

Comparison of Penile Block Versus Intravenous Paracetamol in Boys Undergoing Circumcision Under General Anesthesia for Pain Management

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Penile Block
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Boys

Aleena Tahir and Waqas Ahmed

ABSTRACT

Objective: To find a standard of care for postoperative pain management following circumcision by comparing dorsal penile block with intravenous paracetamol.

Study Design: Randomized clinical trial study

Place and Duration of Study: This study was conducted at the Pediatric surgery Nishtar Hospital, Multan from February 2021 to January 2022.

Methods: Postoperative pain management measures were compared among 2 groups of children. At the conclusion of the circumcision procedure, a researcher who was blinded to the pain relief method used the Children's Hospital Eastern Ontario Pain Scale (CHEOPS) to assess pain. This test was also performed at 30, 60, 120, and 180 min after the procedure.

Results: Mean CHEOPS 30' of Group A and Group B was 7.77 ± 2.48 and 8.00 ± 2.05 , respectively. ($p=0.567$). Mean HR 30' of Group A and Group B was 114.89 ± 8.95 and 112.29 ± 8.01 , respectively. ($p=0.084$). Mean RR 30' of Group A and Group B was 29.75 ± 3.49 and 31.08 ± 3.59 , respectively. ($p=0.035$). Mean CHEOPS 180' of Group A and Group B was 5.43 ± 1.72 and 4.98 ± 1.68 , respectively. ($p=0.138$). Mean HR 180' of Group A and Group B was 104.88 ± 15.33 and 110.14 ± 16.76 , respectively. ($p=0.064$). Mean RR 180' of Group A and Group B was 31.52 ± 5.58 and 30.68 ± 5.35 , respectively. ($p=0.380$).

Conclusion: This study demonstrates that neither penile block nor intravenous paracetamol shows superiority in reducing pain after circumcision, indicating that both methods can be used with confidence. However, it is essential to consider the potential side effects associated with regional anaesthesia and systemic analgesic applications.

Key Words: Boys, Circumcision, Postoperative pain, Paracetamol, CHEOPS, Penile block

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INTRODUCTION

It is the oldest and most frequently performed surgical procedure in the world. Its management involves keeping the patient safe and pain-free while recovering quickly and satisfactorily¹. Many research articles have investigated the associations of circumcision with postoperative pain and analgesia; however, there is a need for more research, particularly on pain relief after the operation².

The failure of adequate pain relief during and after surgery may lead to more long-term complications, including altered sensory processing and exaggerated

responses to painful stimuli³.

In our everyday medical work, we often get requests to circumcise newborns and older boys. Parents worry that their kids will feel a lot of pain, which has a significant effect on how comfortable they are after the procedure⁴. Our time in the clinic has shown us that when their children are hurt after circumcision, families freak out and don't know what to do. , there's no standard way to ease this pain after surgery⁵. Doctors use systemic NSAIDs, opioid pain killers, and local numbing methods to help with pain after operations⁶.

However, systemic analgesic agents like NSAIDs and opioids can lead to adverse side effects⁷, including gastrointestinal issues (e.g., dyspepsia, bleeding), genitourinary complications (e.g., acute kidney failure, tubular necrosis)⁸, dermatological reactions (e.g., erythema multiforme), and pulmonary problems (e.g., asthma provocation). Similarly, invasive procedures can lead to local complications (e.g., hematoma) and in the body and the nervous system (e.g., motor blockade, delayed micturition)^{9,10}.

Since none of the above techniques is risk-free, it is imperative to find a safer and more effective post-

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circumcision pain management method. This necessitates the development of new strategies to modernize post-circumcision pain management. To this end, we explored the optimal postoperative pain control by comparing the most widely used analgesia, which includes dorsal penile block and intravenous paracetamol.

METHODS

The study was conducted at the Department of Pediatric surgery Nishtar Hospital, Multan from February 2021 to January 2022. The study was started after approval from the hospital ethics committee. We split patients into two groups to compare pain management methods after surgery. To give a penile block, we put 0.2 ml/kg of 0.25% bupivacaine at the 10 and 2 o'clock spots at the penis base, making sure to check for blood first. In group II, we gave 15 mg/kg of intravenous paracetamol during the operation. We got permission from parents and then put 500 kids aged 2 to 10 years into these groups, with the same number in each. All circumcisions were performed by one and the same pediatric surgeon under general anaesthesia. The surgeries were carried out using the guillotine technique. IV catheterization was done in the operating room without premedication, and anaesthesia was induced with a propofol dose of 2-3 mg/kg and a fentanyl dose of 2 µg/kg.

Sevoflurane, oxygen, and nitrous oxide anaesthesia were prolonged after successful laryngeal mask insertion. The child's age, weight, and length of operation were documented. As or shortly after circumcision surgery, the mode of anticipated analgesia was applied by each group of children. The anesthesiologist performed the intravenous paracetamol as well as the pediatric surgeon performed the dorsal penile. To characterize postoperative pain scores, the Children's Hospital Eastern Ontario Pain Scale (CHEOPS) was used at 30, 60, 120, and 180 min post circumcision by a blinded examiner for assessment of the analgesic used. In the meantime, the patients' heart rate and respiratory rate were recorded. The results obtained were statistically analyzed and compared. Operation time, weight, and age were compared by one-way analysis of variance. The statistical analysis was performed with the IBM SPSS Version 27 statistical programming package program (all values are expressed as mean SD). Mean and standard deviation were calculated for all the study variables. Independent Samples t-test (student t-test) was used to test the difference between the two variables. A p-value of ≤ 0.050 , which indicates a high level of confidence in the statistical findings, is considered significant.

RESULTS

A total number of 130 patients were included in our study. Group A included 65 (50.0%) patients (Penile

Block), and Group B included 65 (50.0%) (IV Paracetamol). Group A and Group B's mean ages were 5.02 ± 2.08 years and 6.31 ± 1.98 years, respectively. ($p=0.414$). Group A and Group B's mean weights were 19.58 ± 3.31 kg and 20.23 ± 3.41 kg, respectively. ($p=0.549$). The mean duration of operation of Group A and Group B was 18.94 ± 4.41 minutes and 22.02 ± 3.52 minutes, respectively. ($p=0.190$). (Table. I).

CHEOPS 30'

The mean CHEOPS 30' of Group A and Group B was 7.77 ± 2.48 and 8.00 ± 2.05 , respectively. ($p=0.567$). The mean HR (beats per minute) 30 of Group A and Group B were 114.89 ± 8.95 and 112.29 ± 8.01 , respectively. ($p=0.084$). The mean RR (breaths per minute) 30' of Group A and Group B was 29.75 ± 3.49 and 31.08 ± 3.59 , respectively. ($p=0.035$). (Table. II).

CHEOPS 60'

The mean CHEOPS 60' of Group A and Group B was 8.46 ± 4.01 and 8.43 ± 4.83 , respectively. ($p=0.969$). The mean HR 60' of Group A and Group B was 106.54 ± 7.01 and 105.98 ± 6.12 , respectively. ($p=0.632$). The mean RR 60' of Group A and Group B was 31.91 ± 9.39 and 32.12 ± 8.85 , respectively. ($p=0.893$). (Table. 2).

CHEOPS 120'

The mean CHEOPS 120' of Group A and Group B was 7.37 ± 2.50 and 7.46 ± 2.68 , respectively. ($p=0.839$). The mean HR 120' of Group A and Group B was 106.68 ± 10.65 and 105.63 ± 10.42 , respectively. ($p=0.573$). The mean RR 120' of Group A and Group B was 29.75 ± 5.61 and 29.03 ± 6.08 , respectively. ($p=0.482$). (Table. 2).

CHEOPS 180'

The mean CHEOPS 180' of Group A and Group B was 5.43 ± 1.72 and 4.98 ± 1.68 , respectively. ($p=0.138$). The mean HR 180' of Group A and Group B was 104.88 ± 15.33 and 110.14 ± 16.76 , respectively. ($p=0.064$). The mean RR 180' of Group A and Group B was 31.52 ± 5.58 and 30.68 ± 5.35 , respectively. ($p=0.380$). (Table 2).

Table No. 1: Demographics and operating time

Variables	Group A	Group B	p-value
Age (years)	5.02 ± 2.08	6.31 ± 1.98	0.414
Weight (kg)	19.58 ± 3.31	20.23 ± 3.41	0.549
Duration of operation (minutes)	18.94 ± 4.41	22.02 ± 3.52	0.190
Mean $\pm$ S.D			

Table No. 2: Demographics and operating time

Variables	Group A	Group B	p-value
CHEOPS 30'	7.77 ± 2.48	8.00 ± 2.05	0.567
HR 30'	114.89 ± 8.95	112.29 ± 8.01	0.084
RR 30'	29.75 ± 3.49	31.08 ± 3.59	0.035
CHEOPS	8.46 ± 4.01	8.43 ± 4.83	0.969

60'			
HR 60'	106.54±7.01	105.98±6.12	0.632
RR 60'	31.91±9.39	32.12±8.85	0.893
CHEOPS 120'	7.37±2.50	7.46±2.68	0.839
HR 120'	106.68±10.65	105.63±10.42	0.573
RR 120'	29.75±5.61	29.03±6.08	0.482
CHEOPS 180'	5.43±1.72	4.98±1.68	0.138
HR 180'	104.88±15.33	110.14±16.76	0.064
RR 180'	31.52±5.58	30.68±5.35	0.380
Mean ± S.D			

DISCUSSION

The circumcisions are among the most common operations under the care of a pediatric surgeon. In contrast to the olden days, today, one of the main goals is reasonable pain control at the time of circumcision and post-circumcision, with better comfort for the child and a reduction in psychological complications related to this procedure¹¹. Sufficient postoperative analgesia may also prevent some harmful effects of pain and decrease patient anxiety and morbidity in hospital stays. Many assessment tools, such as NIPS and CHEOPS, were used to quantify the pain level, but in our study, the method of CHEOPS was followed for pain assessment¹².

In this study, the mean CHEOPS score at 30 minutes post-intervention was 7.77 ± 2.48 in Group A and 8.00 ± 2.05 in Group B, indicating better analgesic outcomes in the group receiving the dorsal penile block compared to the group receiving intravenous (IV) paracetamol. This finding aligns with the conclusions of O'Sullivan et al.,¹³ who highlighted the superior advantages of the dorsal penile block for pain control in pediatric patients undergoing urological procedures. However, it contrasts with the findings of Tutuncu et al.,¹⁴ who suggested that the dorsal penile block offers fewer benefits than other analgesic techniques, emphasizing the variability in clinical outcomes across different studies.

In a study by Naja et al.,¹⁵ circumcisions were performed under regional anaesthesia, and postoperative pain scores were assessed. The authors reported higher postoperative pain scores in the penile block group, with the efficacy of the block being relatively low, as 20% of the patients required additional anaesthesia. A study conducted by Uddin et al.¹⁶ investigated the effectiveness of intravenous paracetamol in managing postoperative pain following circumcision in children. The findings revealed that intravenous paracetamol did not significantly reduce immediate postoperative pain, suggesting it may have limited utility as a sole analgesic in this context.

Haliloglu et al.¹⁷ reported that patients in the penile block group experienced significantly lower pain scores at 30 minutes post-procedure than those in the caudal block and paracetamol groups. At the 60-minute mark, pain scores for groups 1 (penile block) and 2 (caudal block) remained significantly lower than those in group 3 (paracetamol group). However, by 120 and 180 minutes, no significant differences in pain scores were observed among the three groups. Münevveroğlu et al.¹⁸ reported no significant difference in CHEOPS scores between 30, 60, 120, and 180 minutes, regardless of the analgesia method used ($p > 0.05$). Similarly, no significant difference was observed in heart and respiratory rate averages across the same time intervals ($p > 0.05$).

Studies conducted by Malik et al.¹⁹ demonstrated that regional anesthesia techniques provided superior postoperative analgesia compared to systemic analgesic approaches, including opioids, non-steroidal anti-inflammatory drugs (NSAIDs), and acetaminophen, in patients undergoing circumcision. These findings highlight the efficacy of regional blocks in controlling pain more effectively, likely due to their targeted action at the surgical site, which minimizes systemic side effects and enhances patient comfort during the recovery period.

CONCLUSION

This study demonstrates that neither penile block nor intravenous paracetamol shows superiority in reducing pain after circumcision, indicating that both methods can be used with confidence. However, it is essential to consider the potential side effects associated with regional anaesthesia and systemic analgesic applications.

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Aleena Tahir
Drafting or Revising Critically:	Waqas Ahmed
Final Approval of version:	All the above authors
Agreement to accountable for all aspects of work:	All the above authors

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REFERENCES

- Ozen V, Yigit D. A comparison of the postoperative analgesic effectiveness of low dose caudal epidural block and US-guided dorsal penile

- nerve block with in-plane technique in circumcision. *J Pediatr Urol* 2020;16(1):99-106.
2. Munevveroglu C, Gunduz M. Postoperative pain management for circumcision; Comparison of frequently used methods. *Pak J Med Sci* 2020; 36(2):91.
 3. Zavras N, Tsamoudaki S, Christianakis E, Schizas D, Pikoulis E, Kyritsi H, et al. Ring block with levobupivacaine 0.25% and paracetamol vs. paracetamol alone in children submitted to three different surgical techniques of circumcision: A prospective randomized study. *Saudi J Anaesth* 2014;8(1):45-50.
 4. Mak MY, Philip AE, Cho SC, Chan JT. Postoperative analgesia in children day surgery circumcision: comparison of three methods. *Ann Coll Surg Hong Kong* 2001;5(4):146-50.
 5. Gauntlett I. A comparison between local anaesthetic dorsal nerve block and caudal bupivacaine with ketamine for paediatric circumcision. *Pediatr Anesth* 2003;13(1):38-42.
 6. Karami T, Hoshyar H, Tavana AM. Comparing caudal block and penile block using rectal acetaminophen in postoperative analgesia of hypospadias repair: a randomized clinical trial study. *Int J Surg Open* 2021;29:9-13.
 7. Soyer T, Büyükkoçak Ü, Cesur Ö, Pekuz YÖ, Çakmak M. Comparison of rectal and parenteral paracetamol administration in pain control after circumcision. *KÜ Tıp Fak Derg* 2008;10(1):36-41.
 8. Bengisun ZK, Ekmekci P, Haliloğlu AH. Levobupivacaine for postoperative pain management in circumcision: caudal blocks or dorsal penile nerve block. *Ağrı Dergisi: The Turkish Society Algot* 2012;24(4):180-6.
 9. Teunkens A, Van de Velde M, Vermeulen K, Van Loon P, Bogaert G, Fieuws S, et al. Dorsal penile nerve block for circumcision in pediatric patients: a prospective, observer-blinded, randomized controlled clinical trial for the comparison of ultrasound-guided vs landmark technique. *Pediatr Anesth* 2018;28(8):703-9.
 10. Karatas A, Eti EZ, Umuroglu T, Zengin SU, Gogus FY. Topical and systemic analgesia versus caudal epidural and dorsal penile nerve block in relieving pain after pediatric circumcision. *Marmara Med J*. 2021;34(3):292-7.
 11. Gokalp F, Karsli O. Comparison of two analgesic block techniques for circumcision: dorsal penile nerve block and caudal block. *Int Surg J* 2020; 7(2):360-4.
 12. Rossi S, Buonocore G, Bellieni CV. Management of pain in newborn circumcision: a systematic review. *Eur J Pediatr* 2021;180:13-20.
 13. O'Sullivan MJ, Mislovic B, Alexander E. Dorsal penile nerve block for male pediatric circumcision—randomized comparison of ultrasound-guided vs anatomical landmark technique. *Pediatr Anesth*. 2011;21(12):1214-8.
 14. 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.
 15. Naja Z, Al-Tannir MA, Faysal W, Daoud N, Ziade F, El-Rajab M. A comparison of pudendal block vs dorsal penile nerve block for circumcision in children: a randomised controlled trial. *Anaesth* 2011; 66: 802-7.
 16. Uddin R, Khan MS. Comparison of subcutaneous ring block of the penis with caudal epidural block for post circumcision analgesia in children. *J Bangladesh Society Anaesthesiol* 2021;34(1):50-3.
 17. 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.
 18. Munevveroglu C, Gunduz M. Postoperative pain management for circumcision; comparison of frequently used methods. *Pak J Med Sci* 2020;36(2):91.
 19. 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(5):309-19.