

## Frequency of Urethrocuteaneous Fistula After Use of Autologous Platelet-Rich Plasma

Waqar Hameed Ghazi

Pediatric Urology SIUT Karachi, Pakistan

\*Corresponding author's email address: [waqarghazi@hotmail.com](mailto:waqarghazi@hotmail.com)

(Received, 24<sup>th</sup> April 2025, Accepted 18<sup>th</sup> June 2025, Published 30<sup>th</sup> June 2025)

**Abstract:** Hypospadias is one of the most prevalent congenital anomalies of the male genitalia, and urethrocuteaneous fistula (UCF) represents the most common postoperative complication following surgical correction. Platelet-rich fibrin (PRF), an autologous biomaterial rich in growth factors, has recently gained attention as a potential biological barrier to promote tissue regeneration and minimize surgical complications. **Objective:** To determine the frequency of urethrocuteaneous fistula following hypospadias repair using autologous platelet-rich fibrin membrane. **Methods:** This descriptive case series was conducted at the Department of Pediatric Surgery, Services Hospital, Lahore, from 20th June 2019 to 19th December 2019. A total of 139 male patients aged 1 to 12 years undergoing primary hypospadias repair were included through non-probability consecutive sampling. Patients with prior hypospadias surgeries or other genitourinary anomalies were excluded. Intraoperatively, autologous PRF membranes were prepared from each patient's venous blood and applied as an intermediate layer over the neourethra following urethroplasty. Patients were followed for three months to assess the development of urethrocuteaneous fistula. Data were analyzed using SPSS version 20.0. Post-stratification chi-square test was applied to evaluate associations, with a p-value  $\leq 0.05$  considered statistically significant. **Results:** The mean age of patients was  $6.59 \pm 2.15$  years. Distal penile hypospadias was the predominant type (66.91%), and tubularized incised plate (TIP) urethroplasty was the most frequently performed procedure (73.38%). Urethrocuteaneous fistula developed in 11 patients, resulting in a complication rate of 7.91%. **Conclusion:** The use of autologous platelet-rich fibrin membrane as an adjunct in hypospadias repair is associated with a low incidence of urethrocuteaneous fistula. PRF may serve as a beneficial, cost-effective biological scaffold to enhance wound healing and reduce postoperative complications.

**Keywords:** Hypospadias repair, urethrocuteaneous fistula, platelet-rich fibrin, pediatric urology, TIP urethroplasty

**[How to Cite:** Ghazi WH. Frequency Of Urethrocuteaneous Fistula After Use Of Autologous Platelet-Rich Plasma. *Biol. Clin. Sci. Res. J.*, 2025; 6(6): 66-68. doi: <https://doi.org/10.54112/bcsrj.v6i6.1823>

### Introduction

Hypospadias is a frequent male urethral congenital anomaly due to an abnormal development of the urethra, with an incidence of 1 in 200 to 300 live male births. (1, 2). It is divided according to the position of the opening of the urethra as anterior (distal), middle, and posterior (proximal) types (3). The main aim of surgery is a straight penis with a distal meatus and a cosmetically good-looking penis (4).

Hypospadias repair has significantly evolved with over 300 described techniques, but none are superior (5). Although surgical techniques and materials have improved over the years, UCF represents the most common complication following repair, with rates reported between 4% and 28% (6, 7). The risk is reduced by the incorporation of an interposing tissue layer between the neourethra and skin closure (8).

Platelet-rich fibrin (PRF), a new-generation autologous platelet concentrate with great potential in the promotion of wound healing by releasing several growth factors, such as transforming growth factor-beta (TGF- $\beta$ ), vascular endothelial growth factor (VEGF), and epidermal growth factor (EGF) (9, 10). PRF serves as a natural scaffolding to stimulate angiogenesis, collagen production, and tissue replacement (11). It has been used in different surgical areas, proving to be useful in enhancing the healing process and preventing complications (12).

There is scarce related work about the use of PRF in the management of hypospadias repair in paediatric urology. The present study was conducted to ascertain the incidence of urethrocuteaneous fistula after application of autologous PRF as an interposition layer during hypospadias surgery, which may provide a new method to lower the complication rates postoperatively.

### Methodology

This descriptive case series was carried out at the Department of Paediatric Surgery, Services Hospital, Lahore, for a duration of six months from 20th June 2019 to 19th December 2019. This study consisted of 139 male patients, aged 1 to 12 years, who presented with hypospadias. The sample size was derived by a 95% confidence, 5% margin of error, and an expected frequency of UC fistula of 10% according to existing literature. Consecutive non-probability sampling was employed in selecting the patients. Male children aged 1–12 years with hypospadias, having or not having chordee, were eligible for inclusion. The patients with a history of repair of hypospadias or associated anomaly, including inguinal hernia, undescended testis, were excluded.

The study was approved by the Institutional Review Board, and informed written consent was obtained from the guardian of each patient before the operation. All the operations were done under general anaesthesia by a consultant paediatric surgeon having more than 5 years post-fellowship experience. Autologous blood (10 mL) was collected intra-operatively and centrifuged at 3000 rpm for 10 minutes in a plain glass tube without an anticoagulant during the surgical procedure. This PRF blood clot was separated from the red cells, and it was compacted between sterile gauze to achieve a soft, stretchable membrane. This PRF membrane was interposed over the urethroplasty site and sutured with interrupted 6-0 polyglactin.

All the patients were managed with standard preoperative and postoperative treatment, including prophylactic intravenous antibiotics and sandwich-type dressing. Urethral catheters were kept for 3-9 days according to the type of hypospadias. The patients were followed for 3 months after the operation and examined for clinical urethrocuteaneous fistula. The data were processed through SPSS version 20.0. Age was expressed by mean and standard deviation; frequencies and percentages were established for hypospadias location, repair type, and fistula incidence. Strata used were age, hypospadias location, and repair type.



Chi-square test analysis was performed after post-stratification, and  $p < 0.05$  was considered statistically significant.

Results

A total of 139 male patients with hypospadias, aged between 1 and 12 years, were included in the study. The mean age was  $6.59 \pm 2.15$  years. Most patients ( $n=75$ , 53.96%) were in the 1–6 year age group, while the remaining 64 patients (46.04%) were between 7–12 years (Table 1). In terms of anatomical classification, distal penile hypospadias was the most common site, found in 93 patients (66.91%), followed by mid penile

in 32 patients (23.02%) and proximal penile in 14 patients (10.07%) (Table 2). Regarding the type of surgical technique employed, the tubularized incised plate (TIP) repair was the most frequently used method in 102 cases (73.38%), followed by Mathieu’s repair in 28 cases (20.14%) and Braca repair in 9 cases (6.47%) (Table 3). At the 3-month postoperative follow-up, urethrocuteaneous fistula was observed in 11 patients (7.91%), while 128 patients (92.09%) showed no fistula formation (Table 4). A bar graph representing the distribution of urethrocuteaneous fistula is shown in Figure 1.

Table 1: Age Distribution

Age Group	Frequency	Percentage
1–6 years	75	53.96
7–12 years	64	46.04

Table 2: Site of Hypospadias

Site	Frequency	Percentage
Distal Penile	93	66.91
Mid Penile	32	23.02
Proximal Penile	14	10.07

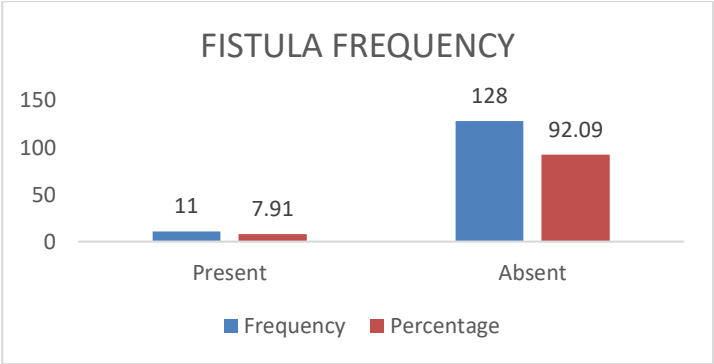
Table 3: Type of Repair

Type of Repair	Frequency	Percentage
TIP Repair	102	73.38
Mathieu’s Repair	28	20.14
Braca Repair	9	6.47

Table 4: Frequency of Urethrocuteaneous Fistula

Fistula	Frequency	Percentage
Present	11	7.91
Absent	128	92.09

Figure 1: Fistula Frequency



Discussion

Hypospadias is one of the most demanding surgeries in paediatric urology because of its ability to be associated with postoperative complications, most commonly urethrocuteaneous fistula (UCF) formation. Even though surgical techniques, along with suture materials and magnifying systems, have been improved, the estimated incidence of UCF varies widely from 4% to 28% in the literature (13). In our series 2, the fistula formation rate was 7.91%, which is low, and it is consistent with other studies where the adjunctive technique of overlying tissue coverage was combined in the series. The use of autologous platelet-rich fibrin (PRF) as an interposition layer for a urethroplasty offers the potential for reduced rates of fistulae by promoting tissue healing and providing a natural scaffold that is rich in

growth factors (14). Our data recommend this proposition: local application of PRF membrane may be associated with the reduction of fistula in comparison to the conventional methods reported by many studies without the use of PRF (15). A study by Elnashar et al. noted a marked decrease in the formation of urethrocuteaneous fistula as PRF was used as an encasing layer, with a rate closer to 10% (16). Similarly, Abdullateef et al. indicated that PRF leads to rapid healing, lesser inflammation, and lower rates of complications (17). Our reported incidence of 7.91% is slightly lower than that in reported series, indicating standardization of surgical procedure and careful patient selection. The largest number of hypospadias was distal penile hypospadias in our series, which has the lowest risk of complications compared to proximal varieties (18). This pattern might have contributed to a generally low rate

of complications. The TIP (tubularized incised plate) (73.38%) repair is noted for its excellent cosmetic and functional results, although the fistula rates are variable (19). The use of PRF membrane in our group seems to improve the results of TIP and other methods by giving an extra biological layer that can favor angiogenesis and epithelialization (20).

There were no statistically significant differences in the incidence of fistula formation according to age group, site of the hypospadias, or type of repair by stratification analysis, indicating that the PRF membrane could be equally effective among various subgroups. However, further prolonged follow-up is needed to conclude the delayed formation of a fistula and the protracted effectiveness of PRF application.

A limitation of this study is the short follow-up (3 months) because some fistulas can appear only after months. Moreover, there was no control group for comparative purposes to demonstrate an appropriate means to compare the PRF directly against the standard methods. Nevertheless, the results are still clinically applicable and can serve as the reference for the application and further research of PRF in paediatric urological as well.

## Conclusion

The findings of this work are indicative of a low rate of UCFF with the use of autologous PRF as an interposition layer in the repair of hypospadias. Biological mechanisms associated with the use of PRF, including increased tissue healing and angiogenesis, probably help improve outcomes from surgery. With a fistula rate of 7.91%, our results supported the inclusion of PRF in our routine hypospadias repair procedure. Although more controlled trials with larger sample sizes and longer follow-up may be conducted, PRF seems to be a promising, safe, and effective adjuvant for paediatric urological reconstructive surgery.

## Declarations

### Data Availability statement

All data generated or analysed during the study are included in the manuscript.

### Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-)

### Consent for publication

Approved

### Funding

Not applicable

## Conflict of interest

The authors declared the absence of a conflict of interest.

## Author Contribution

### WHG (Senior Lecturer)

Manuscript drafting, Study Design, Review of Literature, Data entry, Data analysis, and drafting articles.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

## References

1. Springer A. Assessment of outcome in hypospadias surgery—a review. *Front Pediatr*. 2014;2:2.
2. Baskin LS, Ebberts MB. Hypospadias: anatomy, etiology, and technique. *J Pediatr Surg*. 2006;41(3):463–72. <https://doi.org/10.1016/j.jpedsurg.2005.11.059>
3. Halaseh SA, Halaseh S, Ashour M, Ashour ME. Hypospadias: a comprehensive review including its embryology, etiology, and surgical techniques. *Cureus*. 2022 Jul 31;14(7). <https://doi.org/10.7759/cureus.27544>
4. Braga LH, Pippi Salle JL. Comparative analysis of tubularized incised plate versus onlay island flap urethroplasty for primary proximal hypospadias. *J*

- Urol. 2007;178(4 Pt 2):1451–6. <https://doi.org/10.1016/j.juro.2007.05.170>
5. Leunbach TL, Yankovic F, Springer A, Wisniewski A, Burgu B, Braga L, Ernst A, Lucas-Herald A, O'Toole S, Ahmed SF, Rawashdeh YF. An International Delphi-Based Study for Developing a Core Outcome Set for Hypospadias Surgery. *Sexual Development*. 2024 Jan 18;18(1-6):27–33. <https://doi.org/10.1159/000541596>
6. Okumuş MU, Tireli GA. Tubularized incised plate repair in 473 primary distal hypospadias cases: An evaluation of outcomes according to coverages and stent types. *Actas Urológicas Españolas (English Edition)*. 2022 Jul 1;46(6):361–6. <https://doi.org/10.1016/j.acuroe.2022.01.001>
7. Bloesch S, Misra D, Mohd-Amin AT. Management of urethral fistula after hypospadias repair with particular reference to purse-string sutures: a 24-year review. *Pediatric Surgery International*. 2022 Jun;38(6):919–25. <https://doi.org/10.1007/s00383-022-05109-y>
8. Yadav P, Bobrowski A, Ahmad I, Kim JK, Chancy M, Alshammari D, Rickard M, Lorenzo AJ, Bagli D, Chua ME. A scoping review on chordee correction in boys with ventral congenital penile curvature and hypospadias. *Indian Journal of Urology*. 2024 Jan 1;40(1):17–24. [https://doi.org/10.4103/iju.iju\\_277\\_23](https://doi.org/10.4103/iju.iju_277_23)
9. Fermín TM, Calcei JG, Della Vedova F, Cano JP, Calderon CA, Imam MA, Khoury M, Laupheimer MW, D'hooghe P. Review of Dohan Eherenfest et al.(2009) on “Classification of platelet concentrates: From pure platelet-rich plasma (P-PRP) to leucocyte-and platelet-rich fibrin (L-PRF)”. *Journal of ISAKOS*. 2024 Apr 1;9(2):215–20. <https://doi.org/10.1016/j.jisako.2023.07.010>
10. Kobayashi E, Flückiger L, Fujioka-Kobayashi M, et al. Comparative release of growth factors from PRP, PRF, and advanced-PRF. *Clin Oral Invest*. 2016;20(9):2353–60. <https://doi.org/10.1007/s00784-016-1719-1>
11. Miron RJ, Choukroun J. Platelet Rich Fibrin in Regenerative Dentistry: Biological Background and Clinical Indications. Wiley-Blackwell; 2017.
12. Kulkarni R, Thomas BS, Varghese JM. Platelet-rich fibrin as a membrane for guided tissue regeneration. *ISRN Dent*. 2014;2014:1–6
13. Snodgrass W, Bush N. Primary hypospadias repair techniques: a review of the evidence. *Urol Clin North Am*. 2010;37(2):221–31. <https://doi.org/10.4103/0974-7796.192097>
14. Gürbüz ZG, Ayyıldız SN, Özen S, Orhan İ. The use of platelet-rich fibrin in hypospadias surgery: a prospective controlled study. *J Pediatr Urol*. 2020;16(1):48.e1–48.e6. [https://doi.org/10.4103/jss.jss\\_123\\_22](https://doi.org/10.4103/jss.jss_123_22)
15. Moran GW, Kurtzman JT, Carpenter CP. Biologic adjuvant urethral coverings for single-stage primary hypospadias repairs: a systematic review and pooled proportional meta-analysis of postoperative urethrocutaneous fistulas. *Journal of Pediatric Urology*. 2022 Oct 1;18(5):598–608. <https://doi.org/10.1016/j.jpurol.2022.08.015>
16. Elnashar AM, Albishbishy M, Sheir H, Elayyouti M, Elsherbiny M, Elzohiri M, Waly ME, Elsaied A. Comparative Study Between Autologous Platelet-rich Fibrin Membrane and Local Flaps as Intervening Layer in Management of Distal Hypospadias. *Journal of Pediatric Surgery*. 2025 Jan 1;60(1):161994. Jiang J, Ma S, Ye H, Hu Y. Effectiveness of PRF in preventing complications in urethral reconstructive surgery: a systematic review. *Front Surg*. 2023;10:1023412. <https://doi.org/10.1016/j.jpedsurg.2024.161994>
17. Abdullateef KS, Elbarbary M, Kaddah S, Elezaby BM, Ragab AS, Mohamed W. Modified versus Classical Tubularised Incised Plate Urethroplasty in Hypospadias: A Comparative Study. *African Journal of Paediatric Surgery*. 2024 Apr 1;21(2):111–6. [https://doi.org/10.4103/ajps.ajps\\_107\\_22](https://doi.org/10.4103/ajps.ajps_107_22)
18. Tanger R, Prajapati S, Gupta P, Gupta R, Rengan V, Varma A. Standard Snodgrass urethroplasty versus Snodgrass with glans augmentation urethroplasty for distal hypospadias: A comparative study. *DY Patil Journal of Health Sciences*. 2023 Oct 1;11(4):165–70. [https://doi.org/10.4103/DYPI.DYPI\\_61\\_23](https://doi.org/10.4103/DYPI.DYPI_61_23)
19. Bhat A. Late Postoperative Complications of Hypospadias Repair. In *Hypospadiology: Principles and Practices* 2022 Mar 10 (pp. 295–313). Singapore: Springer Singapore. [https://doi.org/10.1007/978-981-16-8395-4\\_21](https://doi.org/10.1007/978-981-16-8395-4_21)
20. Hernández-Suarez A, Rizo-Gorrita M, Suárez-Vega D, Velazco G, Rodríguez Gelfenstein I, Vázquez-Pachón C, Serrera-Figaló MÁ, Torres-Lagares D. Effectiveness of silicon platelet-rich fibrin and autologous bone on bone regeneration in rabbit calvarian defects: A radiological and histological study. *Applied Sciences*. 2021 Apr 29;11(9):4074. <https://doi.org/10.3390/app11094074>



**Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, <http://creativecommons.org/licenses/by/4.0/>. © The Author(s) 2025