

A Comparison of 0.25% Levobupivacaine vs 0.2% Ropivacaine in Paediatric Circumcision

Dr. S. Frank Davis Daniel M.S., M. Ch¹, Dr. Muthushenbagam M. ², Dr. J. Rosebell³

¹Assistant Professor, Department of Urology, Kanyakumari Government Medical College, Asaripallam, Nagercoil, Kanyakumari District, Tamilnadu, India

²Associate Professor, Department of Anaesthesiology, Kanyakumari Government Medical College, Asaripallam, Nagercoil, Kanyakumari, District, Tamilnadu, India

³Post Graduate, Department Of Anaesthesiology, Kanyakumari Government Medical, College, Asaripallam, Nagercoil, Kanyakumari, District, Tamilnadu, India

Abstract: Circumcision is very often performed in pediatric surgery. Regional techniques are more effective than non-steroid anti-inflammatory drugs, systemic opioids, and acetaminophen for postoperative analgesia in pediatric circumcision. Dorsal penile nerve block is a safe and effective method for postoperative analgesia. We compared the postoperative analgesic efficacy, need for systemic drugs, with 0.25% LEVOBUPIVACAINE vs 0.2% ROPIVACAINE, in elective circumcision cases. **Methods:** 100 boys aged 1 to 12, ASA PS I undergoing elective circumcision participated in this study. Group 1 (n = 50) received a DPNB using a 25 G needle, with 0.25% levobupivacaine 0.5 ml/kg. Group 2 (n = 50) received DPNB using a 25 G needle with 0.2% ropivacaine 0.5 ml/kg. Upon completion of the surgery, the children were observed in the recovery room for pain, sedation, and side effects (nausea, vomiting, agitation, penile hematoma, bleeding, motor block, urinary retention) for 30 minutes. They were observed and recorded for the parameters at 1, 3, 6, 8, 10, 12, 16, 20, 24 hours. **Results:** No significant differences existed between the groups with respect to age, weight, or duration of anesthesia. Patients of both groups had similar pain scores. No opioid was used in either group, intraoperatively. Age (years) is 3.5 ± 1.43 , Weight (Kg) 15.3 ± 4.48 and Duration of surgery (minutes) is 18.4 ± 3.40 . During the 24 hour period none of the patients required analgesics. There was no statistically significant difference for the analgesic demand between group 1 and group 2. 5 minute FLACC pain score of the groups are mean \pm standard deviation 1.05 ± 2.39 , 1.35 ± 1.73 . **Conclusion:** DPNB with levobupivacaine and ropivacaine provide similar pain scores and painfree postoperative periods. Both the drugs are effective for long-term postoperative analgesia after circumcision. Supplementary analgesic need is nil and hence this will be very effective in day care.

Keywords: dorsal penile nerveblock, circumcision, 0.25% levobupivacaine, 0.2% ropivacaine

1. Introduction

Circumcision is very often performed in pediatric surgery. Regional techniques are more effective than non-steroid anti-inflammatory drugs, systemic opioids, and acetaminophen for postoperative analgesia in pediatric circumcision. Dorsal penile nerve block is a safe and effective method for postoperative analgesia. The application of regional anaesthesia in paediatrics has very much increased over past 30 years. Regional anaesthesia is a major therapeutic option for preventing and treating pain in paediatrics both intraoperatively and post operatively [1]. We compared the postoperative analgesic efficacy, need for systemic drugs, with 0.25% LEVOBUPIVACAINE vs 0.2% ROPIVACAINE, in elective circumcision cases.

2. Materials and Methods

This study was approved by the ethical committee and informed consent was obtained from the parents. 100 boys aged 1 to 12, ASA PS I undergoing elective circumcision participated in this prospective, double blinded randomized study. They were randomized into two groups. Exclusion criteria is systemic disease, neurological disease, spinal disease, bleeding disorders, seizure disorder, hypersensitivity to local anaesthetics.

Intravenous access gained using 22-gauge intravenous catheter in the dorsum of the hand. Children were monitored

with a 3 lead electrocardiogram systolic, diastolic, mean blood pressure, heart rate and peripheral oxygen saturations. Premedication injection atropine 20 mcg/kg, Injection ketamine 2 mg/kg. Anesthesia was delivered with an intravenous bolus of propofol 2-3 mg/kg until loss of eyelash reflex. If the intravenous catheter could not be inserted, inhalational induction was performed with a facemask using 8% sevoflurane in 50% air + 50% O₂. Sevoflurane was used for maintenance. After induction, a laryngeal mask, appropriate to the children's age and weight, was put in place.

Patients were randomized into 2 groups. Using closed envelope technique a theatre staff will pick up the cover of her choice. Drug solutions were prepared by trainee anesthetist. During anesthetic maintenance, with the patient in the supine position group 1 (n = 50) received a DPNB using a 25 G needle, with 0.25% levobupivacaine 0.5 ml/kg. This was given in the triangular space under the superficial fascia bounded by symphysis pubis, membranous layer of superficial fascia, corpus cavernosa. Bilateral injection was done and a subcutaneous ring of local anesthetic was injected around the ventral side of shaft of penis. Group 2 (n = 50) received DPNB using a 25 G needle in with 0.2% ropivacaine 0.5 ml/kg. Upon completion of the surgery, the children were observed in the recovery room for pain, sedation, and side effects (nausea, vomiting, agitation, penile hematoma, bleeding, motor block, urinary retention) for 30 minutes, and shifted to post operative ward. If the children displayed any signs of pain perception 25 milligram per Kg

of liquid acetaminophen was given orally. They were observed at 1, 3, 6, 8, 10, 12, 16, 20, 24 hours. The first analgesic demand time was measured from the time the DPNB block was given to the administration of acetaminophen. Probable local or systemic complications were recorded. For follow-up of postoperative pain, the *FLACC Pain Scale* (FLACC: A behavioral scale for scoring postoperative pain in young children) was used. If the FLACC pain score was 5 or over, supplemental analgesics were administered postoperatively and recorded. In the 24-hours period the children were observed for any postoperative pain, adverse events, nausea, vomiting, pruritus, or urinary retention.

FLACC Pain Evaluation Scale

Categories Scoring

Categories	0	1	2
Face	No particular expression or smile	Occasional grimace or frown; withdrawn, disinterested	Frequent to constant frown, clenched jaw, quivering chin
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid, or jerking
Cry	No cry (awake or asleep)	No cry (awake or asleep)	Crying steadily, screams or sobs; frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging, or being talked to; distractable	Difficult to console or comfort

Statistics

Statistical analysis was done using IBM SPSS Statistics version 23. Power analysis was done and the power was found to be 0.93. To compare means students t test was done. A P value of <0.05 was considered significant. Data are given as mean \pm standard deviation.

3. Results

100 boys undergoing circumcision were included in the study. One patient in group 1 and 2 patients in group 2 were excluded from the study. The remaining patients were divided into group 1 (n = 49) and group 2 (n = 48). No significant differences existed between the groups with respect to age, weight, or duration of anesthesia

	Group 1 (n=49)	Group 2 (n=48)	P value
Age (years)	3.5 \pm 1.43	3.3 \pm 1.56	0.30
Weight (Kg)	15.3 \pm 4.48	15.5 \pm 4.98	0.95
Duration of surgery (minutes)	18.4 \pm 3.40	17.9 \pm 3.20	0.66

Table1

Comparison of Groups According to Age, Weight, duration of Anesthesia

On evaluation of the FLACC pain scores at different time intervals between the groups, no significant increase in pain scores was found. A comparison of FLACC pain score measurements of the two different groups during all the time intervals (1, 3, 6, 8, 10, 12, 16, 20, 24 hours) revealed no significant variation (Fig.1)

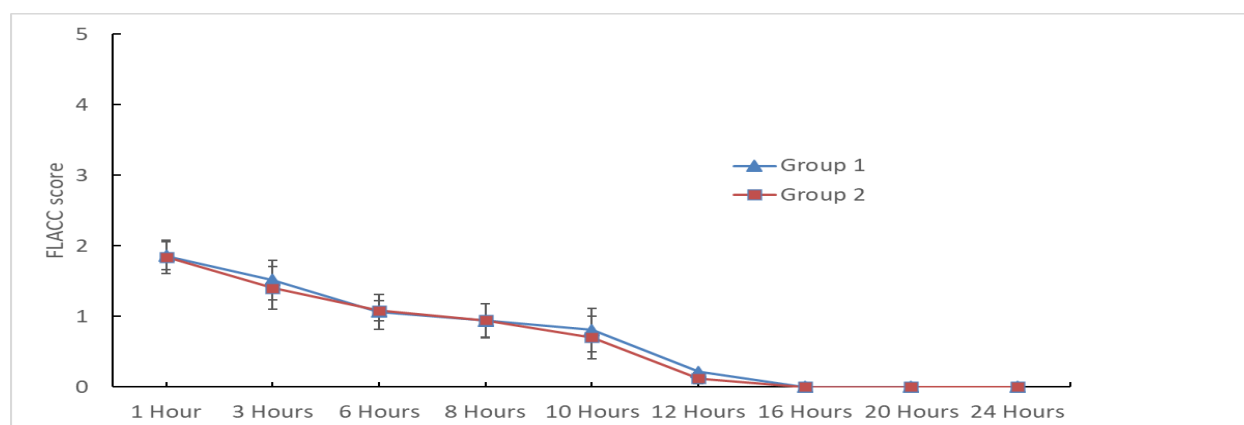


Figure 1: Comparison of FLACC pain scores at different time intervals of Group 1 and Group 2. Group 1: DPNB with levobupivacaine group, Group 2: DPNB with ropivacaine group. Data are expressed as mean \pm SD.

Patients of both groups had similar pain scores. No opioid was used in either group, intraoperatively. Three patients were excluded from the study because they needed extra analgesic immediately at the beginning of the postoperative period. Therefore their blocks were considered as

unsuccessful. During the 24 hour period none of the patients required analgesics. There was no statistically significant difference for the analgesic demand between group1 and group 2.

No major complication (arrhythmia, hypotension, shock, or seizures) after DPNB was noted. In group 1, blood was aspirated in three patients before local anesthetic injection. No edema, hematoma, postoperative agitation, motor block, or urinary retention were seen in either group. No severe hemorrhage occurred during surgery. Postoperatively both the groups did not need systemic analgesics.

4. Discussion

In this study, we compared the efficacy of DPNB with 0.25% levobupivacaine vs 0.2% ropivacaine for circumcision cases under general anesthesia. Postoperative analgesic efficacy and supplementary analgesic requirement of DPNB in both groups were found to be similar. DPNB is sometimes used as a sole anesthetic technique for circumcision and sometimes used along with a general anesthesia. Penile block is a safe, easy, and effective intervention used to decrease postoperative pain. It also reduces the adrenocortical stress response and behavioural distress. After successful blocks, postoperative analgesia can be provided for more than 12 hours. Faster recovery, earlier micturition, and earlier discharge from the hospital is highly beneficial and can be used in daycare.

In this study, we used levobupivacaine and ropivacaine because of its longer sensorial block duration under DPNB.

We found similar postoperative pain scores for 24 hours in both groups. In postoperative period patients were comfortable. Decreasing pain scores for both groups with time are normal. However, low pain scores at all measurement intervals are important as they reflect near-perfect analgesia (5 minute FLACC pain score of the groups are mean \pm standard deviation 1.05 ± 2.39 , 1.35 ± 1.73). This data shows a nearly perfect analgesia level.

The patients in both the groups did not need any systemic analgesics. In a study of penile block with levobupivacaine, postoperative analgesia duration was reported to be over 300 minutes.

We did not face any technical difficulties, major complications. A study by Telgarsky et al. Of DPNB used on 96 boys reported a minor complication rate of 8.3%. In another study, edema occurred in 10 patients of 63 who had DPNB. Serour et al. [2] indicated that edema occurred in 31 patients (12.4%), hematoma in twelve patients (4.8%) and vomiting in sixteen patients (6.4%). The incidence of minor complications in this study was smaller than that of this studies. The most important limitation of this study was that the number of patients in the group was small (only 25).

In conclusion, DPNB with levobupivacaine and ropivacaine provide similar pain scores and painfree postoperative periods. We did not encounter any major complications during the technique and our minor complication rate was small. In light of these data, we suggest that both the drugs are effective for long-term postoperative analgesia after circumcision. Supplementary analgesic need is nil.

References

- [1] millers anaesthesia 8th edition
- [2] Choi WY, Irwin MG, Hui TW, Lim HH, Chan KL. EMLA cream versus dorsal penile nerve block for postcircumcision analgesia in children. *Anesth Analg*. 2003;96:396–399. [PubMed]
- [3] Serour F, Cohen A, Mandelberg A, Mori J, Ezra S. Dorsal penile nerve block in children undergoing circumcision in a day-care surgery. *Can J Anaesth*. 1996;43:954–958. [PubMed]
- [4] Telgarsky B, Karovic D, Wassermann O, Ogibovicova E, Csomor D, Koppl J, et al. Penile block in children, our first experience. *Bratisl Lek Listy*. 2006;107:320–
- [5] [PubMed] 1. Dalens B. Regional anaesthesia in children. *Anaesth Analg*. 1989;68:654–72. [PubMed]
- [6] Melman E, Penuelas J, Marrufo J. Regional anaesthesia in children. *Anaesth Analg*. 1975;54:387–90. [PubMed]
4. Ivani G, Mossetti V. Pediatric regional anesthesia. *Minerva Anesthesiol*. 2009;75:577–583. [PubMed]
- [7] Silvani P, Camporesi A, Agostino MR, Salvo I. Caudal anesthesia in pediatrics: an update. *Minerva Anesthesiol*. 2006;72:453–459. [PubMed]
- [8] Brady-Fryer B, Wiebe N, Lander JA. Pain relief for neonatal circumcision. *Cochrane Database Syst Rev*. 2004;CD004217. [PubMed]
- [9] De Negri P, Ivani G, Tirri T, Favullo L, Nardelli A. New drugs, new techniques, new indications in pediatric regional anesthesia. *Minerva Anesthesiol*. 2002;68:420–427. [PubMed]
- [10] Cyna AM, Middleton P. Caudal epidural block versus other methods of postoperative pain relief for circumcision in boys. *Cochrane Database Syst Rev*. 2008;CD003005. [PubMed]
- [11] Uguralp S, Mutus M, Koroglu A, Gurbuz N, Koltuksuz U, Demircan M. Regional anesthesia is a good alternative to general anesthesia in pediatric surgery: Experience in 1,554 children. *J Pediatr Surg*. 2002;37:610–613. [PubMed]
- [12] Voepel-Lewis T, Malviya S, Tait AR, Merkel S, Foster R, Krane EJ, et al. A comparison of the clinical utility of pain assessment tools for children with cognitive impairment. *Anesth Analg*. 2008;106:72–78. [PubMed]