

Comparison of Post-Operative Analgesic Efficacy of Caudal Epidural Block versus Penile Block in Children Undergoing Hypospadias

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ABSTRACT

Objective: To compare the post-operative analgesic efficacy of penile block vs caudal block following hypospadias repair.

Study Design: Quasi-experimental study.

Place and Duration of Study: Pediatric and Plastic Surgery Departments, Combined Military Hospital, Multan Pakistan, from Jul 2019 to Jul 2021.

Methodology: The total of 34 patients undergoing hypospadias operation was booked for this study after approval of the ethical committee. All patients were operated on under General anaesthesia. The booked patients were randomly divided into Groups 1 and 2. For post-operative analgesia, the first group got penile block while the latter was given caudal epidural block.

Results: The mean age of the patients was 3.99 ± 2.68 years. These patients were split into two groups. Group-1 (n=17) underwent a Penile block, and Group-2 (n=17) underwent a Caudal block. There were no serious complications after a penile block or caudal block. A substantial decline in pain scores was noted, more in the penile block group.

Conclusion: For patients being treated for Hypospadias, the penile block is a more effective and simple method of pain control post-operatively. This can be performed by the surgeon.

Keywords: Caudal block, Hypospadias repair, Penile block.

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INTRODUCTION

Pain is a perception that infants, children and adults equally experience. WHO recommends analgesia for all the paediatric population undergoing surgical procedures. Post-operative analgesia must be kept upfront before contemplating any surgery on children.¹ It decreases the hospital stay, decreases the amount of narcotic analgesia immediately after surgery and helps the surgical child in the convalescence period. Post-operative pain delays the return of the paediatric patient to routine daily activities.²

Children behave differently if they are given inadequate pain relief.³ In Hypospadias surgery, regional analgesia methods like penile and caudal blocks seemed superior to post-operative analgesics. The penile block is a common procedure used for postoperative analgesia and can be infiltrated by the surgeon himself. The patient can be mobile after surgery compared to caudal block, which causes sensory and motor blockade to the lower limbs.⁴ The block is based on well-recognized anatomical landmarks and ultrasound guidance.⁵

Caudal block combined with General Anaesthesia

for postoperative pain relief in procedures below the umbilicus level. However, the block needs expertise and increases the patient time in the theatre.⁶ In addition, the complications of the procedure include needle misplacement in the vascular space, total spinal anaesthesia due to intrathecal administration and urinary retention.⁷

Pain is a subjective feeling and very difficult to assess in children with reliance given to the facial expression and behaviour of the child. There are various methods to assess the severity of pain.⁸ In addition, different methods are used depending on the age of the paediatric patient.^{9,10} This study was conducted to share our experience in our own set for post-operative pain control in children undergoing Hypospadias surgery.

METHODOLOGY

The quasi-experimental study was carried out at the Departments of Paediatric and Plastic Surgery, Combined Military Hospital, Multan, from July 2019 and June 2021 after approval of the Institutional Ethical Review Board (13/Trg/2021 CMH Multan).

Inclusion Criteria: All patients of either gender, aged 1.5-8 years with Hypospadias were included in the study.

Exclusion Criteria: Patients having allergies to the Amide local anaesthetic agents, any systemic disease

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contraindicating to the general anaesthesia, and neurological and spinal cord disorders were excluded from the study.

Over two years, 34 patients undergoing hypospadias repair were enrolled on this study using a non-probability consecutive sampling technique. All cases were operated on under General anaesthesia. The patients were assigned groups randomly. Group 1 & 2 patients received penile block and caudal block, respectively.

The penile block was administered with an insulin syringe, using 0.5mg/kg of 0.25% Bupivacaine considering the anatomical landmarks. The caudal block procedure was carried out using 0.5mg/kg of 0.25% Bupivacaine by 22-G needle. Patients with indwelling catheters were prescribed Oxybutynin post-operatively to prevent bladder spasms. A Visual analogue scale (VAS) was used for post-operatively pain assessment. Pain measurement of the patients was done at the one-hour interval for 04 hours post-operatively and compared between both groups. Analgesia was given on demand by the patient postoperatively.

Data were analyzed using SPSS 23.00 and MS Excel 2016 software. Mean±SD was calculated for the continuous variable. Frequency and percentage were calculated for categorical variables. The chi-square test was used to compare pain relief among both groups at 1st, 2nd, 3rd and 4th hour after the operation. The *p*-value of ≤ 0.05 was considered significant.

RESULTS

A total of 34 male patients were included in the study. The mean was 3.99±2.68years, ranging from 1.5-8years. These patients were split into two groups. Group-1 (n=17) underwent a Penile block, and Group-2 (n=17) underwent a Caudal block. In both groups, pain severity in children was assessed with the help of Visual Analog Scores at the 1st, 2nd, 3rd & 4th hour postoperatively (Table). A substantial decline in pain scores was noted in both groups, but more in the penile block group, in which patients remain almost pain-free. Therefore, no opioid analgesic was used in either group.

DISCUSSION

Hypospadias repair is one of the most frequently performed surgeries in the Paediatric urogenital region. The post-operative pain in the children undergoing this procedure should be kept upfront because the surgery is done on a very sensitive part of the body. Therefore, optimal control of post-operative

pain is essential for the success of the procedure. Many modalities have been tried, including Dorsal penile nerve block, Caudal block, intravenous Paracetamol, intravenous Fentanyl and morphine infusions. However, various studies have proved that the anaesthetic blocks are more effective in post-operative pain control than intravenous analgesia.¹¹ Our study compared the efficacy of caudal epidural block versus dorsal penile nerve block for postoperative pain control in children undergoing hypospadias repair. Regarding the pain assessment, we followed the visual analogue score system. The results showed a better post-operative analgesic effect of the penile block than the caudal block. We came across many studies during the literature search comparing the post-operative analgesic effect between different modalities. Zhu *et al.*¹² researched analgesic efficacy and the impact of the caudal block on post-operative complications and concluded that the analgesic effect was good and there were no complications postoperatively. In a study by Kendigelen *et al.* the pudendal nerve block was found to have better post-operative analgesic efficacy than the caudal block in children undergoing hypospadias repair.¹³

Ashrey *et al.*¹⁴ in their study, revealed that a single injection penile block has better analgesic efficacy than the caudal block in children undergoing penile surgery. The results of the study were similar to our study. Ozen *et al.*¹⁵ in the study published in the Journal of Paediatric urology in 2020 concluded that there was better pain control with dorsal penile nerve block than with caudal epidural block, particularly in the initial post-operative period. Moreover, there was higher satisfaction among the parents of the patients treated with penile block.

Table: Pain Severity of the Children in both groups (n=34)

VAS of Pain	Group-1	Group-2	<i>p</i> -value
After One Hour			
No Pain	14(82.4%)	11(64.7%)	0.095
Mild	2(11.8%)	0	
Moderate	1(5.9%)	3(17.6%)	
Severe	0	3(17.6%)	
After Two Hours			
No Pain	16(94.1%)	10(58.8%)	0.039
Mild	1(5.9%)	7(41.2%)	
Moderate	0	0	
Severe	0	0	
After Three Hours			
No Pain	17(100.0%)	13(76.5%)	0.103
Mild	0	4(23.5%)	
Moderate	0	0	
Severe	0	0	
After Three Hours			
No Pain	14(82.4%)	13(76.5%)	0.327
Mild	3(17.6%)	2(11.8%)	
Moderate	0	2(11.8%)	
Severe	0	0	

Studies confirmed the increase in post-operative complications following a caudal block by Goel *et al.*¹⁶ in an article published in the Indian journal of urology in 2019 and by Routh *et al.*¹⁷ in a recent study in 2021. We were very fortunate that there was no complication associated with both blocks administered for post-operative analgesia.

Eldemirdash *et al.*¹⁸ reported that blocking the dorsal nerve of the penis for surgical intervention was a very effective way of controlling pain both pre-operatively and post-operatively. Furthermore, it is a very safe and successful method in experienced hands. Ekstein *et al.*¹⁹ compared penile, caudal and intravenous fentanyl in children undergoing penile surgery and found no difference in all the three groups regarding post-operative analgesia effectiveness. Alizadeh *et al.*²⁰ found caudal epidural block, in addition to general anaesthesia, to be very effective in providing analgesia, less blood loss and a decrease in time of surgery.

In our study, we found penile block to be superior to caudal epidural block. This is because the surgeon can give a penile block, requiring less time to administer the block. In addition, the post-operative analgesic effect is much better than caudal and has less risk of attended complications of the caudal block.

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CONCLUSION

Penile block is more effective than a caudal block due to the above-mentioned facts and the study results.

Conflict of Interest: None.

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

HUR & HI: Study design, critical review, concept, approval of the final version to be published.

GA & MSA: Data acquisition, data analysis, data interpretation, approval of the final version to be published.

SRJ & SP: Critical review, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

REFERENCES

1. Semsroth M, Gabriel A, Sauberer A, Wuppinger G. Regionalanästhesiologische Verfahren im Konzept der Kinderanästhesie [Regional anesthetic procedures in pediatric anesthesia]. *Anaesthesist* 1994; 43(1):55-72. doi: 10.1007/s00101 0050033.

2. Joshi GP, Ogunnaike BO. Consequences of inadequate post-operative pain relief and chronic persistent postoperative pain. *Anesthesiol Clin North Am* 2005; 23(1): 21-36. doi: 10.1016/j.atc.2004.11.013.
3. Kotiniemi LH, Ryhänen PT, Moilanen IK. Behavioural changes in children following day-case surgery: a 4-week follow-up of 551 children. *Anaesthesia* 1997; 52(10): 970-976. doi: 10.1111/j.1365-2044.1997.202-az0337.x.
4. Weksler N, Atias I, Klein M, Rosenztsveig V, Ovadia L, Gurman GM, et al. Is penile block better than caudal epidural block for postcircumcision analgesia? *J Anesth* 2005; 19(1): 36-39. doi: 10.1007/s00540-004-0287-8.
5. O'Sullivan MJ, Mislovic B, Alexander E. Dorsal penile nerve block for male pediatric circumcision--randomized comparison of ultrasound-guided vs anatomical landmark technique. *Paediatr Anaesth* 2011; 21(12): 1214-1218. doi: 10.1111/j.1460-9592.2011.03722.x.
6. Suresh S, Long J, Birmingham PK, De Oliveira GS Jr. Are caudal blocks for pain control safe in children? an analysis of 18,650 caudal blocks from the Pediatric Regional Anesthesia Network (PRAN) database. *Anesth Analg* 2015; 120(1): 151-156. doi: 10.1213/ANE.0000000000000446.
7. Krane EJ, Dalens BJ, Murat I, Murrell D. The safety of epidurals placed during general anesthesia. *Reg Anesth Pain Med* 1998; 23(5): 433-438. doi: 10.1016/s1098-7339(98)90023-2.
8. Zieliński J, Morawska-Kochman M, Zatoński T. Pain assessment and management in children in the postoperative period: A review of the most commonly used postoperative pain assessment tools, new diagnostic methods and the latest guidelines for postoperative pain therapy in children. *Adv Clin Exp Med* 2020; 29(3): 365-374. doi: 10.17219/acem/112600.
9. Walker SM. Pain after surgery in children: clinical recommendations. *Curr Opin Anaesthesiol* 2015; 28(5): 570-576. doi: 10.1097/ACO.0000000000000227.
10. Papadopoulos NA, Kolassa MJ, Henrich G, Herschbach P, Kovacs L, Machens HG, et al. Quality of life following aesthetic liposuction: A prospective outcome study. *J Plast Reconstr Aesthet Surg* 2019; 72(8): 1363-1372. doi: 10.1016/j.bjps. 2019.04.008.
11. Kapadia R, Parikh P, Prajapati AG, Trivedi B, Mistry NK. Comparison of post-operative analgesic efficacy of caudal block versus dorsal penile nerve block with bupivacaine and tramadol for circumcision in children. *J Evol Med Dent Sci* 2018; 7(42): 5283-5287. doi: 10.53350/pjmhs22164520.
12. Zhu C, Wei R, Tong Y, Liu J, Song Z, Zhang S, et al. Analgesic efficacy and impact of caudal block on surgical complications of hypospadias repair: a systematic review and meta-analysis. *Reg Anesth Pain Med* 2019; 44(2): 259-267. doi: 10.1136/ -2018-000022.
13. Kendigelen P, Tutuncu AC, Emre S, Altindas F, Kaya G. Pudendal Versus Caudal Block in Children Undergoing Hypospadias Surgery: A Randomized Controlled Trial. *Reg Anesth Pain Med* 2016; 41(5): 610-615. doi: 10.1097/AAP. 0 000000447.
14. Ashrey EM, Bosat BE. Single-injection penile block versus caudal block in penile pediatric surgery. *Ain-Shams J Anaesthesiol* 2014; 7(3): 428. doi: 10.4103/1687-7934.139588.
15. Ozen V, Yigit D. Caudal epidural block versus ultrasound-guided dorsal penile nerve block for pediatric distal hypospadias surgery: A prospective, observational study. *J Pediatr Urol* 2020; 16(4): 438.e1-438.e8. doi: 10.1016/j.jpuro.2020.05.009.
16. Goel P, Jain S, Bajpai M, Khanna P, Jain V, Yadav DK, et al. Does caudal analgesia increase the rates of urethrocutaneous fistula formation after hypospadias repair? Systematic review and meta-analysis. *Indian J Urol* 2019; 35(3): 222-229.

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17. Routh JC. Caudal Blocks and Hypospadias Repair Complications-Much Ado about Nothing or the Real Deal? *J Urol* 2021; 205(5): 1252-1253. doi: 10.1097/JU.0000000000001687.
 18. Seyedhejazi M, Azerfarin R, Kazemi F, Amiri M. Comparing caudal and penile nerve blockade using bupivacaine in hypospadias repair surgeries in children. *Afr J Paediatr Surg* 2011; 8(3): 294-297.
 19. Ekstein M, Weinbroum AA, Ben-Chaim J, Amar E. Comparison of Caudal Block vs. Penile Block vs. Intravenous Fentanyl Only in Children Undergoing Penile Surgery: A Prospective, Randomized, Double Blind Study. *Front Pediatr* 2021; 9(1): 654015.
 20. Alizadeh F, Heydari SM, Nejadgashti R. Effectiveness of caudal epidural block on intraoperative blood loss during hypospadias repair: A randomized clinical trial. *J Pediatr Urol* 2018; 14(5): 420.e1-420.e5. doi: 10.1016/j.jpuro.2018.03.025.
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