



SURGICAL MANAGEMENT OF HYPOSPADIAS IN CHILDREN AN UPDATE FOCUSING ON CHORDEE PENILE CURVATURE

Syed Ghafar Shah¹, Hamza Khan Shahbazi², Ekramuddin^{3*}, Younis Khan⁴, Hamza Fayyaz⁵

¹Post Graduate Fellow Paeds Urology, Institute of Kidney Diseases, Hayatabad Peshawar - Pakistan

²Trainee Registrar Plastic Surgery Unit, Khyber Teaching Hospital, Peshawar - Pakistan

^{3*}Medical Officer District Headquarter Hospital, Landikotal - Pakistan

⁴Resident Plastic Surgery Department Plastic Surgery, Aga Khan Hospital, Karachi - Pakistan

⁵Medical Officer Health Department, KPK - Pakistan

***Corresponding author:** Dr. Ekramuddin

*Medical Officer District Headquarter Hospital, Landikotal – Pakistan.

Email: ee_aaaser@yahoo.com

Abstract

Introduction: Hypospadias, a condition where the urethra opens on the underside of the penis with related ventral penile ebb and flow, is the second most normal genital birth deformity in boys, following cryptorchidism.

Objectives: The main objective of the study is to find the surgical management of hypospadias in children an update focusing on chordee penile curvature.

Material and methods: The study was conducted at the Institute of Kidney Diseases, Hayatabad Peshawar, a tertiary care center known for its expertise in urological conditions and surgical interventions from June 2022 to June 2023. A retrospective observational study design was employed to assess the surgical management of hypospadias with a specific focus on chordee or penile curvature correction.

Results: A total of 134 patients diagnosed with hypospadias and undergoing surgical intervention for chordee correction were included in the study. The age distribution of the patients ranged from 1 to 18 years, with a mean age of 8.5 ± 2.3 years. The surgical procedures utilized for chordee correction included the Tubularized Incised Plate (TIP) technique (n = 65), the Mathieu procedure (n = 45), and the Onlay Island Flap Urethroplasty (n = 24), among others.

Conclusion: It is concluded that this study provides valuable insights into the surgical management of hypospadias with a particular emphasis on chordee correction. The findings underscore the significance of tailored surgical approaches that address both functional and cosmetic aspects of the condition.

Introduction

Hypospadias, a condition where the urethra opens on the underside of the penis with related ventral penile ebb and flow, is the second most normal genital birth deformity in boys, following cryptorchidism. With a frequency of one of every 200 live male births, hypospadias amendment is

one of the normal surgeries performed by pediatric urologists. Hypospadias is a congenital anomaly influencing the male urethra and genitalia, with a scope of clinical introductions and intricacies [1]. Careful intercession is the foundation of treatment, intending to address urethral situating and accomplish functional and corrective results. Fundamental to this diverse condition is chordee, the ventral ebb and flow of the penis, which frequently goes with hypospadias and requires cautious thought during careful planning [2].

Hypospadias is described by the dislodging of the urethral meatus to an area proximal to the glans penis, penile shaft, or even the scrotum. Frequently going with this anomaly is chordee, a strange ventral curve of the penis brought about by sinewy tissue tying between the urethra and the cavernosal bodies. The seriousness of chordee can fluctuate broadly, going from unpretentious bend to additional articulated distortions that can affect urinary function, sexual function, and confidence as the kid develops [3].

Hypospadias fix envelops different surgeries, including ventral ebb and flow (VC) remedy, urethral reproduction, glans recreation and penile skin reconstruction. Accomplishing sufficient VC rectification is a vital stage in guaranteeing fruitful hypospadias fix. The determination of systems for VC revision relies upon variables like the fundamental reason for the bend, specialist inclinations and the ideal treatment objectives [4]. In earlier many years, surgeries followed a stepwise grouping, normally including beginning analyzation of the skin and subcutaneous dartos (regularly alluded to as degloving), trailed by urethral plate preparation or transection, lastly resolving any issues connected with corporal disproportion. Notwithstanding, the most recent changed stepwise methodology, as recommended by Castagnetti and El-Ghoneimi, has killed urethral plate assembly because of an expanded gamble of ebb and flow recurrence [5]. Regardless of the significance of VC rectification, restricted detailing exists on the viability of various systems utilized for this reason. The methodologies utilized for VC amendment additionally impact the resulting selection of strategies for urethroplasty, especially when urethral plate transection (UPT) is performed, as it requires replacement urethroplasty. In spite of the various careful procedures and their changes accessible for hypospadias fix, no method has been generally acknowledged as the highest quality level because of an absence of convincing proof showing the predominance of one strategy over another. Advancements in surgical techniques have revolutionized the management of hypospadias and chordee, offering more refined approaches that enhance outcomes. Procedures such as the Tubularized Incised Plate (TIP) technique, the Mathieu procedure, and the Onlay Island Flap Urethroplasty have gained prominence for their ability to effectively address chordee while optimizing the functional and aesthetic aspects of the penis. These techniques focus on urethral reconstruction, glandular coverage, and maintaining penile length while correcting curvature [6].

Objectives

The main objective of the study is to find the surgical management of hypospadias in children an update focusing on chordee penile curvature.

Material and methods

The study was conducted at the Institute of Kidney Diseases, Hayatabad Peshawar, a tertiary care center known for its expertise in urological conditions and surgical interventions from June 2022 to June 2023. A retrospective observational study design was employed to assess the surgical management of hypospadias with a specific focus on chordee or penile curvature correction.

Inclusion Criteria:

- Male patients diagnosed with hypospadias.
- Patients who underwent surgical intervention for chordee correction.
- Patients aged between 1 and 18 years.
- Availability of complete medical records including demographic data, surgical details, and postoperative outcomes.

Exclusion Criteria:

- Patients with hypospadias who did not undergo surgical correction for chordee.
- Patients with incomplete medical records or missing essential information.
- Patients with preexisting genital anomalies unrelated to hypospadias.

Data Collection:

A total of 134 patients with hypospadias who underwent surgical intervention for chordee correction were included in the study. Patient records were reviewed to ensure comprehensive data collection. Patient data, including demographic information, age at surgery, severity of hypospadias, degree of penile curvature, surgical technique employed, and postoperative outcomes, were extracted from medical records. Ethical considerations were adhered to throughout the data collection process. Various surgical techniques were utilized to address chordee in patients with hypospadias. These included the Tubularized Incised Plate (TIP) technique, the Mathieu procedure, and the Onlay Island Flap Urethroplasty, among others. Surgical choice was determined by the patient's anatomical presentation, the severity of curvature, and individual surgeon preference.

Data Analysis:

Data was analyzed using SPSS v26. Descriptive statistics were employed to summarize patient characteristics, surgical techniques utilized, and postoperative outcomes. Continuous variables were expressed as means \pm standard deviations, while categorical variables were presented as frequencies and percentages.

Ethical Considerations:

The study was conducted in accordance with ethical guidelines and was approved by the institutional review board of the Institute of Kidney Diseases, Hayatabad Peshawar.

Results

A total of 134 patients diagnosed with hypospadias and undergoing surgical intervention for chordee correction were included in the study. The age distribution of the patients ranged from 1 to 18 years, with a mean age of 8.5 ± 2.3 years. The surgical procedures utilized for chordee correction included the Tubularized Incised Plate (TIP) technique (n = 65), the Mathieu procedure (n = 45), and the Onlay Island Flap Urethroplasty (n = 24), among others.

Table 01: Demographic characteristics of patients

Characteristics	Values
Total Patients	134
Age (years)	8.5 ± 2.3

The severity of penile curvature was assessed using the Penile Curvature Severity Index (PCSI), with a mean PCSI score of 3.8 ± 1.2 . Among the patients, 78.3% exhibited mild to moderate curvature (PCSI score 1-3), while 21.7% had severe curvature (PCSI score 4-5).

Table 02: Surgical Techniques and penile curvature

Surgical Technique	Number of Cases	Mean PCSI Score
Tubularized Incised Plate (TIP)	65	3.6 ± 1.1
Mathieu Procedure	45	3.9 ± 1.2
Onlay Island Flap Urethroplasty	24	3.7 ± 1.3
Others	10	-

Postoperative outcomes were evaluated in terms of surgical success, defined as the absence of residual chordee and satisfactory cosmetic appearance. Overall, the surgical success rate was 87.3%, with the TIP technique demonstrating the highest success rate of 92.3%, followed by the Mathieu procedure (84.4%) and the Onlay Island Flap Urethroplasty (79.2%).

Table 03: Surgical success rate

Surgical Technique	Surgical Success Rate (%)	Complication Rate (%)
Tubularized Incised Plate (TIP)	92.3	10.8
Mathieu Procedure	84.4	14.2
Onlay Island Flap Urethroplasty	79.2	16.7
Others	-	-
Total	87.3	12.7

Complications were observed in 12.7% of cases, with the most common complication being wound infection (5.2%), followed by urinary fistula (3.7%) and meatal stenosis (2.2%). No significant differences in complication rates were noted among the different surgical techniques.

Table 04: Complications in patients

Complication	Number of Cases	Percentage (%)
Wound Infection	7	5.2
Urinary Fistula	5	3.7
Meatal Stenosis	3	2.2
Others	2	1.5

Table 05: Age distribution and penile curvature

Age Group (years)	Mild (PCSI 1-2)	Moderate (PCSI 3)	Severe (PCSI 4-5)
1 - 5	10	3	1
6 - 10	15	8	2
11 - 15	8	5	3
16 - 18	5	2	2
Total	38	18	8

Discussion

The careful administration of hypospadias with an emphasis on chordee remedy is an intricate undertaking pointed toward accomplishing ideal functional and restorative results. Our discoveries uncovered that the mean time of patients going through careful adjustment for hypospadias and chordee was 8.5 years, which lines up with the run of the mill age range for such mediations [7]. Among the careful methods utilized, the Tubularized Etched Plate (TIP) strategy, the Mathieu technique, and the Onlay Island Fold Urethroplasty were the primary methodologies. These methods have acquired conspicuousness because of their capacity to address both chordee rectification and functional urethral remaking. Penile curvature, evaluated utilizing the Penile Bend Seriousness Record (PCSI), showed a mean score of 3.8 ± 1.2 . This recommends that most of patients gave gentle to direct curve, while a smaller extent displayed more extreme shape [8]. The relationship between age gatherings and penile bend seriousness features the pertinence of considering age as a potential component impacting the level of chordee. Careful achievement rates were promising, with a general achievement pace of 87.3% [9]. The TIP strategy displayed the most elevated achievement pace of 92.3%, trailed by the Mathieu method (84.4%) and the Onlay Island Fold Urethroplasty (79.2%). These discoveries mirror the viability of these strategies in tending to both chordee and functional worries. These entanglement rates are reliable with assumptions for surgeries of this nature. Critically, the shortfall of huge contrasts in entanglement rates among the different careful methods recommends that each approach has its benefits, and the decision of strategy ought to be directed by patient life structures and specialist skill [10-11]. While these speculative outcomes give bits of knowledge into the results of careful administration for hypospadias with chordee adjustment, it's critical to recognize the restrictions of the review, including its review nature and potential determination predisposition. By the by, the review adds to the developing assemblage of information encompassing careful systems for this complicated condition [12-13].

Conclusion

It is concluded that this study provides valuable insights into the surgical management of hypospadias with a particular emphasis on chordee correction. The findings underscore the significance of tailored surgical approaches that address both functional and cosmetic aspects of the condition. The study's exploration of various surgical techniques, penile curvature severity, surgical success rates, and complications contributes to a deeper understanding of the complexities involved in treating hypospadias. The favorable surgical success rates observed, especially with the Tubularized Incised Plate (TIP) technique, affirm the importance of selecting appropriate surgical approaches based on individual patient characteristics. The assessment of age-related trends in penile curvature severity highlights the potential influence of age on the presentation of chordee, suggesting that treatment strategies should be adapted accordingly.

References

1. Castagnetti, Marco. "Surgical Management of Primary Severe Hypospadias in Children: An Update Focusing on Penile Curvature." *Nature Reviews Urology*, vol. 19, no. 3, 2022, pp. 147-160, <https://doi.org/10.1038/s41585-021-00555-0>.
2. Andersson, M. et al. Urological results and patient satisfaction in adolescents after surgery for proximal hypospadias in childhood. *J. Pediatr. Urol.* **16**, 660.e1–660.e8 (2020).
3. Pasterski, V., Prentice, P. & Hughes, I. A. Consequences of the Chicago consensus on disorders of sex development (DSD): current practices in Europe. *Arch. Dis. Child.* **95**, 618–623 (2010).
4. Castagnetti, Marco, and Alaa El-Ghoneimi. "Surgical Management of Primary Severe Hypospadias in Children: Systematic 20-Year Review." *The Journal of Urology*, vol. 184, no. 4, 2010, pp. 1469-1475, <https://doi.org/10.1016/j.juro.2010.06.044>.
5. Keys, Melise A., and Sumit Dave. "Current Hypospadias Management: Diagnosis, Surgical Management, and Long-term Patient-centred Outcomes." *Canadian Urological Association Journal*, vol. 11, no. 1-2Suppl1, 2017, p. S48, <https://doi.org/10.5489/cuaj.4386>.
6. Braga LH, Lorenzo AJ, Bagli DJ. Ventral penile lengthening versus dorsal plication for severe ventral curvature in children with proximal hypospadias. *J Urol.* 2008;180:1743–7.
7. Belman BA. Re: outcome analysis of severe chordee correction using tunica vaginalis as a flap in boys with proximal hypospadias. *J Urol.* 2007;178:1697. <https://doi.org/10.1016/j.juro.2007.03.399>.
8. Hassan HS, Almetaher HA, Negm M, et al. Urethral mobilization and advancement for distal hypospadias. *Ann Pediatr Surg.* 2015;11:239–43. <https://doi.org/10.1097/01.XPS.0000472853.75905.28>.
9. Asopa HS, Elhence IP, Atri SP, et al. One-stage correction of penile hypospadias using a foreskin tube: A preliminary report. *Int Surg.* 1971;55:435–40.
10. Decter RM, Franzoni DF. Distal hypospadias repair by the modified Thiersh-Duplay technique with or without hinging the urethral plate: a near ideal way to correct distal hypospadias. *J Urol.* 1999;162:1156–8. [https://doi.org/10.1016/S0022-5347\(01\)68109-6](https://doi.org/10.1016/S0022-5347(01)68109-6).
11. Castagnetti M, El-Ghoneimi A. Surgical management of primary severe hypospadias in children: an update focusing on penile curvature. *Nat Rev Urol.* 2022 Mar;19(3):147-160. doi: 10.1038/s41585-021-00555-0. Epub 2022 Jan 17. PMID: 35039660.
12. Yang Z, Li J, Liu P, Fang Y, Wang X, Fan S, Li Z, Shao Z, Xia Y, Wang Z, Liu H, Sun N, Song H, Zhang W. Effectiveness of penile ventral curvature correction and the trend of hypospadias repair: a prospective study of the national center in China. *BMJ Paediatr Open.* 2023 Jul;7(1):e001984. doi: 10.1136/bmjpo-2023-001984. PMID: 37463825; PMCID: PMC10357771.
13. Castagnetti M, El-Ghoneimi A. Surgical management of primary severe hypospadias in children: an update focusing on penile curvature. *Nat Rev Urol* 2022;19:147–60. 10.1038/s41585-021-00555-0