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Prospective Study of Pediatric Patients with Hypospadias in a Tertiary Hospital in Rural India

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ABSTRACT

Background: Hypospadias is a common congenital anomaly of the male urethra, often associated with chordee, requiring surgical correction. The distribution and outcomes vary across populations, especially in rural settings.

Aim: To study the clinical profile, surgical management, and postoperative outcomes of pediatric patients with hypospadias in a tertiary hospital in rural India.

Materials and Methods: This prospective study included 40 pediatric patients undergoing surgical repair for hypospadias at DLNP Government Medical College, Ratlam. Data were analyzed for age, meatal location, chordee, operative technique, and complications.

Results: Distal penile hypospadias was the most common (75%), followed by mid penile (20%) and proximal penile (5%). Chordee was present in 62.5% of patients. The TIP (Snodgrass) repair was the most frequent procedure (47.5%). Postoperative complications occurred in 35% of cases, mainly urethrocutaneous fistula and wound infection.

Conclusion: Distal hypospadias was the predominant type. TIP urethroplasty remains the most reliable and successful technique with acceptable complication rates even in rural setups..

KEYWORDS: *Hypospadias, Chordee, TIP urethroplasty, Pediatric surgery, Postoperative outcomes*

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1. INTRODUCTION

Hypospadias is among the most frequently encountered congenital anomalies of the male external genitalia, with an estimated incidence of 1 in 250 to 1 in 300 live male births. [1] It is characterized by an abnormally placed urethral meatus on the ventral aspect of the penis, frequently associated with varying degrees of chordee, abnormal prepuce, and ventral curvature. The etiology is multifactorial, involving genetic, endocrine, and environmental factors that influence urethral fold fusion during embryogenesis. [2]

The clinical spectrum of hypospadias ranges from minor distal variants with good functional outcomes to complex proximal forms that pose significant reconstructive challenges. The goals of surgery are to achieve a straight penis, a terminally located and vertically oriented meatus, and an acceptable cosmetic appearance while minimizing complications. [3]

Over the past two decades, several surgical techniques have been developed, including MAGPI, Mathieu, Onlay island flap, two-stage repair, and the widely accepted Tubularized Incised Plate (TIP/Snodgrass) urethroplasty. Although multiple procedures exist, the choice of technique depends on meatal location, chordee severity, and surgeon experience. [4,5]

Despite advances in surgical techniques and instrumentation, hypospadias repair continues to have variable success rates, particularly in resource-limited and rural settings. The present prospective study was undertaken to evaluate the clinical presentation, surgical management, and outcomes of pediatric hypospadias cases treated in a tertiary hospital serving a rural population in central India.

2. MATERIALS AND METHODS

This prospective observational study was conducted at Dr. Laxmi Narayan Pandey Government Medical College and Hospital, Ratlam — a tertiary care center serving a rural population in India — to evaluate pediatric patients with hypospadias over a defined period. All children under 15 years undergoing hypospadias repair were included after obtaining institutional ethical clearance and written informed consent from parents or guardians, while patients with intersex disorders, significant comorbid anomalies, or hemoglobin below 9 g/dL were excluded. Detailed demographic, clinical, and operative data were collected using a structured proforma, including age, type and location of the meatus, degree of chordee, associated anomalies, and type of surgical procedure performed. Postoperative outcomes such as complications, urinary stream, and cosmetic appearance were assessed during follow-up at 1 week, 15 days, 1 month, 3 months, and 6 months using standardized clinical and parental evaluations. Data were entered into Microsoft Excel and analyzed using SPSS, applying descriptive and comparative statistical methods, with significance set at $p < 0.05$. The study aimed to correlate the type and severity of hypospadias with surgical outcomes, identify complication patterns, and assess both functional and cosmetic results following different surgical techniques, thereby providing insights into the management of hypospadias in a rural tertiary hospital setting.

3. RESULTS

Distal penile hypospadias was the most common variant (75%), followed by mid-penile (20%) and proximal (5%). Chordee was present in 62.5% of patients. TIP urethroplasty was the most frequently performed procedure (47.5%). Postoperative complications occurred in 25% of cases, mainly urethrocutaneous fistula and wound infection.

Table 1. Distribution according to location of urethral meatus

Location of Meatus	No. of Patients	Percentage (%)
Proximal penile	2	5.0
Mid penile	8	20.0
Distal penile	30	75.0
Total	40	100.0

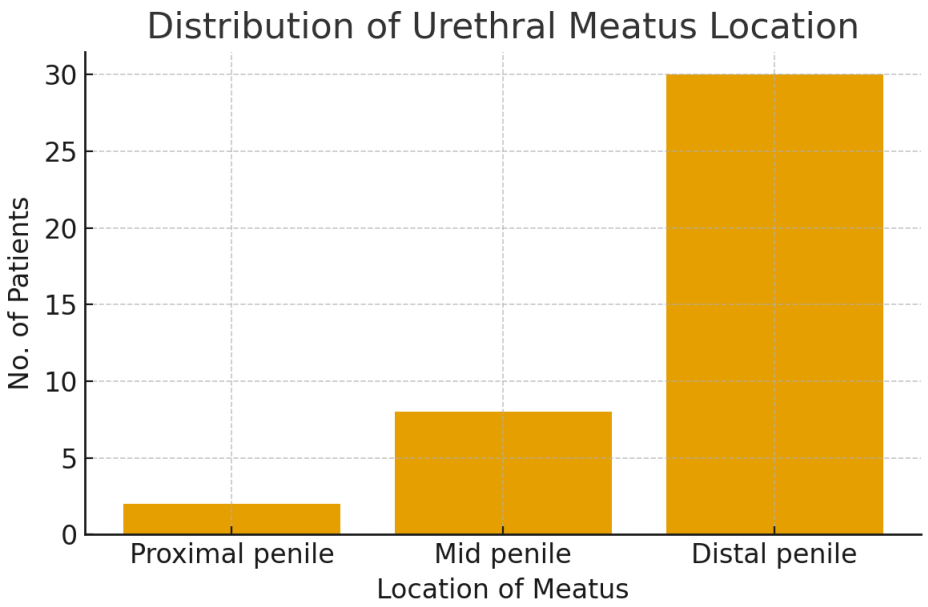


Figure 1. Distribution of urethral meatus location

Table 2. Distribution according to presence of chordee

Chordee	No. of Patients	Percentage (%)
Present	25	62.5
Absent	15	37.5
Total	40	100.0

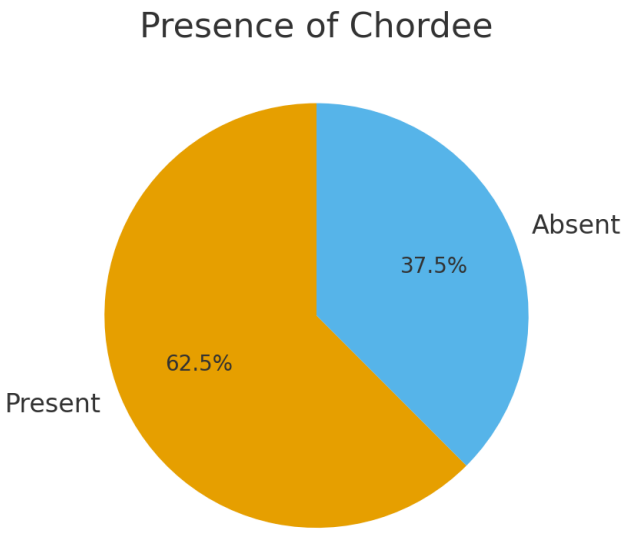


Figure 2. Presence of chordee

Table 3. Distribution according to operative procedure performed

Procedure	No. of Patients	Percentage (%)
TIP (Snodgrass)	19	47.5
MAGPI	4	10.0
Onlay	9	22.5
Mathieu	0	0.0
Two-stage repair	8	20.0
Total	40	100.0

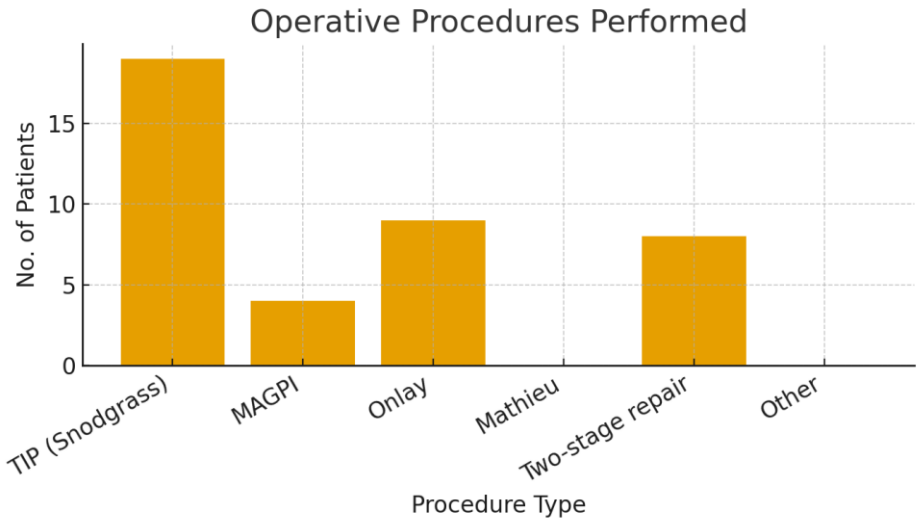


Figure 3. Operative procedures performed

Table 4. Postoperative complications

Complication	No. of Patients	Percentage (%)
Hematoma	1	2.5
Meatal stenosis	2	5.0
Infection/Urethrocutaneous fistula	4	10.0
Recurrent curvature	1	2.5
Repair breakdown	2	5.0
Total (any complication)	10	25.0

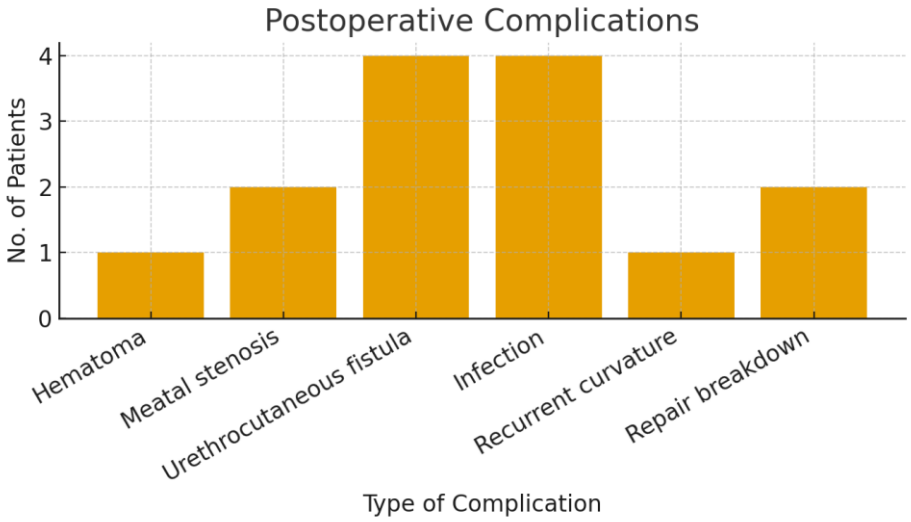
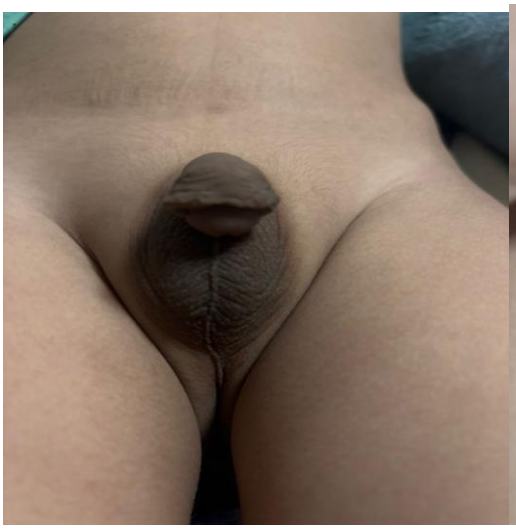


Figure 4. Postoperative complications

Figure 5. Distal penile hypospadias with Chordee
Figure 6. Mid penile Hypospadias
Figure 7. Intraoperative view showing chordee correction
Figure 8. Postoperative outcome showing straight penis and terminal meatus



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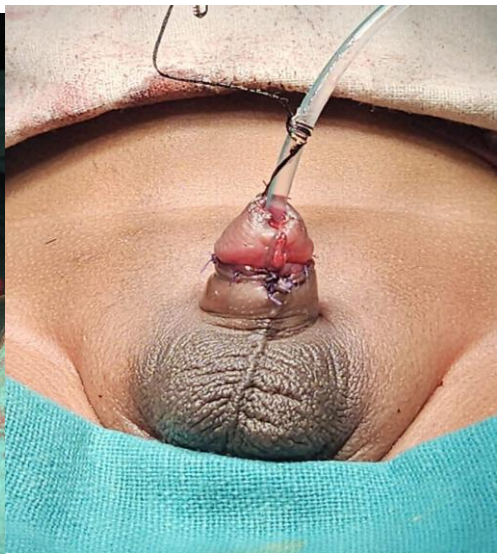

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4. DISCUSSION

The findings of the present study reaffirm the predominance of distal penile hypospadias, accounting for 75% of our cohort. This distribution mirrors data from several Indian and international series, where distal variants constitute 60–80% of cases. Mid-shaft and proximal lesions are comparatively less common but often associated with significant chordee requiring extensive correction. In our study, chordee was present in 62.5% of patients, similar to reports by Bhat et al. and Springer. [6,7]

The TIP (Snodgrass) urethroplasty was the most frequently performed procedure (47.5%), consistent with global trends where it has become the gold-standard technique for distal and selected mid-penile hypospadias. [8,9] The technique's advantages include simplicity, reproducibility, preservation of the urethral plate, and a low rate of meatal stenosis. Our two-stage repair rate (20%) reflects the need for staged reconstruction in proximal or complex variants. [9]

Postoperative complications occurred in 25% of our patients, predominantly urethrocutaneous fistula and infection. These figures align with previously reported rates of 20–40%. Fistula formation remains the most frequent issue, often related to infection, inadequate vascularized cover, or technical factors. Improved tissue handling, use of dartos or tunica vaginalis interposition layers, and meticulous hemostasis have been shown to reduce fistula incidence. [10]

Infection was the second most common complication in our cohort, possibly reflecting delayed follow-up and limited access to specialized postoperative care in the rural setting. Despite these challenges, the overall functional and cosmetic outcomes were satisfactory in the majority of cases.

Comparing our outcomes with published series underscores that results comparable to urban tertiary centers can be achieved even in rural hospitals when standardized protocols, adequate surgical expertise, and structured follow-up are ensured. Future multicentric studies with longer follow-up are warranted to assess urinary stream dynamics, cosmetic satisfaction, and psychosexual outcomes into adolescence. Urethrocutaneous fistula and wound infection were the most frequent complications, similar to the findings of Snodgrass et al. [9] and Manzoni et al. [11]. With increasing surgeon experience and careful tissue handling, these can be minimized. Our study highlights the importance of consistent follow-up and postoperative care, even in resource-limited rural settings.

5. CONCLUSION

Distal penile hypospadias was the predominant type in our series. TIP urethroplasty remains the most reliable surgical option with acceptable complication rates. Early diagnosis, proper selection of surgical technique, and postoperative care are key to achieving optimal outcomes.

6. DECLARATIONS

Conflict of Interest: None declared.

Funding: No external funding was received for this study.
Ethical Approval: Approved by the Institutional Ethics Committee, DLNP Government Medical College, Ratlam (M.P.).
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