	Consoled with hug or touch	Never consoled

Each of the five categories is graded between 0 and 2, thus eventually adding up the total score between zero and ten.

Statistical analysis:

Student's t- test was used to analyze demographic data. The comparison of total analgesic requirement, time to first rescue analgesic administration and FLACC pain scores between the two groups was done by paired t- test. We considered a statistically significant difference when P-value was less than 0.05.

Results:

Forty patients were included in the study, of which one half of the patients were randomized to undergo DPNB (Group A) and remaining half received Caudal block (Group B) with 0.5 ml/kg of 0.25% Bupivacaine each. For any reason, none of the patients were withdrawn from the study. Both study groups were comparable in terms of baseline demographic parameters like age, weight, ASA scores, duration of anaesthesia and surgery in minutes (min) (Table 2).

Table: 2 Patient demographic and Pre operative data

	Group A(n=20)	Group B (n=20)	P value
Age	6.65±0.88	6.9±10.85	0.366
Weight	21.4±1.5	21.65±1.46	0.597
ASA I/II	14/ 16	15/ 5	-
Duration of anaesthesia (min)	53.3±1.98	53.8±2.12	0.445
Duration of Surgery (min)	20.35±1.31	20.5±1.43	0.732

All the data are presented as mean ± SD except ASA classification (presented in numbers); P > 0.05, statistically non significant.

Table 3 shows mean FLACC scores at 30 min and then at hourly

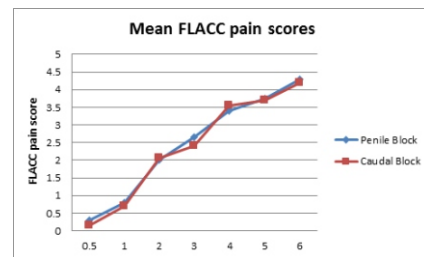
intervals for 6 hours post operatively. There differences between Group A (DPNB) and Group B (Caudal block) in terms of FLACC scores were insignificant, which is also noted in Chart 1.

Table 3: Mean FLACC scores at different time intervals

Hours	Group A (Penile Block)	Group B (Caudal Block)	P value
30 min	0.3±0.47	0.15±0.37	0.268
1	0.8±0.77	0.7±0.73	0.676
2	2.0±0.86	2.05±0.69	0.840
3	2.65±1.04	2.4±0.99	0.442
4	3.4±1.05	3.55±0.94	0.637
5	3.75±1.12	3.7±0.98	0.881
6	4.3±1.22	4.2±1.11	0.787

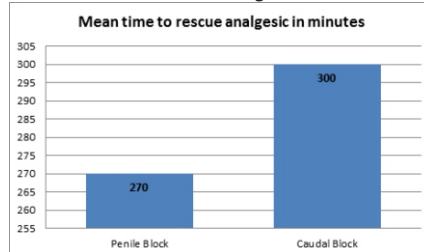
All the data are presented as mean ± SD; P < 0.05, is statistically significant

Chart 1: Comparison of mean FLACC pain scores at different time intervals



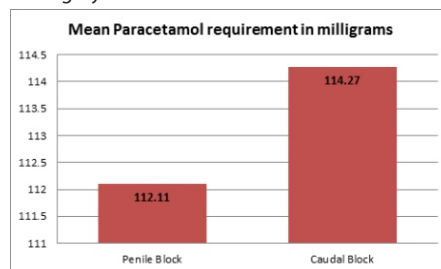
Also there was no significant difference between Group A (mean 270 min) and Group B (mean 300 min) in terms of mean time required to first rescue analgesic in minutes, P = 0.589 (Chart 2)

Chart 2: Mean time to first rescue analgesic in minutes



In patients receiving Penile block (Group A), the requirement for analgesic was comparable to those patients who received the caudal block (Group B) P=0.651 (Chart 3)

Chart 3: Mean Paracetamol requirement in milligrams in the first 6 hours after surgery



Discussion:

Despite improvements in understanding the mechanism of acute pain, pain relief after surgery continues to be a major medical challenge. For this purpose, caudal block and DPNB are amongst many a different techniques that are being used.^{13,14}

In literature there are differing views and opinions on both these anesthetic methods (Dorsal penile block and Caudal) for penile

procedures. Therefore it becomes difficult for the anaesthetists to choose a procedure that may provide both a prolonged lasting analgesia as well as lesser side effects post operatively.

Bayaz SG¹⁵ and Weksler N *et al.*¹⁶ found the postoperative analgesic efficacy and supplementary analgesic needs of penile block and caudal block to be similar. In another study, the time to first analgesia requirement was compared between penile block and caudal and the difference was detected to be insignificant.¹⁷

In comparison, Naja Z *et al.*¹⁸ recorded higher postoperative pain scores in penile block group. Sandemann *et al.*¹⁹ noted that those patients who received Penile block needed more analgesics to control postoperative pain as compared to those who underwent Caudal block. Another study, compared Caudal block and Penile block for the management of postoperative pain and concluded longer postoperative analgesia was achieved with Caudal block.²⁰

To add to the confusion, some researchers advocate the use of Penile block over Caudal block. A study by Ashrey EM,²¹ found penile block to be better than caudal block in terms of postoperative pain. Similar findings by Kundra *et al.*²² and Metzelder *et al.*²³ found that penile block provided better analgesia when compared with caudal epidural analgesia in children.

In this study, we compared the outcome of dorsal penile nerve block and caudal block in terms of analgesic efficacy and post operative pain score in patients undergoing circumcision. The results showed that both DPNB and Caudal block were equally effective in providing post operative analgesia. No significant difference was found in FLACC scores between the groups. The mean time for first rescue analgesia was comparable and both the groups required similar doses of paracetamol as rescue analgesic in the first 6 hours after surgery.

Some studies,^{3, 6,13, 23} have reported minor complications like bleeding, edema, impairment of micturation and temporary leg weakness. We did not come across any technical difficulties or complications during DPNB or Caudal block. Once the patients started tolerating oral fluids, passed urine, were mobile and comfortable, they were discharged on the same day.

Limitations of the study:

1. The study was limited to evaluation of postoperative analgesia only up to the first 6 hours after which the patient was discharged.
2. Our sample size was not enough to assess the block-related complication in any patients.

Conclusion:

In conclusion, both DPNB and caudal block provide for comparable pain scores and post operative analgesia. In conclusion, from the data obtained in our study, we propose that both the regional techniques, in competent hands are simple and efficient to perform under general anesthesia. Both techniques provide efficient long-term postoperative analgesia after circumcision.

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