Impact of Age at Surgical Repair on Early Outcomes of Hypospadias: A Retrospective Cohort Study.

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ABSTRACT:

Objective: To document the impact of age at surgical repair of Hypospadias at Ibne Sina University, Mirpur Khas.

Methodology: In this study we have included 33 male patients who underwent primary hypospadias repair between January 2024 and March 2026. Patients were divided into three age groups (11 each): Group A (≤18 months), Group B (19 months-5 years), and Group C (>5 years). Outcomes within 3 months included urethrocutaneous fistula, meatal stenosis, wound gapping, surgical site infection and re-intervention.

Results: All operations were performed by senior consultants. Distal and midshaft cases were repaired with TIP technique; proximal cases with two-stage repair. Overall complication rate was 18.2% (6/33). Urethrocutaneous fistula occurred in 2 (6.1%), wound dehiscence in 2 (6.1%), surgical site infection in 2 (6.1%). No meatal stenosis or flap necrosis. Re-intervention was required in 2 (6.1%), both after two-stage repair for proximal hypospadias. Complication rate by age Group A were 9.1%, Group B 18.2%, Group C 27.3%.

Conclusion: Hypospadias repair achieves acceptable outcomes across all age groups at our institution when performed by experienced surgeons. Two-stage repairs for proximal hypospadias carry the highest complication burden.

Keywords: Hypospadias; age at repair; urethrocutaneous fistula; Pakistan.

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Introduction:

Hypospadias is a congenital malformation of the male genitalia defined by three characteristic features: an abnormal location of the urethral meatus on the ventral penile surface, ventral curvature known as chordee, and a dorsally hooded prepuce. It is one of the most common congenital anomalies affecting the male genitourinary system, with a reported global incidence of approximately 1 in 200 to 300 live male births.[1] A rising trend has recently been observed, attributed to environmental toxic chemicals, genetic susceptibility, and prenatal exposure to newly modified hormonal agents.[1,2] Surgical correction is the only definitive treatment for hypospadias. There are certain goals of hypospadias repair including normal positioning of the urethral opening to the glans tip, straightening the penile shaft, gaining an aesthetically acceptable appearance, and preserving normal urinary and sexual function.[3,4] To the date there is more than 300 operative procedure proposed for its repair showing the technical difficulty of this abnormality. The Tubularized Incised Plate (TIP) urethroplasty is the most widely used procedure for distal and mid-penile hypospadias, while two-stage repairs are reserved for severe proximal cases.[5-7]

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The best age to correct this abnormality is always questionable and remained in the debates. International guidelines suggest to repair it between 6 and 18 months of age because of better tissue pliability, better penile-to-body size ratio, low risk of anesthesia and decrease impact of mental health.[8,9] Early repair has also been associated with lower re-operation rates.[10]

In Pakistan, this congenital abnormality often presents very late to specialized doctors, largely due to limited parental awareness, inadequate access to surgical services, financial constraints, and sociocultural factors. Consequently, many children undergo repair between 2 and 10 years of age, leading to significant deviation from international guidelines.[10,11] In the literature, there have been many inconsistencies on age and postoperative complications. Data depicts higher ratios of fistula, meatal stenosis and wound infection in later age presenter which may be due to larger penile dimension, powerful erections and decreased tissue pliability.[12,13] Others argue that age alone does not solely anticipate complications when surgical technique and surgeon experience are controlled.[14]

At plastic surgery department, Ibne Sina University hypospadias repairs are performed across a wide age range showing the delayed presentation pattern in Sindh province. There is no previous study has checked the relationship between age at repair and early outcomes in this region. This study is designed to fill this gap to compare early postoperative complication rates across different age groups.

Methodology:

This retrospective cohort study was conducted in the Department of Plastic Surgery at Ibne Sina University following ethical approval from the Institutional Ethical Review Board (Ref. No. ERB-5/2026, dated 21 May 2026). Owing to the retrospective design, the requirement for written informed consent was waived. Eligible participants included all male patients who underwent primary hypospadias repair at our institution between June 2024 and June 2026,

with a minimum postoperative follow-up of three months. Patients with prior hypospadias surgery, associated intersex disorders, known bleeding diathesis, or incomplete follow-up data were excluded. Participants were stratified into three age groups: Group A (≤18 months), Group B (19 months-5 years), and Group C (>5 years). Demographic details, hypospadias type, surgical technique, operative time, and complications were extracted from hospital records, operative logbooks, and outpatient charts using a standardized proforma. The primary outcome was the occurrence of early complications within three months, including urethrocutaneous fistula, meatal stenosis, wound dehiscence, flap necrosis, and surgical site infection. The secondary outcome was the need for re-intervention within three months. Data analysis was performed using SPSS version 26.0. Continuous variables were expressed as mean ± standard deviation, while categorical variables were reported as frequencies and percentages. The chi-square test was applied to compare complication rates across age groups, with statistical significance set at $P \leq 0.05$.

Results:

The total population included in this study were 33 male patients who underwent primary hypospadias repair. Patients were divided into three age groups of 11 patients each: Group A (≤18 months), Group B (19 months to 5 years), and Group C (>5 years). The mean age was 1.5 years in Group A, 3.2 years in Group B, and 16.2 years in Group C (range 6-21 years). Distal hypospadias was the most common type overall (n=19, 57.6%), followed by midshaft (n=8, 24.2%) and proximal (n=6, 18.2%). Table 1 shows the distribution of hypospadias type across age groups. All distal and midshaft cases were repaired using the Tabularized Incised Plate (TIP) technique, with operative times ranging from 60 to 78 minutes (mean 68 ± 7 minutes). All proximal hypospadias cases were repaired using a two-stage technique, with operative times recorded as exactly 120 minutes per hospital protocol (rounded to the nearest 5 minutes; actual times ranged 115-125 minutes). Fig 1 & 2

Table No1. Hypospadias type by age group.

Hypospadias type	Group A (≤18 mo) n=11	Group B (19 mo-5 y) n=11	Group C (>5 y) n=11	Total
Distal	7	6	6	19
Midshaft	3	3	2	8
Proximal	1	2	3	6

The overall complication rate was 18.2% (6 out of 33 patients). Twenty-seven patients (81.8%) experienced no complications at all. Wound dehiscence occurred in 2 patients (6.1%), both from Group C (aged 15 and 17 years) who had undergone TIP repair. Surgical site infection occurred in 2 patients (6.1%), one from Group A and one from Group B, both after TIP repair. Urethrocutaneous fistula occurred in 2 patients (6.1%). The first case was a 14-year-old patient in Group C after TIP repair. The second case was a 3-year-old patient in Group B after two-stage repair for proximal hypospadias. Fig.3 Re-intervention was required in 2 patients (6.1%), both of whom had undergone two-stage repair for proximal hypospadias. Both re-interventions occurred in Group B. No cases of meatal stenosis or flap necrosis were recorded.

When analyzed by age group, complications were distributed as follows.

Fig No 1: Distribution of Hypospadias

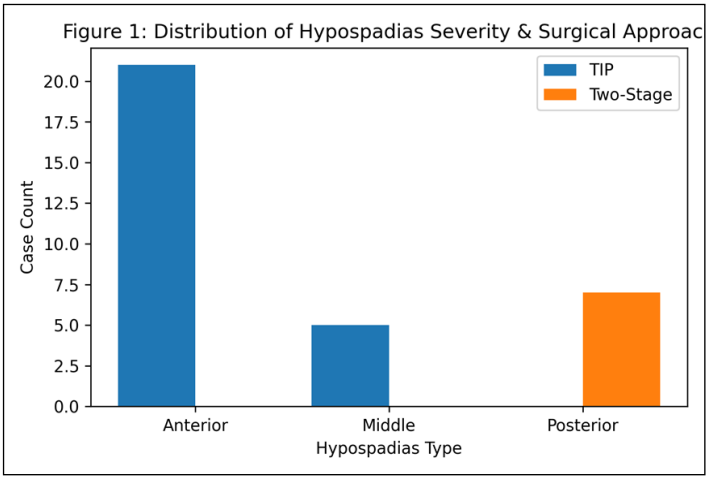


Fig No 2: Operative Time vs Surgical Approach Complexity

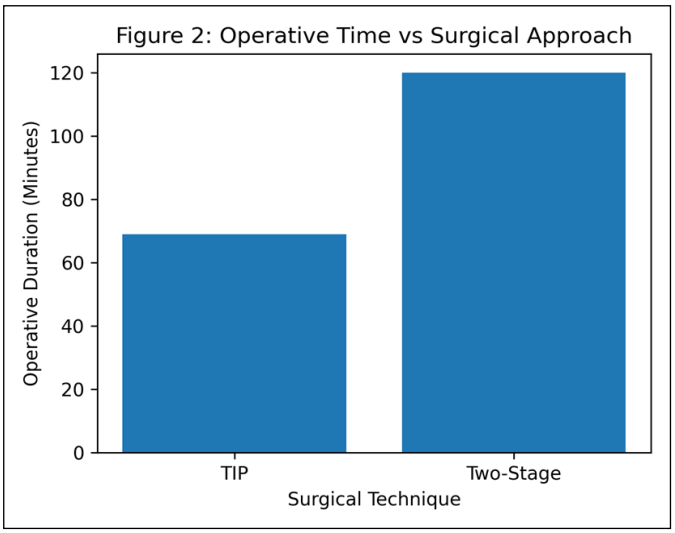
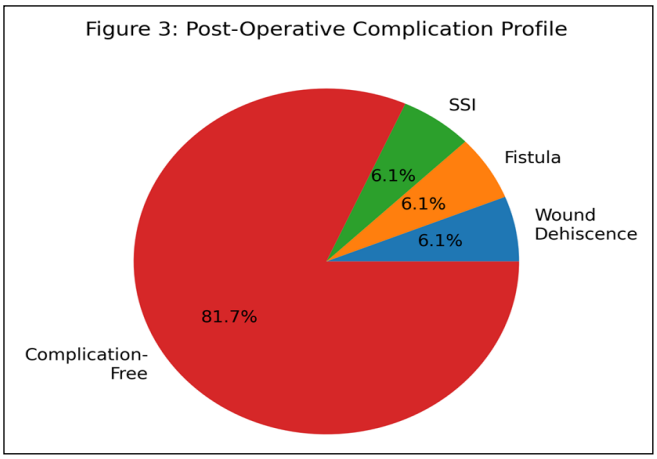


Fig No 3: Post-Operative Complication Profile



In Group A (≤18 months, n=11), there was 1 case of surgical site infection and no other complications. In Group B (19 months to 5 years, n=11), there was 1 case of surgical site infection, 1 case of urethrocutaneous fistula, and both re-interventions occurred in this group. In Group C, there were 2 cases of wound dehiscence and 1 case of urethrocutaneous fistula. Among the patients who received

two-stage repair, 2 required re-intervention, 1 developed a urethrocutaneous fistula. In contrast, among patients who received TIP repair, there were 2 cases of wound dehiscence (both in Group C), 2 cases of surgical site infection, and 1 case of urethrocutaneous fistula with no re-interventions required.

Discussion:

In this study we have examined the relationship between age at hypospadias repair and early postoperative outcomes in 33 patients. The overall complication rate was 18.2%. These findings demonstrate that hypospadias repair can be performed with good outcomes across all age groups in our setting. Studies from well-resourced countries report rates ranging from 6% to 25%.[12,13] Bush et al. reported a complication rate of approximately 15% in their series of 834 patients undergoing TIP repair.[12] Sarhan et al. from Egypt reported fistula rates of 12-18% depending on age group.[14] Pfistermuller KL et al in meta-analysis mentioned that Moriya et al. found complication rates of 10-20% in their Japanese cohort.[15] In contrast, studies from limited resource settings often report higher complication rates. A local study from Akhtar et al.[16] reported that in their studies the ratio of complication rate was 31.6% in 98 patients whereas in our rate of 18.2% is below this figure, depicts that results in this setting are acceptable despite the challenges of delayed presentation. UCF occurred in 6.1% patients in our study which is lower than the 10% to 20% rates reported in many series 16-18 for example Wang et al. reported UCF of 15-25% in their cohort.[16] Similarly, Sarhan et al. from Egypt reported fistula rates of 12-18% depending on age group.[14]

The lower fistula rate could be due to more presentation of distal hypospadias in our group of population. The relationship between age and complications remains controversial. We couldn't find any statistically significant difference in complication rates across age groups. This finding supports the work of Bush et al. who reported that age does not independently predict complications when surgical technique is standardized.[12] Likewise, Moriya et al. found that age was not a consistent predictor of individual complications.[15] Nonetheless, our findings differ from those of Randy Fauzan et al who reported significantly elevated complication rates in older children, particularly for urethrocutaneous fistula.[13] Sarhan et al. also found higher complication rates in older age groups at a single Egyptian center.[14] These discrepancies may reflect differences in case mix and surgical expertise. Our cohort had predominantly distal hypospadias, whereas other studies included more proximal cases.

Wound dehiscence occurred only in our adolescent patients (Group C) after TIP repair. This is consistent with the biological rationale that older patients have larger penile dimensions and more powerful postoperative erections, which may place tension on the repair.[13,17] Randy Fauzan et al. similarly attributed higher complication rates in older children to these mechanical factors.

Re-intervention was required in 6.1% of our patients, all of whom had undergone two-stage repair for proximal hypospadias. This finding highlights that proximal hypospadias and two-stage repair are associated with higher surgical morbidity, regardless of patient age. Our re-intervention rate is comparable to the 5-10% rates reported in other series for complex proximal cases.[14,15] Scougall K et al., reported proximal hypospadias and staged repair as significant risk factors for reoperation.[18] Akhtar et al. reported that staged repairs in their cohort had a re-intervention rate of 26.7%, substantially higher than our 6.1%, possibly reflecting differences in case complexity and surgical experience.

In our study the limitations include the small sample size and retrospective design which limits the statistical power. Regardless of these limitations, this study adds valuable information from a rural region of Pakistan. The findings suggest that hypospadias repair can be performed with acceptable outcomes across a wide age range when performed by experienced surgeons. However, the higher burden of complications in two-stage repairs for proximal hypospadias supports the need for careful case selection and informed parental counseling.

This can be consolidated if prospective studies with lager sample size and longer follow up can be conducted to examine the impact of age on long term functional and cosmetic outcomes.

Conclusion:

We evaluated 33 hypospadias repairs. Overall, 18.2% experienced problems. Fistula, wound dehiscence, and infection all had a rate of 6.1%. No meatal stenosis or flap necrosis. Only two-stage proximal repairs required re-intervention (6.1%). Complications were observed at all ages. Wound dehiscence occurs only in teens. Re-intervention was only performed for proximal hypospadias in two cases. The limited sample size restricts statistical comparisons between groups. Nonetheless, these findings show that competent consultant surgeons may perform hypospadias surgery with satisfactory results in patients of all ages at our hospital. Larger prospective trials with longer follow-up times are recommended to further understand the association between age at repair and long-term results.

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Authors' Contribution	
Ali Hassan	Conceptualization, Manuscript writing
Ghulam Mustafa	Data collection, Data Extraction
Mahesh Kumar	Supervision, Planning
Zameer Abbas Mir	Final manuscript writing, supervision