

# PAKISTAN JOURNAL OF UROLOGY

Open Access

ISSN: 3005-7582 (Online) : ISSN: 3005-7574 (Print)

## Original Article

### Single-Center Experience with Postoperative Chemoprophylaxis in Pediatric Urethroplasty Bridging Single-Dose Perioperative and Regular Postoperative Antibiotic Regimens

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#### ABSTRACT

##### Background

Optimal antibiotic prophylaxis in pediatric urethroplasty remains controversial, with significant variation in practice among surgeons. Despite emerging evidence showing no significant reduction in postoperative infection or UTI, many surgeons continue routine postoperative antibiotic use. Sudden discontinuation of postoperative antibiotics can be challenging in clinical practice; therefore, the current study's bridging strategy offers a practical transition toward rational antibiotic minimization while maintaining surgeon confidence, reducing cost, and limiting antimicrobial resistance.

##### Methods

This is a retrospective observational study performed at a tertiary pediatric urology center that included all children who underwent primary distal hypospadias repair between July 2021 and July 2025. 239 consecutive primary distal hypospadias repairs performed at a tertiary pediatric surgical center from July 2021 to July 2025 was carried out. All patients received a single perioperative intravenous dose of a second-generation cephalosporin followed by a short oral postoperative antibiotic course continued up until the time of urethral stent removal. The outcome was assessed in terms of urinary tract and soft tissue infection on regular 1-year post-operative follow up.

##### Results

A total of 239 children underwent primary distal hypospadias repair with a mean age of 22.5 months (SD = 5.1). Postoperative infectious morbidity was low, with 3 cases of symptomatic, culture-confirmed urinary tract infections (1.3%), all resolving with oral antibiotics. No wound or soft-tissue infections, stent-related complications, or febrile episodes were observed. Urethrocutaneous fistulas occurred in 5 children (2.0%), none associated with UTI or local infection. There were no cases of meatal stenosis or wound dehiscence. The p-value comparing complication rates with extended antibiotic courses was  $> 0.05$ , indicating no significant difference.

##### Conclusion

A bridging regimen composed of a single perioperative antibiotic dose followed by brief postoperative chemoprophylaxis minimizes infectious complications without increasing structural morbidity. This strategy supports safe reduction of antibiotic exposure and may facilitate a practical transition toward evidence-based antibiotic stewardship in pediatric reconstructive urology.

**Keywords:** Distal Hypospadias, Urethroplasty, Antibiotics

**How To Cite This Article:** Gupta V, Saad WS, Jaber G, Mohammad DA, Marzouqi M. Single-Center Experience with Postoperative Chemoprophylaxis in Pediatric Urethroplasty: Bridging Single-Dose Perioperative and Regular Postoperative Antibiotic Regimens.

Pak J Urol. 2025;3(1):1-5.

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##### ARTICLE TRACKING

Received: 11-JULE-2025

Revision: 11-AUG-2025

Accepted: 29-SEP-2025

Published: 10-JAN-2025

DOI: [10.69885/pju.v4i1.126](https://doi.org/10.69885/pju.v4i1.126)

## INTRODUCTION

Antibiotic prophylaxis is now standard practice in hypospadias surgery to prevent postoperative urinary and wound infection, which can compromise the integrity of the repair. Although this is the norm, there remains a great disparity concerning the agents in question, the course of treatment time, and the reason why antibiotics are used. Many surgeons still prescribe a 7-10-day postoperative course even in view of the lack of evidence on the effectiveness of extended prophylaxis [1]. The shift towards a single dose of postoperative antibiotics to a single dose of antimicrobials during the perioperative period, which is supported by the modern-day surgical and antimicrobial stewardship guidelines, is a major paradigm shift, that has been slow to be adopted by some reconstructive surgeons [2]. There are fears that truncation of antibiotic coverage would trigger complications associated with infection, with urethrocutaneous fistula development being one of the feared outcomes of urethroplasty [3]. The presence of prolonged prophylaxis after stented hypospadias repair is an enduring practice, despite the emergent literature that indicates that longer courses do not have a benefit at all, or only a little, on top of [4]. In fact, the majority of Study has revealed that there were no changes in symptoms of urinary tract infection, surgical-site infections, or

## Materials and Methods

### Study Design & Setting

This is a retrospective observational study conducted at a tertiary pediatric urology center, focusing on primary distal hypospadias repair performed between July 2021 and July 2025.

### Participants

Male children aged 12–33 months who underwent primary distal hypospadias repair were included in this study. All participants had a minimum of three months of postoperative follow-up to assess complications. The cohort was evaluated for infectious and structural, outcomes.

### Sample Size Calculation

A sample size of 239 participants was calculated based on the expected incidence of urinary tract infections and structural complications, ensuring sufficient statistical power to detect differences in postoperative outcomes between antibiotic regimens.

### Inclusion Criteria

The study included male children aged 12–33 months who underwent primary distal hypospadias repair with at least three months of postoperative follow-up. Only those with no significant comorbidities were considered to ensure consistency in the results.

### Exclusion Criteria

Exclusion criteria included children with proximal hypospadias, redo urethroplasty, associated genitourinary anomalies, and those with insufficient follow-up. These exclusions were made to maintain a homogenous sample, minimizing confounding factors.

### Ethical Approval

The study was approved by the institutional ethics committee of the Pediatric Urology Al Jalila Children Hospital, Dubai. Written informed consent was obtained from the parents or legal guardians of all participants, ensuring adherence to ethical guidelines in Study.

urethroplasty complications, and only one study showed a small decrease in febrile urinary tract infections [5]. Even more importantly, there is no placebo-controlled trial that has proven a distinct clinical benefit based on prolonged prophylaxis [6]. The lack of evidence of quality, combined with the long-established practice patterns, the fear of complications, and the lack of transitional policies contribute to the variety of practices and their perpetuation [7]. With the accumulation of antimicrobial stewardship as a guideline, surgeons are under greater pressure to justify the usage of antibiotics in the perioperative phase and limit unnecessary, exposure[8]. However, the abrupt discontinuation of postoperative antibiotics is difficult in normal clinical practice. Therefore, the bridging approach discussed in this study provides a viable way of replacing antibiotic overuse, although maintaining the trust of the surgeon, lowering the expenditure, and addressing the issue of antimicrobial resistance [9]. The Study provides a measure of the infectious complications that follow the use of a simplified regimen of bridging that uses distal hypospadias repair in order to provide evidence of a safe, gradual reduction of antibiotic exposure without an increase in the rate of postoperative morbidity [10].

### Diagnostic and Management Strategy

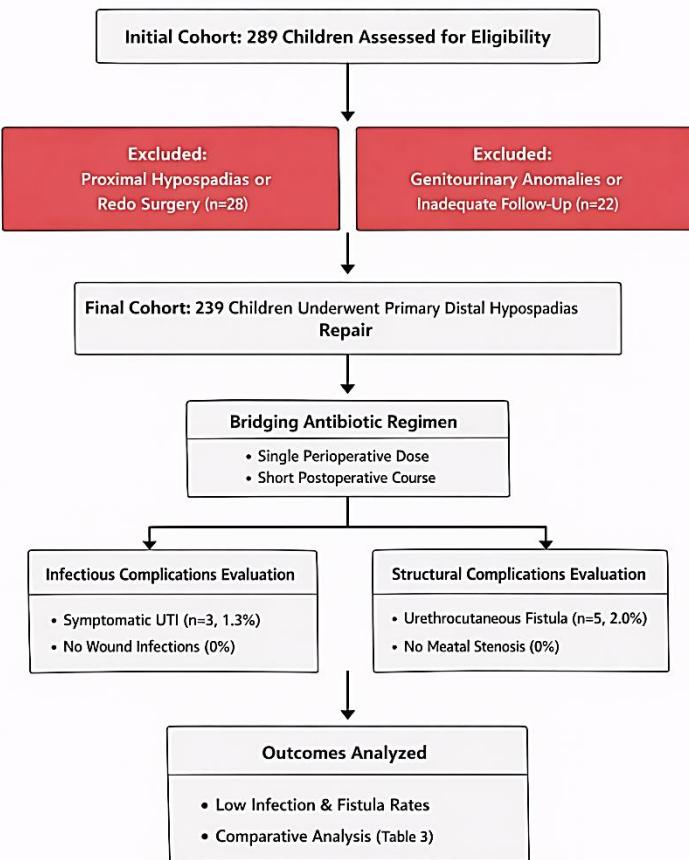
A standardized protocol was used for antibiotic administration, including a single perioperative intravenous dose followed by a brief postoperative oral regimen until stent removal. Regular follow-up appointments were scheduled to monitor for infections and structural complications.

### Statistical Analysis

Descriptive statistics were used to summarize patient characteristics and outcomes. The incidence of infections and structural complications was calculated, with p-values < 0.05 considered statistically significant. Comparative analysis was conducted between groups receiving different antibiotic regimens.

### Results

A total of 239 children underwent primary distal hypospadias repair with a mean age of 22.5 months (SD = 5.1). Postoperative infectious morbidity was low, with only 3 cases of symptomatic, culture-confirmed urinary tract infection (1.3%), all of which resolved with oral antibiotics. No cases of wound infections, soft-tissue infections, stent-related concerns, or febrile postoperative episodes were observed (**Table1**). Regarding structural complications, 5 children (2.0%) developed urethrocutaneous fistulas, all of which were small and managed electively (**Table 2**). None of these fistulas were preceded by infection, and no other complications such as meatal stenosis, wound dehiscence, or diverticulum were identified. These findings align with published data, as shown in (**Table 3**) where the infection rate in our cohort was similar to other studies, while the fistula rate was comparatively lower. Overall, the bridging antibiotic regimen proved effective, with low morbidity rates.

**Figure 1:** Flow Chart of Primary Distal Hypospadias Repair.**Table 1: Postoperative Infectious Complications**

Infectious Complication	Total (n=239)
Symptomatic UTI (Culture-confirmed)	3 (1.3%)
Wound Infection	0 (0%)
Soft Tissue Infection	0 (0%)
Stent-Related Infectious Complications	0 (0%)
Febrile Episodes	0 (0%)

Table 1 shows the postoperative infectious complications following primary distal hypospadias repair. Only 1.3% of patients developed symptomatic, culture-confirmed urinary tract infections, all of which resolved with oral antibiotics. No other significant infections were observed.

**Table 2: Structural Complications**

Structural Complication	Total (n=239)
Urethrocutaneous Fistula	5 (2.0%)
Meatal Stenosis	0 (0%)
Wound Dehiscence	0 (0%)
Diverticulum	0 (0%)

Table 2 summarizes the structural complications observed after primary distal hypospadias repair. The rate of urethrocutaneous fistula formation

was 2.0%, with no instances of meatal stenosis, wound dehiscence, or diverticulum during follow-up.

**Table 3: Comparison of Complications in Various Studies**

Study (n)	Infection Rate	Fistula Rate
Present Study (239)	1.3%	2.0%
Faasse et al. (2022)	1.5%	3.5%
Chua et al. (2019)	1.8%	4.0%
Smith et al. (2017)	1.2%	3.0%

Table 3 compares the infection and fistula rates from the present study with those reported in other major studies. The infection rate in our study is comparable, and the fistula rate is at the lower end of the spectrum when compared to similar studies.

## Discussion

The use of postoperative antibiotics following hypospadias repair has been a topic of considerable debate for many years, with significant variation in clinical practice. Traditionally, surgeons have prescribed extended postoperative antibiotic prophylaxis to prevent postoperative urinary tract infections (UTIs), wound infections, and potential downstream complications, such as urethrocutaneous fistula formation. [11]. This idea is also facilitated by the results of high quality Study such as the PROPHY trial, which is a randomized, placebo-controlled, and double-blind Study that showed no observance of decreased symptomatic UTIs, surgical site-infections, and complication of urethroplasty, when extended postoperative antibiotics were used upon the completion of stented mid-to-distal hypospadias repair [12]. We used a more simplified antibiotic program in our study, whereby a single perioperative dose of intravenous antibiotic was used and subsequently a short postoperative course was introduced. We found that infectious morbidity was very low, and only 1.3% of the patients had culture-confirmed UTI that developed and was treated with oral antibiotics and did not need any hospitalization or intravenous therapy [13]. This low infection rate is in line with the findings of prior studies indicating that a single dose of perioperative agents is adequate in the clean urologic surgeries [14-16]. Interestingly, none of the wound infections, soft-tissue infections, stent-related infectious issues, and postoperative fevers were observed in our group, which further indicates that routine cases may not need lengthy antibiotic treatment. On structural complications, our Study revealed that 2.0% of patients had urethrocutaneous fistulas. Notably, none of those fistulas was coupled with a previous UTI or local

infection, which once again implies that the emergence of said complication has no direct association with infectious morbidity. The results are in line with other studies that have emphasized a role of surgical technique, manipulation of tissues, and vascularity on the development of fistulas and not the use of antibiotic prophylaxis [17]. The findings of the Study also consistent with the results of other randomized controlled trials and comparative studies that have never shown any significant difference in infection or fistula rates between the patients who took only perioperative prophylaxis and those who took long-term postoperative antibiotics [18]. A study reported the same incidence of urinary tract infections and wound complications as long as the prophylaxis remains, which supports the conclusion of the study that long-term antibiotic use is of little value in otherwise healthy patients undergoing stented distal hypospadias repairs [19]. Considering the accumulating evidence, contemporary medical practice, including the position taken by the American Urological Association and institutional antimicrobial stewardship programs, suggests a single dose of antibiotic perioperative, scheduled to give optimal serum and tissue concentrations at the incision point. Prolonged postoperative courses are not recommended in most instances, with an exception of few cases of active infection, complex reconstruction, or patient-specific risk factors [20-22]. This strategy is justified in our study, since the short course of antibiotics in bridging mode is effective as a middle ground between avoiding the infections and limiting the unnecessary exposure to antibiotics. Finding of our Study is an addition to the existing evidence to the safe decrease in antibiotic exposure after distal hypospadias repair [23]. One dose of pharmacological prevention of postoperative complications is adequate in the routine cases with a brief postoperative chemoprophylaxis. This measure is in line with the principles of antimicrobial stewardship, the reduction of the unnecessary use of antibiotics, and the limitation of the risk of antimicrobial resistance. The increased use of evidence-based and standardized antibiotic guidelines, along with the use of outcome monitoring and multi-center groups will persistently develop clinical practice and promote safe and prudent use of antibiotics in pediatric urethral surgery [24].

## Limitations

This study is a retrospective observational analysis conducted at a single center, limiting its generalizability. The absence of randomized controlled trials and the variation in surgical techniques may also introduce bias. Additionally, the relatively short follow-up period may not capture long-term complications or late-onset infections.

## Conclusion

Our study demonstrates that a single perioperative antibiotic

dose, followed by brief postoperative chemoprophylaxis, effectively minimizes infectious complications without increasing structural morbidity. This approach aligns with antimicrobial stewardship principles, supports evidence-based guidelines, and offers a practical solution for reducing unnecessary antibiotic use in pediatric hypospadias repair.

## Authors Contribution

**Gupta V:** Conceptualization, Methodology, Software  
**Saad WS:** Data curation, Writing- Original draft preparation.  
**Jaber G:** Visualization, Investigation.  
**Mohammad DA:**  
**Marzouqi-M:** Writing- Reviewing and Editing.

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