International Surgery Journal
Gokalp F et al. Int Surg J. 2020 Feb;7(2):360-364
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20200283

Original Research Article

Comparison of two analgesic block techniques for circumcision: dorsal penile nerve block and caudal block

Fatih Gokalp[1]*, Onur Karsli[2]

[1]Osmaniye Government Hospital, Urology Clinic, Osmaniye, Turkey
[2]Department of Urology, Health Science University Kocaeli Derince Training and Research Hospital, Kocaeli, Turkey

Received: 23 November 2019
Accepted: 31 December 2019

***Correspondence:**
Dr. Fatih Gokalp,
E-mail: fatihgokalp85@gmail.com

ABSTRACT

Background: Circumcision is most common and oldest surgery but also could be frightening for children because of postoperative pain. Authors aim to evaluate postoperative pain conditions of patients by using the visual pain scale (VPS).
Methods: Between 2016 and 2018, 168 children undergone circumcision. The patients were splitted into three groups depend on their anesthetic care; the dorsal penile block (DPNB), caudal block (CB) and combine block.
Results: The mean age were 95.3±20.9 (65-186) months. There was no significant difference between the CB and combine block in VPS at 1st, 3rd hours and second days (p=0.19, p=0.39 and p=0.9 respectively). The VPS significantly higher in the DPNB arm when compared with caudal and combine block arm at 1st and 3rd hours (p<0.01 and p<0.01 respectively) but there was no significant difference between the DPNB and caudal block at second days (p=0.9). There was no significant difference between groups for analgesic requirements (p=0.07). Incidences of nausea and vomiting were seen rarely especially in the DPNB arm and the difference was not statistically significant among the groups (p=0.9).
Conclusions: CB and DPNB are effective techniques for pain relief following penile surgery. CB has superior to DPNB at 1st and 3rd hours but no difference at follow up. Both techniques are appropriate methods for postoperative pain relief.

Keywords: Analgesia, Caudal block, Circumcision, Dorsal penile block, Pain

INTRODUCTION

Circumcision is one of the oldest surgical operations which was performed and described till ancient times.[1] Thirty percent of males' undergone circumcision in worldwide.[2]

Circumcision is performed for medical indication but most of religious. Religious circumcision is commonly performed in Muslim and Jewish community. Medical indications for circumcision are chronic sclerosan inflammation, phimosis, to prevent urinary infection and also sexually transmitted diseases. Surgery success and complication rates depend on good preoperative preparation including anesthetic care and proper knowledge for complications.[3] Circumcision in children is followed by severe pain, especially during the first 2 hours of postoperative period. Pain control after surgery increases patient satisfaction and shortens hospital stay.[4]

Various methods are being used for postoperative pain of this operation such as dorsal penile nerve block (DPNB), caudal block (CB), topical analgesia and also systemic non-steroidal anti-inflammatory drugs (NSAIDs).[4] Especially, CB and DPNB have been using as most common techniques and both provide effective analgesia for circumcision.[5]

On the other hand, there are some major complications in both techniques. Complications rates such as ischial osteomyelitis and glans penis necrosis after penile block have been reported as 4-7% in the literature.[6] Motor blockade and urinary retention may have been seen in the CB.[7]

The current study was planned to investigate benefits and complications among DPNB, CB, and combination of DPNB and CB.

METHODS

After receiving permission from Kocaeli Derince Research Ethics Committee, this cross-sectional study was conducted. Patients applied to urology clinic between 2016 and 2018 for circumcision were enrolled in the study. Preoperative preparation for surgery was done carefully. Parents of all patients were informed about the procedure and the data of the patients will be used for scientific purpose. Written informed consent was obtained. Preoperatively patients were divided to three groups. Group 1 includes patients who received penile block; group 2, consisted of caudal block patients; and group 3, includes patients who received combine block (low dose caudal and penile block). Circumcision was performed under general anesthesia and dorsal slit technique was used. The postoperative pain was measured and recorded by using the Wong Baker visual pain scale in postoperative 1st, 3rd hours and second day.[8]

Block technique

DPNB

The patient was placed in the supine position. Two injections were done to infra-pubic area symmetrically, just below the lower border of the symphysis pubis. Other injections were done 1 cm lateral to the midline on each side, below buck's fascia at 10.30 and 1.30 O'clock position. Another injection was injected ventrally.

Drugs and dosage

Administered anesthetic agents were 5 ml/kg of 2% prilocaine without adrenalin or alternatively, 5 ml/kg of lidocaine with adrenaline.

Caudal block

The patient was placed in the lateral position with the spine and the knees flexed. Flexion helped for better palpation to the sacral cornua. The sacral hiatus was identified by palpating the posterior superior iliac spine and the sacral hiatus form the edges of an equilateral triangle. The middle finger and the thumb rest on the two posterior superior iliac spines, which form the base on the triangle described above; the index finger was then placed to complete the equilateral triangle. The tip of the triangle so formed was now palpated by the distal phalanx of the thumb as it had a bigger surface area to feel both the cornua together. With the palpating finger on the S4 spinous process, needle puncture was achieved in the most proximal region of the sacral hiatus with the needle inclined 45-60° to the skin. The needle was then advanced further to "feel" the "give" or "pop-up" experienced due to perforation of the sacrococcygeal ligament.

Drugs and dosages

Sacral level: 0.25 ml/kg of 0.5% bupivacaine; T10: 0.75 ml/kg of 0.25% of bupivacaine. Drug was given slowly at a rate from 0.25 to 0.5 ml/min, in aliquots and with intermittent aspiration to rule out intravascular injection.

Combined block

The caudal block was performed the same procedure which mentioned above. After the caudal block, the patient was placed in supine position and the DPNB was done.

Drugs and dosage

Caudal block: Sacral level: 0.10 ml/kg of 0.5% bupivacaine was used. Drug was given slowly at a rate from 0.25 to 0.5 ml/min, in aliquots and with intermittent aspiration to rule out intravascular injection.

DPNB: 5 ml/kg of 2% prilocaine without adrenalin was used.

Statistical analysis

Statistical evaluation was completed using the Statistical Package for Social Sciences program (version 18) SPSS Inc. Differences between the groups and correlations between variables were investigated with Kruskal Wallis, the Chi-square test and ANOVA. Results were assessed at a 95% confidence interval and $p<0.05$ was accepted as statistically significant.

RESULTS

Totally, 168 children underwent circumcision. The subjects divided into three groups by anesthetic care. The mean age of patients was 95.3±20.9 (65-186) months. The mean operation time was 17.1±2.1 (10-26) minutes. The caudal group had significantly shorter operation time ($p<0.001$). Demographic and perioperative data were presented for each group in Table 1. The visual pain scores (VPS) were similar between the CB and combine block arm at first and third hours and second days (1st hour: 1.46±0.8, 1.87±1.67, 3rd hour: 2.11±1.1, 1.9±1.3, second days: 2.86±1.2, 2.92±1.2; $p=0.19$, $p=0.39$ and $p=0.9$ respectively). There was significantly higher VPS scores following DPNB, compared with caudal block at first and third hours but not significantly different at second days (1st hour 4.0±2.2, 1.46±0.8, 3rd hour:

2.9±1.0, 2.1±1.1, second days: 2.3±0.8, 2.8±1.2; p<0.01, p<0.01 and p=0.9, respectively) (Figure 1). The VPS was significantly higher in DPNB arm when compared with combine block (p<0.01) (Figure 2). The analgesic requirement was higher in DPNB groups but there was not a significant difference between groups (p=0.07) (Figure 3). Incidence of nausea and vomiting was seen rarely especially in the DPNB arm but there was no significant difference between groups (p=0.9). The prolonged motor blockage was significantly higher in the CB compared with combine block (p=0.02). Urinary retention was not seen in any group. Postoperative only minor complications were seen including infection and hematoma. The bleeding was the most common complication which was managed conservatively and seen in 15 patients who needed analgesic requirements but there was not significantly difference between groups (p=0.28). One (0.5%) patient in the DPNB group was undergone reoperation for persistent bleeding. The cost analysis of each groups showed that CB and combine block arm costs were similar but the DPNB was significantly cheaper than others (mean±SD; caudal: 224.23± 59.3 TL, Combine: 232.4±61.8 TL and DPB: 74.6±17.8 TL, p=0.757, p<0.001 and p<0.001, respectively, TL: Turkish Liras).

Table 1: Demographic data of patients.

Variable	Caudal	Combined	DPNB	P value
No. of patients	30	100	38	
Mean age (month)	89.6±17.1 (72-134)	90.3±16.5 (68-128)	114.6±22.7 (70-186)	
Mean operative time (min)	14.1±2.1 (10-17)	17.3±0.9 (14-20)	18.3±2.3 (14-24)	<0.001
Analgesic requirement (N, %)	4 (13%)	13 (13%)	11 (28.9%)	0.07
Bleeding (N, %)	1 (3.3%)	8 (8%)	6 (15.7%)	0.28
Cost (TL: Turkish Liras)	224.2±59.3 (140.8-459.5)	232.4±61.8 (135.6-564.7)	74.6±17.8 (50-167.8)	<0.001
VPS 1. hour	1.4±0.8 (1-5)	1.8±1.6 (0-7)	4.0±2.2 (1-8)	<0.001
VPS 3. hour	2.1±1.1 (1-6)	1.9 ±1.3 (0-6)	2.9±1.0 (1-5)	<0.001
VPS 2. day	2.86±1.2 (1-7)	2.9±1.2 (1-7)	2.3±0.8 (1-5)	0.9

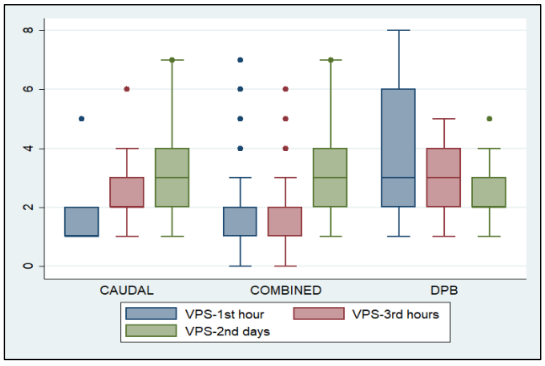

Figure 1: VPS score of each group.

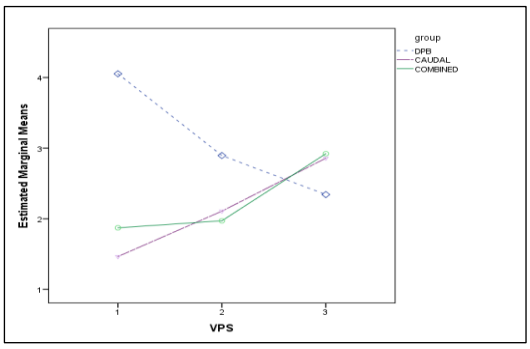

Figure 2: Changing of VPS between groups.

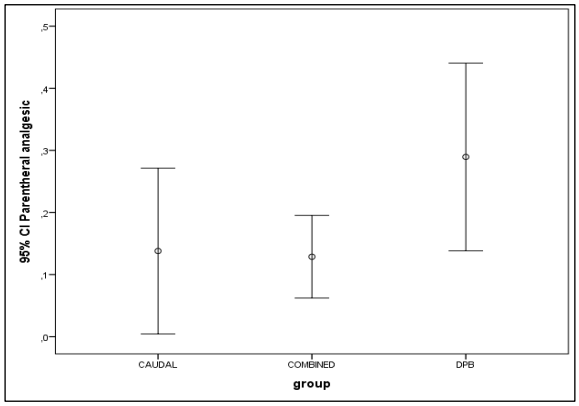

Figure 3: Analgesic requirements of groups.

DISCUSSION

In this study, authors compared the effectiveness of penile block, caudal block and combination of them using prilocaine and bupivacaine for pain control after circumcision, which is one of the traumatic experiences of childhood. When the pain assessment scales were compared, there was a significant superiority in the caudal block and combined analgesia group compared to the other group, especially on the first hours. The VPS was significantly higher in the DPNB group when compared with CB and combine block, but the analgesic

requirement was not significantly different between groups (p=0.07). In general, effective analgesia of all three methods resulted in the satisfaction of the parents of all children.

In many studies, caudal block and penile block were compared with different local anesthetics in terms of their efficacy. In the study by Demiraran and Vater found that caudal block and penile block using bupivacaine were effective in pain after circumcision.[9,10] In his study with bupivacaine (0.25%) (0.2 ml/kg), Demiraran showed that postoperative analgesia lasted 6-8 hours with single dose epidural and 6 hours with penile block.[10] Similar to this study, Malik et al, meta-analysis study showed caudal block provide longer analgesia but there was not significantly difference in the efficacy and duration of first additive analgesia between DPNB and CB.[11] Haliloglu et al's study was compared DPB, caudal block and intravenous paracetamol.

The pain score was significantly lower in the caudal block groups.[12] However, Cyna et al review study showed that there was no significant difference between caudal and the DPNB block in pain score and parents' satisfactory.[13]

This study showed that complications were not related with degree of pain or the VPS. The most frequently observed complication is hemorrhage. Only one (% 0.5) patient undergone reoperation for bleeding. Thorup et al study had demonstrated reoperation rate as % 0.1.[14] In the literature, the complication rates depend on multiple factors, such as age of patients, clinical comorbidities, and surgical technique. This study demonstrated the bleeding was the most common complication had seen especially in children who has needed analgesic requirement but there was no significant difference between the groups. The DPNB had also major complications such as glans necrosis due to containing vasoconstrictor.[15] In this study we did not see any major complications such as methemoglobinemia or glans necrosis in the DPNB groups.

The caudal block had short-term complications including urinary retention and prolonged motor blockage. In this study, the prolonged motor blockage was significantly higher in caudal block arm compared with combine block. Similar to this study, Silviani et al study demonstrated low concentrations of bupivacaine prolonged analgesia while shortening the duration of motor block ($p<0.05$).[16] The literature suggested that bupivacaine had dose related motor blockage and optimal anesthetic dose may increase analgesic efficacy after CB while limiting the duration of motor block.[11]

CONCLUSION

Single-shot caudal epidural blockade and DPNB are safe and effective regional technique for pain relief following penile surgery. Both techniques can be regarded as suitable alternatives for providing postoperative analgesia in children undergoing penile surgery.

ACKNOWLEDGEMENTS

Author thank to their anesthesia care team who worked particular for study. All authors read and approved final manuscript.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee of Kocaeli Derince Research Hospital (2019/6)

REFERENCES

1. Remondino P. History of Circumcision from the earliest times to the present. Honolulu, Hawaii: University Press of the Pacific; 2001.
2. Homfray V, Tanton C, Mitchell KR, Miller RF, Field N, Macdowall W, et al. Examining the association between male circumcision and sexual function: evidence from a British probability survey. AIDS. 2015;29(11):1411.
3. Jöhr M, Berger TM. Anaesthesia for the paediatric outpatient. Curr Opin Anaesthesiol. 2015;28:623-30.
4. Weksler N, Atias I, Klein M, Rosenztsveig V, Ovadia L, Gurman GM. Is penile block better than caudal epidural block for postcircumcision analgesia?. J Anesth. 2005;19(1):36-9.
5. Tutuncu AC, Kendigelen P, Ashyyeralyeva G, Altintas F, Emre S, Ozcan R, et al. Pudendal Nerve Block Versus Penile Nerve Block in Children Undergoing Circumcision. Urol J. 2018;15(3):109-15.
6. Kaplanian S, Chambers NA, Forsyth I. Caudal anaesthesia as a treatment for penile ischaemia following circumcision. Anaesth. 2007;62(7):741-3.
7. Dalens B, Vanneuville G, Dechelotte P. Penile block via the subpubic space in 100 children. Anesthesia and analgesia. 1989;69(1):41-5.
8. Garra G, Singer AJ, Domingo A, Thode HC. The Wong-Baker pain FACES scale measures pain not fear. Pediatr Emergency Care. 2013;29(1):17-20.
9. Vater M, Wandless J. Caudal or dorsal nerve block?. Acta Anaesthesiol Scand. 1985;29(2):175-9.
10. Demiraran Y, Akman Y, Tuce Z, Cam K, Erol A. A comparison of postoperative analgesic efficacy of dorsal penile nerve block versus single dose caudal epidural block for penile surgery in children. Med J Kocatepe. 2005;6:47-52.
11. Malik K, Chamberlain RS. Caudal and Penile Blocks Demonstrate Similar Reliability and Efficacy in Pediatric Patients Undergoing Circumcision: A Meta-Analysis. Int J Clin Med. 2016;7(05):309.
12. Haliloglu AH, Gokce MI, Tangal S, Boga MS, Tapar H, Aladag E. Comparison of postoperative analgesic efficacy of penile block, caudal block and

intravenous paracetamol for circumcision: A prospective randomized study. Int Braz J Urol. 2013;39(4):551-7.
13. Cyna AM, Middleton P. Caudal epidural block versus other methods of postoperative pain relief for circumcision in boys. Cochrane Data Sys Rev. 2008(4).
14. Thorup J, Thorup SC, Ifaoui IB. Complication rate after circumcision in a paediatric surgical setting should not be neglected. Dan Med J. 2013;60(8):4681.
15. Sara CA, Lowry CJ. A complication of circumcision and dorsal nerve block of the penis. Anaesth Inten Care. 1985;13(1):79-82.
16. Silvani P, Camporesi A, Agostino MR, Salvo I. Caudal anesthesia in pediatrics: an update. Minerva Anestesiol. 2006;72(6):453-9.

Cite this article as: Gokalp F, Onur K. Comparison of two analgesic block techniques for circumcision: dorsal penile nerve block and caudal block. Int Surg J 2020;7:360-4.