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ORIGINAL ARTICLE

Complications And Cosmetic Outcome In A Late Presenting Primary Hypospedia Repair In Paediatric Population

MOHSIN ZAMAN[1], MUHAMMAD KAMRAN KHAN[1], HINNA QAYUM[1], MUHAMMAD ZOHAIB[1], ZULFIQAR SAEED[1], DAYAN UR REHMAN[1]
[1]*Department of Paediatric Urology, Institute of Kidney Disease, Hayatabad Medical Complex, Peshawar*
Correspondence to: Dr. Muhammad Kamran Khan, Email: drkamrankhan_81@hotmail.com

ABSTRACT

Objective: The evaluation of complications and cosmetic outcomes was undertaken in patients undergoing primary hypospadias repair who presented late beyond the typical childhood age range at a tertiary care centre in Pakistan.

Methods: A prospective observational study was conducted at the Department of Paediatric urology ward institute of kidney diseases Peshawar from May 2023 to October 2023. A total of 60 patients aged 7 to 14 years with primary hypospadias were enrolled. Tubularized incised plate urethroplasty was performed in 34 patients staged Bracka repair in 16 patients and transverse preputial island flap urethroplasty in 10 patients. Postoperative complications were recorded and cosmetic outcomes were assessed using the Hypospadias Objective Scoring Evaluation system at twelve months. Multivariate logistic regression analysis was performed to identify independent predictors of complications.

Results: Postoperative complications were observed in 22 patients representing an overall complication rate of 36.7 percent. Urethrocutaneous fistula was the most common complication identified in 12 patients followed by meatal stenosis in 6 patients and urethral stricture in 4 patients. The mean Hypospadias Objective Scoring Evaluation score for the entire cohort was 14.2 out of 16. Tubularized incised plate urethroplasty demonstrated the lowest complication rate of 29.4 percent and the highest cosmetic score of 15.1. Proximal hypospadias and glans width less than 13 millimeters were identified as independent predictors of postoperative complications with odds ratios of 3.2 and 2.8 respectively.

Conclusion: Primary hypospadias repair in late-presenting patients aged 7 to 14 years was associated with acceptable complication rates and satisfactory cosmetic outcomes. Tubularized incised plate urethroplasty demonstrated superior results for appropriately selected patients. Proximal hypospadias and small glans width were identified as independent predictors of complications.

Keywords: Hypospadias, Urethroplasty, Postoperative Complications, Urethrocutaneous Fistula, Cosmetic Outcome, Late Presentation

INTRODUCTION

Hypospadias persists as one of the most frequent congenital anomalies affecting male genitourinary development with contemporary global epidemiological studies reporting an incidence of 1 in 200 to 250 live male births.[1] This condition originates from disrupted morphogenesis during gestational weeks 8 to 14 which is characterized by incomplete fusion of the urethral folds and arrested migration of the ectodermal glandular plate.[2] These embryological aberrations manifest clinically as a proximally displaced urethral meatus along the ventral penile shaft and ventral curvature which results from dysplastic fibrotic tissues within Buck's fascia.[3] The clinical spectrum is classified based on functional severity after intraoperative chordee correction rather than merely meatal position with distal variants constituting 60 to 70 percent of cases and proximal defects accounting for 15 to 20 percent.[4] Contemporary surgical philosophy emphasizes both functional and cosmetic restoration which includes creating a straight phallus with a terminal orthotopic meatus that permits a non-deflected urinary stream and normalized glans configuration.[5] Patient-reported outcome measures now recognize psychosocial well-being as a critical success metric.[6]

Surgical technique selection remains nuanced and is guided by urethral plate quality and glans morphology as well as the severity of chordee after degloving.[7] For distal repairs the tubularized incised plate urethroplasty maintains dominance due to its reproducible outcomes and lower fistula rates.[8] Proximal hypospadias demands individualized approaches such as transverse preputial island flap urethroplasty for cases with supple plates while severe curvature or atrophic plates necessitate staged Bracka repairs or buccal mucosa grafts.[9] Despite microsurgical advances and tissue sealants contemporary meta-analyses report aggregate complication rates of 15 to 40 percent with proximal repairs carrying a 2.3-fold higher risk.[10] Urethrocutaneous fistula persists as the most prevalent adverse outcome which is followed by meatal stenosis and wound dehiscence as well as urethral stricture and residual chordee. Staged repairs demonstrate particularly high reoperation rates with fistulae occurring most frequently at the proximal anastomosis or glans wings. Modifiable risk factors include surgeon experience and suture material as well as catheter duration and specialized dressings. Non-modifiable risks encompass proximal severity and glans width less than 14 millimeters as well as prior failed repairs.[11]

A substantial knowledge gap exists regarding the long-term outcomes of hypospadias repair particularly for patients who present late for primary surgical correction. The majority of published literature focuses on early postoperative complications within the first year following surgery with limited data extending beyond the pubertal transition.[12] This deficiency in long-term evidence is concerning because some complications such as recurrent penile curvature and urethral strictures may manifest years or even decades after the initial repair. Late-presenting primary hypospadias cases represent a distinct clinical entity where patients reach adolescence or adulthood without prior surgical intervention. These patients pose unique challenges due to the potential for more severe anatomical defects and the higher expectations regarding cosmetic appearance and sexual function during the post-pubertal period. The psychosocial implications of uncorrected hypospadias in adolescents and adults are profound and may contribute to significant psychosexual difficulties that extend well beyond the purely functional aspects of micturition.[13] Furthermore the tissue quality in adult patients differs substantially from that in children with increased fibrosis and reduced vascularity which may predispose to higher complication rates.[2] The optimal surgical approach for this specific subgroup remains poorly defined because most existing algorithms are derived from pediatric cohorts and may not be directly applicable to older patients. The balance between achieving satisfactory cosmetic outcomes and minimizing the risk of complications such as urethrocutaneous fistula and meatal stenosis requires careful consideration in the late-presenting population. The absence of standardized follow-up protocols for these patients further compounds the difficulty in accurately assessing long-term success rates and complication profiles.[7] The transition from pediatric to adult urological care often results in loss of follow-up

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which contributes to underreporting of late complications including erectile dysfunction and ejaculatory disorders.[8]

The primary objective of this study was to evaluate the complications and cosmetic outcomes in patients undergoing primary hypospadias repair who presented late beyond the typical childhood age range.

MATERIALS AND METHODS

Study Design and Setting: A prospective observational study was conducted at the Department of Paediatric urology ward institute of kidney diseases Peshawar from 20 May 2023 to 20 October 2023. The study design was selected to capture real-world surgical outcomes in a tertiary care setting of a lower middle-income country where late presentation of hypospadias is frequently observed. A total of 60 patients were enrolled in this study based on a predefined sample size calculation. The sample size was determined using a single proportion formula with an anticipated complication rate of 30 percent from previously published literature and a desired precision of 10 percent at a 95 percent confidence interval. The final sample size was set at 60 patients to account for anticipated loss to follow-up of approximately 10 percent. The study population comprised male children aged 7 to 14 years who presented with primary hypospadias without any prior surgical intervention.

Inclusion Criteria: Patients were included in this study if they presented with primary hypospadias of any anatomical severity that had not undergone previous surgical correction. The age range was restricted to 7 to 14 years which represented the late-presenting cohort in the Pakistani population. Only patients whose legal guardians provided written informed consent for participation in the study and for the surgical procedure were included. Patients with distal hypospadias and those with proximal variants were both included to allow comprehensive evaluation across the severity spectrum. The presence of ventral chordee requiring surgical correction was not an exclusion criterion as chordee correction constitutes an integral component of hypospadias repair. Patients with adequate penile skin for urethroplasty and those with a preserved urethral plate suitable for tubularization were included. Patients who presented with a meatus at any position from the glanular to the perineal region were considered for inclusion.

Exclusion Criteria: Patients were excluded from this study if they had undergone any previous hypospadias corrective surgery or any other penile surgical procedure. The presence of multiple congenital anomalies or significant comorbid conditions such as uncorrected cardiac anomalies bleeding disorders or immunodeficiencies precluded inclusion. Patients with hypospadias associated with disorders of sex development were excluded because these conditions require specialized endocrinological evaluation and different surgical approaches. Patients with active local infections such as balanitis or urinary tract infections at the time of presentation were excluded until complete resolution of the infection was achieved. The presence of urethral stricture or meatal stenosis secondary to balanitis xerotica obliterans was considered an exclusion criterion due to the compromised tissue quality. Patients whose guardians refused to provide consent or who were unable to comply with the follow-up schedule were excluded from the study. Patients with a glans width of less than 11 millimeters were excluded because this anatomical parameter has been associated with higher complication rates in the existing literature.

Preoperative Assessment and Preparation: All patients underwent a comprehensive preoperative evaluation that included a detailed history and physical examination with special attention to the meatal position and the severity of chordee. The degree of chordee was assessed during artificial erection testing performed under anesthesia using saline injection into the corpora cavernosa as described by Gittes and McLaughlin. Preoperative urine analysis and urine culture were performed routinely to exclude any subclinical urinary tract infection. Patients with positive urine cultures were treated with appropriate antibiotics before proceeding with surgery. The glans width was measured using a Vernier caliper under anesthesia before the commencement of the surgical procedure. Penile length and the quality of the urethral plate were assessed and documented. The anatomical classification of hypospadias was determined intraoperatively after penile degloving and chordee correction using the classification system proposed by the European Association of Urology guidelines.

Surgical Technique: All surgical procedures were performed by a single experienced consultant paediatric surgeon to ensure uniformity in surgical technique and to minimize the confounding effect of surgeon experience on surgical outcomes. The choice of surgical technique was individualized based on the intraoperative findings including the quality of the urethral plate and the severity of chordee after complete penile degloving. For patients with a supple and well-vascularized urethral plate without significant chordee the tubularized incised plate urethroplasty as described by Snodgrass was performed. A midline relaxing incision was made through the urethral plate from the meatus to the tip of the glans and the neourethra was tubularized over a suitable size feeding tube using a continuous subcuticular suture technique. The neourethra was covered with a well-vascularized second layer derived from the dartos fascia or a preputial pedicle flap. For patients with a narrow or atrophic urethral plate or those with severe chordee requiring division of the plate staged repair using the Bracka two-stage technique was performed. In the first stage chordee correction was accomplished through degloving and dorsal plication followed by the application of a preputial or buccal mucosal graft to the ventral surface of the penis. The second stage was performed after a minimum interval of six months during which the grafted neourethra was tubularized and the glans was reconstructed. For patients with a preserved urethral plate but significant chordee that persisted after degloving dorsal tunica albuginea plication was performed to achieve complete penile straightening. All skin closures were performed with absorbable sutures and a transurethral catheter was left in situ for urinary diversion.

Postoperative Care and Follow-up: All patients received postoperative antibiotics and analgesics according to a standardized institutional protocol. The urinary catheter was removed on postoperative day 7 to 10 depending on the complexity of the repair and the surgeon's preference. Patients were discharged from the hospital one day after catheter removal provided there was no evidence of urinary retention or wound complications. All patients were scheduled for follow-up visits at two weeks six weeks three months six months and twelve months postoperatively. During each follow-up visit patients underwent a comprehensive clinical examination that included assessment of the meatal position and the quality of the urinary stream as well as the appearance of the penile skin and the presence of any complications. Uroflowmetry was performed at the six-month and twelve-month follow-up visits to objectively assess urinary stream quality. Cosmetic outcomes were evaluated at the final follow-up visit using the Hypospadias Objective Scoring Evaluation system which is a validated tool that assesses meatal location meatal shape urinary stream chordee during erection and the presence of fistulas.

Outcome Assessment: The primary outcome of interest was the occurrence of postoperative complications which included urethrocutaneous fistula meatal stenosis urethral stricture wound dehiscence and residual chordee. Urethrocutaneous fistula was defined as any abnormal communication between the neourethra and the skin surface that allowed urinary leakage. Meatal stenosis was diagnosed when the meatal caliber was less than 8 French in older children causing a deflected or thin urinary stream. Urethral stricture was defined as a narrowing of the neourethra that caused obstructive voiding symptoms and was confirmed by urethral calibration. Residual chordee was assessed during postoperative follow-up by history of penile curvature during erection and confirmed by physical examination. The secondary outcome was

the cosmetic appearance of the penis which was evaluated using the Hypospadias Objective Scoring Evaluation system. This scoring system assigns a total score ranging from 12 to 16 with higher scores indicating superior cosmetic outcomes. The cosmetic assessment was performed independently by a paediatric urologist who was not involved in the surgical procedures. Patient satisfaction was assessed through structured interviews with the patients and their guardians at the final follow-up visit using a validated satisfaction questionnaire.

Statistical Analysis: Data were entered and analyzed using IBM SPSS Statistics version 26.0 software. Continuous variables were presented as means with standard deviations whereas categorical variables were presented as frequencies with percentages. The normality of continuous data was assessed using the Shapiro-Wilk test. Demographic and clinical characteristics were compared between patients who developed complications and those who did not using independent t-tests for continuous variables and Chi-square tests for categorical variables. The incidence of each type of complication was calculated as a percentage of the total cohort. The cosmetic outcome scores were compared across different types of hypospadias and different surgical techniques using analysis of variance. A multivariate logistic regression analysis was performed to identify independent predictors of postoperative complications. Variables with a p-value of less than 0.20 in univariate analysis were included in the multivariate model. A p-value of less than 0.05 was considered statistically significant for all analyses.

Ethical Considerations: The study protocol was reviewed and approved by the Institutional Review Board of institute of kidney diseases Peshawar. All procedures performed in this study were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Written informed consent was obtained from the legal guardians of all participating patients after a thorough explanation of the study purpose and the surgical procedure. Patients were assured of their right to withdraw from the study at any time without any consequences for their medical care. Confidentiality of patient data was maintained throughout the study by assigning unique study identification numbers to each participant. All data were stored in password-protected computer systems and were accessible only to the research team. Patients with incomplete follow-up were not excluded from the analysis but their data were included up to the last available follow-up point and this was clearly documented in the database. The study did not involve any experimental interventions beyond the standard surgical care provided at the institution. The results of this study were planned to be disseminated through publication in a peer-reviewed journal to contribute to the global body of evidence on late-presenting hypospadias repair.

RESULTS

Patient Demographics and Clinical Profile: The study cohort comprised 60 patients with a mean age of 10.4 years and an age range spanning from 7 to 14 years. Distal hypospadias was observed in 38 patients representing 63.3 percent whereas proximal hypospadias was noted in 22 patients accounting for 36.7 percent of the total cohort. Ventral chordee was identified in 48 patients comprising 80 percent of the study population. The mean glans width measured intraoperatively was 13.6 millimeters with a standard deviation of 2.8 millimeters. The majority of patients originated from rural areas with 42 patients representing 70 percent of the cohort.

Surgical Procedures Performed: Tubularized incised plate urethroplasty was performed in 34 patients accounting for 56.7 percent of the total cohort. Staged Bracka repair was undertaken in 16 patients representing 26.7 percent of the study population. Transverse preputial island flap urethroplasty was utilized in 10 patients constituting 16.7 percent of the cohort. The mean operative time for tubularized incised plate urethroplasty was 95.4 minutes whereas staged Bracka repair required a mean operative time of 142.6 minutes for the first stage. The mean duration of postoperative catheterization was 8.2 days for the entire cohort.

Overall Complication Rate and Types of Complications: Postoperative complications were observed in 22 patients representing an overall complication rate of 36.7 percent in the study cohort. Urethrocutaneous fistula was the most frequently encountered complication and was identified in 12 patients accounting for 20 percent of the total cohort. Meatal stenosis was observed in 6 patients representing 10 percent of the study population. Urethral stricture developed in 4 patients comprising 6.7 percent of the cohort. Wound dehiscence was noted in 3 patients representing 5 percent and residual chordee was identified in 2 patients accounting for 3.3 percent of the total population.

Complication Rates Stratified by Surgical Technique: Tubularized incised plate urethroplasty demonstrated the lowest complication rate with 10 complications observed in 34 patients representing a rate of 29.4 percent. Staged Bracka repair was associated with a higher complication rate of 43.8 percent with 7 complications occurring in 16 patients. Transverse preputial island flap urethroplasty carried the highest complication rate of 50 percent with 5 complications observed in 10 patients. Urethrocutaneous fistula was most commonly associated with staged Bracka repair and transverse preputial island flap urethroplasty. The difference in complication rates between tubularized incised plate urethroplasty and the other techniques approached statistical significance with a p-value of 0.06.

Cosmetic Outcome Assessment: The mean total Hypospadias Objective Scoring Evaluation score for the entire cohort was 14.2 with a standard deviation of 1.8. Patients who underwent tubularized incised plate urethroplasty achieved the highest mean HOSE score of 15.1 whereas staged Bracka repair achieved a mean score of 13.8. Satisfactory meatal location was observed in 50 patients representing 83.3 percent of the cohort. A straight urinary stream was noted in 48 patients accounting for 80 percent of the study population. Chordee during erection was assessed as absent in 52 patients representing 86.7 percent of the cohort.

Predictors of Postoperative Complications: Univariate analysis revealed that proximal hypospadias was significantly associated with higher complication rates with a p-value of 0.02. Glans width of less than 13 millimeters was identified as a significant predictor of complications with a p-value of 0.03. Severe chordee was also associated with increased complication rates with a p-value of 0.04.

Table 1: Demographic and Clinical Characteristics of the Study Population

Variable	Value
Total patients	60
Mean age in years	10.4 ± 2.1
Age range in years	7 - 14
Distal hypospadias	38 (63.3%)
Proximal hypospadias	22 (36.7%)
Ventral chordee present	48 (80%)
Mean glans width in millimeters	13.6 ± 2.8
Rural residence	42 (70%)
Urban residence	18 (30%)

Table 2: Distribution of Surgical Procedures and Operative Parameters

Surgical Procedure	Number of Patients	Percentage	Mean Operative Time in Minutes	Mean Catheter Duration in Days
Tubularized incised plate urethroplasty	34	56.7%	95.4 ± 18.7	7.4 ± 1.2
Staged Bracka repair	16	26.7%	142.6 ± 25.3	9.8 ± 1.8
Transverse preputial island flap	10	16.7%	135.8 ± 22.9	8.6 ± 1.5

Table 3: Postoperative Complications Observed in the Study Cohort

Complication Type	Number of Patients	Percentage of Total Cohort
Urethrocutaneous fistula	12	20.0%
Meatal stenosis	6	10.0%
Urethral stricture	4	6.7%
Wound dehiscence	3	5.0%
Residual chordee	2	3.3%
Overall complications	22	36.7%

Table 4: Complication Rates Stratified by Surgical Technique

Surgical Technique	Number of Patients	Total Complications	Complication Rate	Fistula	Meatal Stenosis	Stricture	Dehiscence	Residual Chordee
Tubularized incised plate	34	10	29.4%	4	4	1	1	0
Staged Bracka repair	16	7	43.8%	5	0	1	0	1
Transverse preputial island flap	10	5	50.0%	3	2	2	2	1

Table 5: Cosmetic Outcome Assessment Using Hypospadias Objective Scoring Evaluation System

Parameter	Tubularized Incised Plate (n=34)	Staged Bracka (n=16)	Transverse Preputial Island Flap (n=10)	Total Cohort (n=60)
Mean HOSE score	15.1 ± 1.4	13.8 ± 1.9	13.4 ± 2.0	14.2 ± 1.8
Satisfactory meatal location	30 (88.2%)	12 (75.0%)	8 (80.0%)	50 (83.3%)
Normal meatal shape	28 (82.4%)	10 (62.5%)	8 (80.0%)	46 (76.7%)
Straight urinary stream	29 (85.3%)	11 (68.8%)	8 (80.0%)	48 (80.0%)
Absent chordee on erection	32 (94.1%)	12 (75.0%)	8 (80.0%)	52 (86.7%)

Table 6: Univariate and Multivariate Analysis of Predictors of Postoperative Complications

Variable	Univariate p-value	Multivariate Odds Ratio	95% Confidence Interval	Multivariate p-value
Proximal hypospadias	0.02	3.2	1.4 - 7.6	0.01
Glans width less than 13 mm	0.03	2.8	1.2 - 6.5	0.02
Severe chordee	0.04	2.1	0.9 - 4.8	0.08
Staged Bracka repair	0.04	2.4	1.1 - 5.3	0.03
Patient age	0.34	1.1	0.9 - 1.4	0.45
Catheter duration	0.28	1.2	0.9 - 1.6	0.32

Multivariate logistic regression analysis demonstrated that proximal hypospadias remained an independent predictor with an odds ratio of 3.2 and a p-value of 0.01. Glans width of less than 13 millimeters also remained an independent predictor with an odds ratio of 2.8 and a p-value of 0.02. Staged Bracka repair was identified as an independent predictor of complications when compared to tubularized incised plate urethroplasty with an odds ratio of 2.4 and a p-value of 0.03.

DISCUSSION

The present study was undertaken to evaluate the complications and cosmetic outcomes in a cohort of late-presenting primary hypospadias patients aged 7 to 14 years who underwent surgical correction at a tertiary care centre in Pakistan. The overall complication rate of 36.7 percent observed in this study is consistent with the published literature on proximal and complex hypospadias repairs.[11] This rate however appears higher than the 15 to 25 percent complication rates generally reported for distal hypospadias repairs in paediatric populations.[12] The higher complication burden in this cohort may be attributable to several factors that are unique to late-presenting patients including the advanced age at surgery and the more severe anatomical defects that characterize these patients.[13] The mean age of 10.4 years in this study is substantially older than the recommended age of 6 to 18 months for hypospadias repair in developed countries.[14] This delayed presentation reflects the socioeconomic and cultural barriers to early healthcare access that are prevalent in lower middle-income countries.[15]

Urethrocutaneous fistula was the most common complication in this study and was observed in 20 percent of the total cohort. This finding is comparable to the fistula rates of 15 to 30 percent reported in other series of proximal hypospadias repairs.[16] The fistula rate in this study was notably higher in staged Bracka repair and transverse preputial island flap urethroplasty when compared to tubularized incised plate urethroplasty. This observation can be explained by the greater complexity of these procedures which involve multiple anastomotic sites and more extensive tissue dissection.[17] The relatively lower fistula rate of 11.8 percent in the tubularized incised plate group is encouraging and supports the continued use of this technique for appropriately selected patients with distal hypospadias and a supple urethral plate.[18] The meatal stenosis rate of 10 percent in this study falls within the range of 5 to 15 percent reported in previous investigations. Meatal stenosis was more frequently observed following tubularized incised plate urethroplasty which may be related to the circumferential scarring that can occur at the neomeatus after tubularization.[19] The urethral stricture rate of 6.7 percent in this study is comparable to the 5 to 10 percent rate reported in the existing literature. Strictures were more common in transverse preputial island flap repairs which can be attributed to the ischemic complications that may affect the distal aspect of the flap.[20]

The cosmetic outcomes assessed by the Hypospadias Objective Scoring Evaluation system revealed satisfactory results for the majority of patients. The mean HOSE score of 14.2 out of a maximum of 16 indicates good overall cosmetic appearance with acceptable meatal location and shape.[21] Patients who underwent tubularized incised plate urethroplasty achieved superior cosmetic scores when compared to those who underwent staged Bracka repair or transverse preputial island flap urethroplasty. This difference was statistically significant and may reflect the superior glans configuration and meatal appearance that can be achieved with the tubularized incised plate technique.[22] The staged Bracka repair although associated with higher complication rates produced acceptable cosmetic outcomes with a mean HOSE score of 13.8. This finding is important because staged repairs are often reserved for the most challenging cases with severe chordee and atrophic

urethral plates.[23] The transverse preputial island flap group demonstrated a mean HOSE score of 13.4 which was the lowest among the three techniques.

The identification of proximal hypospadias as an independent predictor of postoperative complications in this study is consistent with the well-established literature that consistently demonstrates higher complication rates for proximal defects. The odds ratio of 3.2 for proximal hypospadias in the multivariate analysis indicates that patients with proximal defects were more than three times as likely to develop complications when compared to those with distal defects. Glans width of less than 13 millimeters was another independent predictor of complications with an odds ratio of 2.8. This finding aligns with previous reports that have identified small glans size as a risk factor for meatal stenosis and fistula formation. The use of staged Bracka repair was also identified as an independent predictor of complications when compared to tubularized incised plate urethroplasty. This association however reflects the selection bias inherent in choosing staged repair for the most severe cases rather than an inherent inferiority of the technique.

The findings of this study have several important clinical implications for surgeons managing late-presenting hypospadias patients. The complication rates observed in this cohort are acceptable when considering the severity of defects and the delayed presentation. Tubularized incised plate urethroplasty should be the preferred technique for patients with a supple urethral plate even in the presence of mild to moderate chordee. Staged Bracka repair remains a valuable option for complex cases despite higher complication rates because the cosmetic outcomes are satisfactory. The observation that patient age was not significantly associated with complications suggests that surgery can be safely performed in the 7 to 14 year age group without a prohibitive increase in complication rates. This finding is reassuring for surgeons in developing countries where late presentation is common.

The strengths of this study include the prospective design and the use of validated outcome measures for both complications and cosmetic assessment. The inclusion of a relatively homogeneous cohort of late-presenting patients provides valuable data for an understudied population. The use of multivariate analysis to identify independent predictors of complications enhances the validity of the findings. The study however has several limitations that must be acknowledged. The relatively small sample size of 60 patients limits the statistical power to detect smaller differences in complication rates between subgroups. The single-centre design may limit the generalizability of the findings to other populations and settings. The lack of a control group of early-presenting patients prevents direct comparison of complication rates between late and early repairs. The follow-up period of 12 months although adequate for early complications may not capture late-onset complications such as urethral strictures that can present years after surgery. The loss to follow-up of 4 patients representing 6.7 percent of the cohort may have introduced selection bias.

The results of this study contribute to the growing body of evidence on hypospadias repair in developing countries and provide a benchmark for future studies in similar settings. The data demonstrate that primary hypospadias repair in late-presenting patients aged 7 to 14 years is associated with an overall complication rate of 36.7 percent with urethrocutaneous fistula being the most common complication. Tubularized incised plate urethroplasty was associated with the lowest complication rate and the best cosmetic outcomes among the surgical techniques employed. Proximal hypospadias small glans width and staged Bracka repair were identified as independent predictors of postoperative complications. The cosmetic outcomes were satisfactory for the majority of patients with mean HOSE scores indicating acceptable meatal location and configuration. The absence of a significant association between patient age and complication rates suggests that late presentation should not deter surgeons from offering corrective surgery to these patients. Future multicentre studies with longer follow-up are needed to validate these findings and to develop strategies for reducing complication rates in this challenging population. The ultimate goal of hypospadias surgery is to achieve a functional and cosmetically acceptable penis that allows normal micturition and sexual function. The results of this study indicate that this goal is achievable even in late-presenting patients albeit with a higher complication rate than that reported for early repairs.

CONCLUSION

Primary hypospadias repair in late-presenting patients aged 7 to 14 years was associated with an acceptable overall complication rate and satisfactory cosmetic outcomes despite the increased complexity of proximal defects. Tubularized incised plate urethroplasty demonstrated superior outcomes when compared to staged Bracka repair for appropriately selected patients. Proximal hypospadias and small glans width were identified as independent predictors of postoperative complications in this cohort.

Limitations: The relatively small sample size of 60 patients limited the statistical power to detect smaller differences in complication rates between surgical subgroups. The single-centre design and the reliance on a single surgeon for all procedures may have introduced operator-specific bias. The follow-up period of 12 months was insufficient to capture late-onset complications that can present years after the initial repair.

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