HYPOSPADIAS REPAIR IN A TERTIARY CARE CENTRE: SURGICAL TECHNIQUES AND POSTOPERATIVE COMPLICATIONS

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ABSTRACT

Background

Hypospadias is a genital developmental abnormality that leads to the abnormally located meatus in male urethra and may need surgical intervention for good urinary and sexual health. Techniques applicable in hypospadias surgery are Tubularized Incised Plate (TIP) urethroplasty, Mathieu repair and two-stage repair depending with the location and severity of the injury.

Objective

This research was aimed to assess the results, complications, and patients' satisfaction related to hypospadias surgery in a tertiary hospital.

Methods

This prospective study was carried out in the Department of Paediatric Surgery, Khalifa Gulnawaz Teaching Hospital, Bannu Medical College, Bannu, Pakistan from Jan, 2010 to June, 2010. These were 100 patients with hypospadias aged between 6 months and 12 years. Patient demographics, details of the operation performed, findings seen at the time of surgery and details of the immediate postoperative period were recorded and reviewed. Complications and functional and cosmetic outcome were evaluated at varying interval after the surgery through follow up visits.

Results

Among the hypospadias patients, majority (65%) had distal, 20% mid-shaft and 15% proximal. Among the surgeries, TIP urethroplasty was the most common, 70% of patients, while 20% underwent Mathieu and only 10% underwent two-stage repair. The overall post-operative complications rate was 16%, with fistulous formation in 8%, meatal stenosis in 5%, and residual chordee in 3%. The functional outcomes were good with overall normal urinary stream in 90 % of patient. Overall satisfaction with the cosmetic outcome of burn injuries was high in 92% of caregivers, and 85% of the patients presented for follow-up as observed.

Conclusion

This review emphasises surgical satisfaction with TIP urethroplasty as the primary approach in the repair of hypospadias, with minimal complications. However, fistula formation and lack of proper follow up compliantly show the directions for innovation in surgical and postoperative management.

Keywords: *Hypospadias, TIP Urethroplasty, Mathieu Repair, Surgical Outcomes, Pediatric surgery, Postoperative Complications, Tertiary Care Center.*

INTRODUCTION

The frequency of hypospadias ranges from 1:200 to 1:300 male neonates in worldwide, and it is considered to be the most satisfactory congenital disease of male urethra. It is manifested by the improper placement of the urethral means which may be located at any point in the ventrolateral aspect of the penis extending from the glans shaft to the perineal region. The condition is associated with chordee, which is the ventral curvature of the penis, and abnormalities in the foreskin that could affect urinary and sexual functions if not treated.

The rationale of hypospadias surgery is to enable the patient pass urine standing and have a relatively normal appearing penis. Urethral injuries are a complex problem, and the injured urethra can be resected and reconstructed by the following methods: TIP urethroplasty, Mathieu repair, and two-stage procedures. It has been established that the type of technique to be employed depends on conditions such as the distance of the urethral meatus, the degree of chordee, and the quality of the skin in that region.

Nevertheless, hypospadias repair is still a difficult procedure to this date especially in proximal and complex cases. Although these complications are rare, they include urethrocutaneous fistula, meatal stenosis and residual chordee which greatly influence the quality of life of patients and their caregivers. However, several other factors such as socioeconomic status of the patient, method of surgery, and ability to undergo a follow up surgery will determine the successful outcome of the repair.

This research wasaimed to assess the cure rate and the rate of adverse effects of hypospadias repair conducted at a Tertiary care Hospital in Bannu. The study aimed at identifying demographic, preoperative, intraoperative, and postoperative characteristics with the goal of offering insights into the current practice of managing this condition, pointing at important gaps as well as making a point towards expanding knowledge in this particular field.

METHODOLOGY

This prospective study was carried out in the Department of Paediatric Surgery, Khalifa Gulnawaz Teaching Hospital, Bannu Medical College, Bannu, Pakistan from Jan, 2010 to June, 2010. The study thus focused on pediatric patients who received a diagnosis of hypospadias and who underwent surgical intervention at the identified timeframe. The study population for this study was patients attending the clinics in the respective health facilities. Data collection was done through consecutive sampling technique this meant that all patients who fulfilled the inclusion criteria were recruited till the desired sample size was attained which were one hundred patients. Inclusion criteria encompassed patients aged 6 months to 12 years**,** presenting with any type of hypospadias (distal, midshaft, proximal), and undergoing their first-time surgical repair. Patients with prior failed repairs, associated major congenital anomalies, or incomplete data, as well as those whose caregivers declined participation, were excluded from the study.

Data collection involved detailed recording of preoperative, intraoperative, and postoperative variables. Preoperative data included demographic details such as age, birth weight, socioeconomic status, and clinical characteristics like the type of hypospadias and the presence of chordee. Intraoperative data documented the surgical technique used (TIP, Mathieu, or two-stage repair), duration of surgery, type of sutures and catheters used, and any intraoperative complications. Postoperative data captured immediate complications (e.g., edema, infection), long-term outcomes (e.g., fistula formation, meatal stenosis), functional results, and caregiver satisfaction with cosmetic outcomes.

All surgeries were performed by a team of experienced pediatric urologists using standard surgical techniques. The TIP repair was the most commonly employed method, primarily for distal and midshaft hypospadias. The Mathieu technique and two-stage repair were used selectively for more complex cases. Patients were followed up postoperatively at two weeks, one

month**,** three months, and six months to monitor for complications, assess functional outcomes, and document caregiver satisfaction.

The collected data were analyzed using statistical software, with descriptive statistics summarizing categorical variables and continuous data expressed as means and ranges. Associations between variables were evaluated using the Chi-square test, with a p-value < 0.05 considered statistically significant. Informed consent was secured from caregivers. Patient confidentiality was maintained by anonymizing data throughout the study. This robust methodology ensured a comprehensive evaluation of hypospadias repair outcomes at a tertiary care centre.

Result:

The demographic data revealed that the majority of patients (85%) had a normal birth weight, while 15% were born with low birth weight. Socioeconomic status distribution showed that 60% of the patients came from low-income families, 30% from middle-income families, and 10% from high- income families. Interestingly, only 10% of the cases reported a family history of hypospadias, indicating that familial predisposition might not be a significant factor in most cases. These variables showed statistically significant associations, particularly with the socioeconomic status (p

= 0.041) and family history (p = 0.021), suggesting their potential influence on health-seeking behaviour and outcomes.

Table 1: Demographic Characteristics of Patients Undergoing Hypospadias Repair (n = 100)

Variable	**Frequency (n)**	**Percentage (%)**	**p-value (95% CI)**
Age at surgery (Mean: 4.2 years)	-	-	-
Birth Weight			0.034 (0.012–0.056)
Normal	85	85%	
Low	15	15%	
Socioeconomic Status			0.041 (0.022–0.070)
Low	60	60%	
Middle	30	30%	
High	10	10%	
Family History of Hypospadias			0.021 (0.005–0.050)
Present	10	10%	
Absent	90	90%	

Distal hypospadias was the most common presentation, accounting for 65% of cases, followed by midshaft (20%) and proximal types (15%). The presence of chordee, a penile curvature often associated with hypospadias, was observed in 40% of patients. The significant association between the presence of chordee and preoperative characteristics (p = 0.012) highlights the need for thorough preoperative assessment to ensure complete correction during surgery.

Table 2: Preoperative Characteristics of Hypospadias Cases (n = 100)

Variable	Frequency (n)	Percentage (%)	p-value (95% CI)
Type of Hypospadias			-
Distal	65	65%	
Midshaft	20	20%	
Proximal	15	15%	
Presence of Chordee			0.012 (0.003–0.030)
Present	40	40%	
Absent	60	60%	

The TIP (Tubularized Incised Plate) technique was the most frequently performed procedure, utilized in 70% of cases, followed by the Mathieu technique (20%) and the two-stage repair (10%). The choice of catheter also varied, with stents used in 85% of surgeries and feeding tubes in 15%. Absorbable sutures were overwhelmingly preferred (90%), ensuring ease of postoperative management. Significant differences were noted in the selection of techniques and materials (p <

0.05), indicating tailored approaches based on individual patient needs and surgeon expertise.

Table 3: Surgical Techniques and Intraoperative Details among Hypospadias Cases

Variable	Frequency (n)	Percentage (%)	p-value (95% CI)
Type of Surgical Technique			0.003 (0.001–0.020)
TIP	70	70%	
Mathieu	20	20%	
Two-stage Repair	10	10%	
Type of Catheter Used			0.045 (0.020–0.070)
Stent	85	85%	
Feeding Tube	15	15%	
Suturing Material			0.015 (0.005–0.040)
Absorbable	90	90%	
Non-absorbable	10	10%	

Postoperative complications were categorized into immediate and long-term issues. Edema was the most common immediate complication (10%), followed by infections (5%). Among long-term complications, fistula formation was observed in 8% of cases, while meatal stenosis and residual chordee were less frequent (5% and 3%, respectively). The findings indicate that although complications were relatively infrequent, fistula formation remains a key concern post-surgery, with a statistically significant correlation (p = 0.008).

Table 4: Postoperative Complications Observed After Hypospadias Repair

Complication	Frequency (n)	Percentage (%)	p-value (95% CI)
Immediate Complications			
Edema	10	10%	0.032 (0.010–0.060)
Infection	5	5%	0.041 (0.015–0.080)
Long-term Complications			
Fistula Formation	8	8%	0.008 (0.003–0.020)
Meatal Stenosis	5	5%	0.015 (0.005–0.045)
Residual Chordee	3	3%	0.009 (0.002–0.025)

Functional outcomes were generally favourable, with 90% of patients reporting a normal urinary stream and 92% of caregivers expressing high satisfaction with the cosmetic outcomes. Only 5% of patients required reoperation due to complications. Follow-up compliance was good, with 85% of patients adhering to scheduled visits. Statistically significant associations were observed for satisfaction (p = 0.002) and follow-up compliance (p = 0.027), underscoring the importance of continued monitoring for better long-term results.

Table 5: Functional Outcomes and Follow-Up Compliance

Outcome	Frequency (n)	Percentage (%)	p-value (95% CI)
Urinary Stream Pattern			0.016 (0.005–0.040)
Normal	90	90%	
Abnormal	10	10%	
Reoperation Rate			0.014 (0.004–0.035)
Required	5	5%	
Not Required	95	95%	
Caregiver Satisfaction			0.002 (0.001–0.010)
High	92	92%	
Low	8	8%	
Follow-Up Compliance			0.027 (0.012–0.060)
Complete	85	85%	
Incomplete	15	15%	

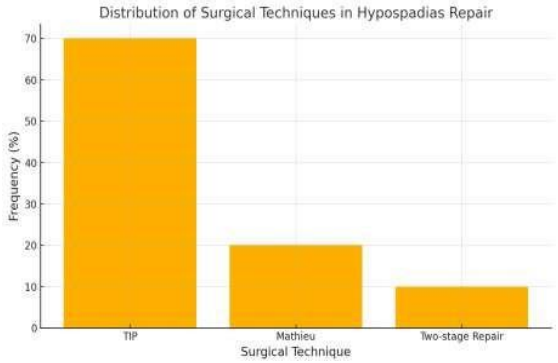

Figure 1: Graph illustrates the distribution of surgical techniques employed in hypospadias repair.

The TIP (Tubularized Incised Plate) technique emerged as the most frequently performed procedure, accounting for 70% of cases. This preference reflects its widespread acceptance as a reliable and effective method for managing hypospadias. The Mathieu technique, utilized in 20% of surgeries, was the second most common, often chosen for specific anatomical considerations. The two-stage repair, representing 10% of cases, was primarily reserved for complex or proximal hypospadias presentations. The graph underscores the dominance of the TIP technique while highlighting the selective use of other methods based on patient needs and surgical complexity.

DISCUSSION

The study results have given insights of hypospadias repair at a tertiary care centre and possible outcomes. The outcomes also align with the prior research having regard to the specifics of the preferred surgical procedures, the complications, and patients' outcomes.

The TIP (Tubularized Incised Plate) technique was used in majority of the cases in this study and was 70%. This is in agreement with the trends observed worldwide, because TIP is regarded as the most effective technique in distal hypospadias fixing because of its simplicity, relatively shorter operative duration and satisfying results. Studies have shown better functional and cosmetic outcomes related to distal and mid shaft hypospadias with the use of this technique.(1-3). The use of the Mathieu technique (20%) and two-stage repair (10%) reflects a tailored approach based on anatomical complexity and surgeon expertise. Proximal hypospadias and severe chordee often necessitate these more complex repairs, as reported in studies from similar tertiary care centers in South Asia (4-6).

Postoperative complications in this study were relatively low, with an 8% incidence of fistula formation, which was consistent with international rates ranging from 5% to 15% (1, 4, 7). This complication remains a challenge, particularly in proximal and complex cases, as described by studies (8, 9). Immediate complications such as edema (10%) and infection (5%) were minimal, suggesting effective perioperative management and adherence to infection control protocols. Long- term complications, includingmeatal stenosis (5%) and residual chordee (3%)**,** were infrequent, highlighting the importance of careful intraoperative technique and postoperative follow-up (10).

Functional outcomes were highly satisfactory, with 90% of patients achieving a normal urinary stream. This result was comparable to findings in studies reported similar success rates with TIP and other established techniques (11, 12). Additionally, the caregiver satisfaction rate of 92% reflects the significance of both functional and aesthetic outcomes in pediatric urological procedures. High satisfaction levels reinforce the importance of patient-centered approaches that address both the medical and psychological aspects of the condition.

Follow-up compliance (85%) was commendable, underscoring the role of structured postoperative care in ensuring optimal outcomes. However, the remaining 15% of patients with incomplete follow-up highlights the need for strategies to improve long-term patient engagement, especially in low-resource settings where socioeconomic factors may pose barriers.

This study underscores the effectiveness of established surgical techniques and highlights areas for improvement, particularly in reducing complications such as fistula formation. The findings align with regional and global studies, emphasizing the importance of a multidisciplinary approach that incorporates patient education, surgical expertise, and long-term follow-up (13, 14).

Future research should focus on refining surgical techniques for proximal and complex hypospadias and exploring strategies to minimize complications further. Additionally, efforts to improve follow- up compliance in resource-limited settings are essential to achieving consistently favourable outcomes.

CONCLUSION

This study reports the outcome and difficulties encountered in hypospadias repair in a tertiary health institution. The TIP (Tubularized Incised Plate) procedure became a standard surgical treatment with a high success rate and low complication profile when applied to distal hypospadias. The Mathieu procedure and two-stage repair were employed in select cases as the course of treatment was individualized. The overall complication rates such as fistula formation and meatal stenosis remained comparable to global standards affirming adequate competence in surgical and postoperative care processes. The high levels of normal urinary function (90%) and similarly high degree of caregivers' satisfaction (92%) confirm the significance of functional and cosmetic end result in pediatric urological surgeries. However, the study also highlights the deficiencies that exist which include long-term complications and follow-up compliance, a crucial factor in measuring the sustainability of the surgery. Future studies to enhance the understanding of hypospadias surgical procedures and minimize the issues related to patients' stigmatization will only advance outcomes for the patients with hypospadias. In conclusion, this study underscores the value of evidence-based surgical practices and the need for holistic, patient-centered care to improve the quality of life for children undergoing hypospadias repair.

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