Original Article

Comparison of Acute Complications of Single Staged Versus Two Staged Hypospadias Repair

Syed Mohammad Haider[1], Hamza Khan Shahbazi[2], Muhammad Shadman*[2], Fahimullah Khan[2], Shehzad Ahmad[2], Hamza Fayyaz[2]

[1] *MTI Khyber Teaching Hospital, Peshawar*
[2] *Burns and Plastic Surgery Center, Peshawar*

Article Info

Corresponding Author
Muhammad Shadman
Burns and Plastic Surgery Center, Peshawar-Pakistan
Email: shadmanch@gmail.com

Date Received:
08th February, 2025
Date Revised:
08th April, 2025
Date Accepted:
06th May 2025

Abstract

Objective: To compare the immediate and early complications (till 4 weeks post-op) of single staged versus two staged hypospadias repairs.

Methodology: This study was carried out at the Department of Plastic Surgery, Hayatabad Medical Complex Peshawar, from 18-02-2020 to 18-08-2020., which included 60 patients undergoing hypospadias repair. Patients in group A underwent a single staged repair, while those in group B underwent two staged repair. Data was collected during postoperative follow-up visits. Data collection included patient demographics and complication rate (infection, wound dehiscence and meatal stenosis).

Results: A total of 8.3% of the overall sample developed infection, 15% wound dehiscence and 8.3% meatal stenosis. In group A, 13.3% developed infection compared to 3.3% in group B (p 0.161), 20% in group A developed wound dehiscence compared to 10% in group B (p 0.278) and 10% in group A developed meatal stenosis compared to 6.7% in group B (p 0.64).

Conclusion: Although the children in the double staged repair group developed less no of complications than the single staged group, the difference was not statistically significant. Two staged repair is a preferred choice for repair of hypospadias due to lower frequency of complications and better cosmetic results compared to single stage.

Keywords: Dehiscence, Hypospadias, Infection, Meatal stenosis, Single-stage repair, Two-staged repair.

This article may be cited as:
Haider SM, Shahbazi HK, Shadman M, Khan F, Ahmad S. Comparison of acute complications of single staged versus two staged hypospadias repair. J Postgrad Med Inst. 2025;39(2):142-47. http://doi.org/10.54079/jpmi.39.2.3665

Introduction

Hypospadias is a congenital anomaly, marked by underdevelopment of the urethra, resulting in an abnormally positioned urethral meatus often found on the underside of the penis or, in some cases, extending to perineal region.[1] Ranked as the third most prevalent congenital anomaly after clubfoot and hydrocoele, hypospadias occurs at a frequency of approximately 3 to 4 cases per 1000 live births.[2]

Hypospadias is a developmental defect affecting the anterior urethra and penis, where the urethral opening is abnormally positioned on the undersurface of the penis closer to the base rather than at the tip of the glans, which may appear split or open.[3] In most cases, it is accompanied by ventral shortening and curvature of the penis, known as chordee, which is more pronounced in proximal urethral anomalies.

The primary goals of the hypospadias surgery are to improve genital appearance, correct urine flow direction, facilitate standing urination, resolve curvature-related sexual dysfunction, and ensure proper semen deposition during intercourse.[4] Several surgeries have been developed for hypospadias repairs over the years. Among the single-staged procedures are Snodgrass, Snodgraft, and MAGPI procedures. While, the most common two staged surgery for hypospadias is Aivar Bracka repair. Managing severe proximal hypospadias is complex, with various surgical techniques proposed. Single-stage procedures often lead to complications such as fistula formation, strictures, and metal stenosis, frequently necessitating reoperations.[5] Currently, no single technique is considered optimal, and the search for an ideal approach continues.[6] In recent years, two-stage procedure has regained popularity for treating severe proximal hypospadias.[7]

A study reported that infection and wound dehiscence was found in 3.1% vs. 2.9% and meatal stenosis in 0% vs. 2.9% in single versus two staged hypospadias repair, respectively.[8] Another study showed that with single staged and two staged, failure rate due to complications is not much significant i.e. 9.4% vs. 9.9%, p>0.05.[9]

Over 300 different hypospadias repair techniques have currently been reported in scientific literature. While the majority of reports emerged over the last sixty years, the foundational surgical methods date back more than a century.[10]

Advances in anesthesia, fine surgical instruments, suturing material, dressings, and antibiotics have significantly enhanced clinical results. These developments have made it possible to perform single-stage surgical correction, often performed as an outpatient procedure during the first year of life. One-stage repair provides the benefit of utilizing unscarred tissue in a single procedure, typically before the child reaches school age.[11]

This study was carried out to compare the acute complications of single-staged versus two-staged hypospadias repairs. Different clinical settings are applying different methods. To attain the recent evidence regarding a more effective method with fewer complications, it is required to be evaluated. Therefore, the purpose of this study is to gather data on complications of hypospadias repair so that we can use a more suitable approach in the local setting in the future. This approach will contribute to refining clinical practices and enhancing local guidelines for the management of children with hypospadias.

Methodology

The study was carried out at Department of Plastic Surgery, Hayatabad Medical Complex, Peshawar. Ethical approval was obtained before starting the study.

This study included sixty patients undergoing hypospadias repair. Thirty patients had undergone a single-staged repair whereas thirty patients had undergone two-staged repair. A sample size of 30 cases per group was selected using 80% test power, 5% significance level and anticipating expected percentage of wound dehiscence 54.5% in single staged and 0% in two staged hypospadias repairs6. Sampling technique was non-probability consecutive.

All children of age 1-6 years presenting with hypospadias were part of the study. While patients who had an infection at the surgical site on clinical examination and Crippled hypospadias, defined as grossly disfigured phallus due to multiple prior corrective surgeries, were excluded from the study.

PROCEDURE:

Demographic variables, including name, patient's age, age at diagnosis, and type of procedure done, were collected from the patient records. Selection criteria for the type of procedure includes certain factors like the type of hypospadias, presence of chordee, width of the urethral plate, circumcision status and the phallus size for age. In group A, patients had undergone single-staged hypospadias repair. In group B, patients had undergone two staged hypospadias repair techniques. Patients were followed up for 10 days for infection and wound dehiscence and then in OPD for meatal stenosis at 4 weeks post-operation

DATA ANALYSIS:

SSPSS version 21 was utilized for the analysis of the data. The mean ±SD was used to represent the quantitative variables, such as age and duration of diagnosis. The qualitative variables i.e. complications (infection, wound dehiscence and meatal stenosis) were expressed as frequencies and percentages. In both groups, comparisons were made for baseline data, such as age, to see any significant difference. Both groups were also compared for the outcome's variable like the presence of infection, wound dehiscence, met-

J Postgrad Med Inst 2025;39(2):141-47.
http://doi.org/10.54079/jpmi.39.2.3665

al stenosis. Chi-square test was applied in comparing proportions, and the student t-test was applied in comparing means. In all cases, P-value ≤ 0.05 was taken as significant. Data was stratified based on age and duration of diagnosis. Post-stratification, the chi-square test was applied with a P-value ≤ 0.05 taken as significant.

Results

TThe mean age of the whole sample was 3.4 + 1.3 years. Most of the children were in the age group 1-3 years (58.3%). The mean age in group A was 2.8 + 1.6 years and in group B it was 3.4 + 1.2 years. (p 0.254) See table 1 for comparison of age in categories between both groups.

On follow up, 8.3% of the overall sample developed infection, 15% wound dehiscence and 8.3% meatal stenosis. In group A, 13.3% developed infection compared to 3.3% in group B (p 0.161), 20% in group A developed wound dehiscence compared to 10% in group B (p 0.278) and 10% in group A developed meatal stenosis compared to 6.7% in group B (p 0.64). See Table 2.

The tables elaborate on the stratification of complications in both age groups.

Discussion

Table 1. COMPARISON OF AGE CATEGORIES (n = 30 each)

		Study group		P value
		Single stage repair	Two staged repair	
Age groups	1-3 years	20	15	0.190
		66.7%	50.0%	
	> 3-6 years	10	15	
		33.3%	50.0%	
Total		30	30	
		100.0%	100.0%	

Table 2. COMPARISON OF COMPLICATIONS BETWEEN BOTH GROUPS (n = 30 each)

Complications	Study group		P value
	A	B	
Infection	04	01	0.161
Wound Dehiscence	06	03	0.278
Meatal Stenosis	03	02	0.640

Table 3. AGE GROUPS WISE STRATIFICATION OF INFECTION

Age groups			Study group		P value
			Single stage repair	Two staged repair	
1-3 years	Infection	Yes	3	0	0.117
			100.0%	0.0%	
		No	17	15	
			53.1%	46.9%	
> 3-6 years	Infection	Yes	1	1	0.763
			50.0%	50.0%	
		No	9	14	
			39.1%	60.9%	

Table 4. AGE GROUPS WISE STRATIFICATION OF WOUND DEHISCENCE

Age groups			Study group		P value
			Single stage repair	Two staged repair	
1-3 years	Wound Dehiscence	Yes	4	1	0.265
			80.0%	20.0%	
		No	16	14	
			53.3%	46.7%	
> 3-6 years	Wound Dehiscence	Yes	2	2	0.656
			50.0%	50.0%	
		No	8	13	
			38.1%	61.9%	

Table 5. AGE GROUPS WISE STRATIFICATION OF MEATAL STENOSIS

Age groups			Study group		P value
			Single stage repair	Two staged repair	
1-3 years	Meatal Stenosis	Yes	3	2	0.889
			60.0%	40.0%	
		No	17	13	
			56.7%	43.3%	
> 3-6 years	Meatal Stenosis	No	10	15	NA
			40.0%	60.0%	

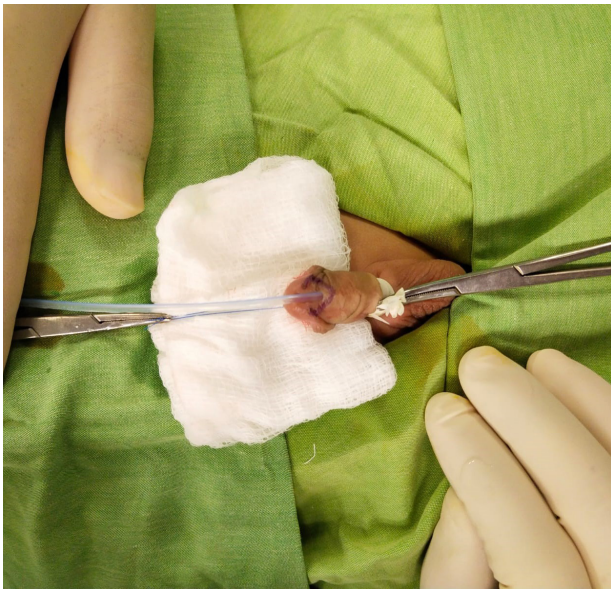

Figure 1A: Single Stage (pre-op)

Figure 1B: Single Stage (post-op)

J Postgrad Med Inst 2025;39(2):141-47.
http://doi.org/10.54079/jpmi.39.2.3665

Figure 2A: Two Stage Repair (Pre-op)

Figure 2B: Two Stage Repair (Post-op)

Complications can arise after any surgical procedure, but their likelihood is greater in hypospadias repair compared to any other reconstructive procedure. Depending upon the degree of hypospadias, reported complication rates vary from 6 to 30%.[12-14] In our study 8.3% of the overall sample developed infection, 15% wound dehiscence and 8.3% meatal stenosis. Frequency of complications was less in group B (Bracka's two staged repair) compared to group A (single staged repair).

Plate preservation methods, such as tabularized incised plate (TIP) techniques, are the preferred options for both proximal and distal hypospadias. TIP offers superior functional and cosmetic outcomes as compared to onlay flap technique.[15,16] The primary determinant of complications is severity of malformation, as severe cases require extensive reconstruction, making treatment more challenging. Additionally, factors such as penile curvature, tissue deficiency and the complexity of surgery often necessitate a staged reconstruction in these cases.[17,18]

Although severe sepsis is uncommon, factors like reduced vascularity, high humidity, high temperatures, and the surgical site's close proximity to a potentially contaminated area can all lead to mild and localized infections. Swabs taken from the penile meatus at admission showed a reported infection rate of 53% at first, but it later dropped to 30% in preoperative skin swabs after the application of local antiseptic preparations. Coliforms and Staphylococcus aureus were the most commonly identified pathogens, both of which showed sensitivity to cephalosporins and aminoglycosides.

In group A, 13.3% developed infection compared to 3.3% in group B (p 0.161). To prevent infection, several measures were implemented, including preoperative cleansing with povidone-iodine, administration of prophylactic antibiotics, intraoperative application of antibiotic solutions, careful hematoma prevention, and the local use of Mercurochrome.[19] Urinary infection was monitored during treatment.

There are very few documented cases of wound dehiscence, making it an extremely uncommon complication.[20,21] In our study 20% in group A developed wound dehiscence compared to 10% in group B (p 0.278). Wound dehiscence can result from factors such as infection, edema, hematoma, frequent erections, reduced blood supply, suture weakness, tension along the suture line, or aggressive dressing removal.[22] It is more commonly observed in TIP repairs compared to Mathieu, whereas flap necrosis occurs more often in Mathieu technique.[20] Proper surgical technique, including meticulously covering the urethroplasty site with dartos fascia, eversion of the skin edges, and adequate postoperative care, can address this issue.

Interpositional dermal grafting was suggested by Kogan et al. (1983) and Lindgren et al. (1998) for patients with chronic severe chordee (≥30°) following conventional techniques, particularly in case with a short penis.[23,24] This technique produced satisfactory outcomes with no erectile dysfunction after surgery. Caesar and Caldamone,[25] as well as Gershbaum et al.[26] reported that dermal grafts provided better results than tunica vaginalis grafts for correcting chordee in severe hypospadias. Additionally, no significant statistical difference was found in mean age at surgery between single-stage and two-stage repairs.

Meatal stenosis was reported to be higher in the single-stage repair versus two-stage repair i.e. 10% in group A compared to 6.7% in group B (p 0.64).

After examining their 15 years of experience with one-stage repairs, Ozturk et al. came to the conclusion that proximal hypospadias and severe chordee are linked to higher rates of complications.[27] Snodgrass and Lorenzo[28] examined 33 cases of severe hypospadias treated with their surgical approach, which included dorsal plication. They observed a 21% incidence of fistula formation, 6% dehiscence of repair completely, and 3% stenosis of meatus with a 33% overall complication rate. Despite being a key indicator of cosmetic outcomes from a parental perspective, satisfaction level among parents after hypospadias repair are seldom addressed in pediatric surgical literature. Pope et al .[29] Found high parental satisfaction with dermal grafts for correcting chordee in severe hypospadias. Furthermore, Snodgrass et al.[30] utilized a standardized questionnaire to assess both parental and surgeon perspectives on the outcomes of tubularized incised plate hypospadias repair.

Conclusion

Although the children in the staged repair group developed fewer complications than the staged group, there was no significant statistical difference, which could be explained by the study's small sample size. We suggest additional research with bigger sample sizes and multicenter studies to find complications rate of single-stage and double-stage repair before recommending future research and treatment directions.

References

1. Stein R. Hypospadias. Eur Urol Suppl. 2012;11(2):33-45.
2. Stanasel I, Le H-K, Bilgutay A, Roth DR, Gonzales ET, Janzen N, et al. Complications following staged hypospadias repair using transposed preputial skin flaps. J Urol. 2015;194(2):512-6.
3. van der Horst HJ, de Wall LL. Hypospadias, all there is to know. Eur J Pediatr. 2017 Apr. 176 (4):435-441.
4. Vanura KN, Babu S. A comparative study one stage versus two stage repair of Hypospadias. Ind J of applied research.2024; 14:62-65.
5. Chen C, Yang T-Q, Chen J-B, Sun N, Zhang W-P. The effect of staged transverse preputial island flap urethroplasty for proximal hypospadias with severe chordee. J Urol. 2016;196(5):1536-40.
6. Baba AA, Wani SA, Bhat NA, Mufti GN, Lone TN, Nazir S. Buck's fascia repair with glanuloplasty in hypospadias surgery: A simple approach with excellent outcome. J Pediatr Urol. 2017.
7. Joshi RS, Bachani MK, Uttarwar AM, Ramji JI. The Bracka two-stage repair for severe proximal hypospadias: A single center experience. J Indian Assoc Pediatr Surg. 2015;20(2):72.
8. Zheng D-C, Yao H-J, Cai Z-K, Da J, Chen Q, Chen Y-B, et al. Two-stage urethroplasty is a better choice for proximal hypospadias with severe chordee after urethral plate transection: a single-center experience. Asian J Androl. 2015;17(1):94.
9. Campos F, Bugeja S, Frost A, Fes E, Ivaz S, Andrich DE, et al. PD14-11 Single stage versus classical staged approach for penile urethral strictures. J Urol. 2015;193(4):e322-e3.
10. Hadidi AT. History of hypospadias: Lost in translation. J Pediatr Surg. 2017 Feb. 52 (2):211-217.
11. Chertin B, Natsheh A, Ben-Zion I, Prat D, Kocherov S, Farkas A, et al. Objective and subjective sexual outcomes in adult patients after hypospadias repair performed in childhood. J Urol. 2013 Oct. 190 (4 Suppl):1556-60.
12. Powel CR, Mcaleer I, Alagiri M, Kaplan GW. Comparison of flaps versus grafts in proximal hypospadias surgery. J Urol. 2000;163:1286–8.
13. Duckett JW. Hypospadias. In: Walsh PC, et al., editors. Campbell's Urology. 7th ed. Philadelphia: WB Saunders Co; 1998. pp. 2093–119.
14. Beuke M, Fisch M. Salvage strategies after complications of hypospadias repair. Urologe A. 2007;46:1670–5.
15. Njinou B, Terryn F, Lorge F, Opsomer RJ, DeGroote P, Veyckemans F, et al. Correction of severe median hypospadias: Review of 77 cases treated by the onlay island flap technique. Acta Urol Belg. 1998;66:7–11.
16. Elbarky A complications of the preputial island flap-tube urethroplasty. Br J Urol Int. 1999;84:89–94.
17. Hansson E, Becker M, Aberg M, Svensson H. Analysis of complications after repair of hypospadias. Scand J Plast Reconstr Surg Hand Surg. 2007;41:120–4.
18. Grobbelaar AO, Laing JH, Harrison DH, Sanders R. Hypospadias repair: The influence of postoperative care and a patient factor on surgical morbidity. Ann Plast Surg. 1996;37:612–7.
19. Ratan SK, Sen A, Ratan J, Pandey RM. Mercurochrome as an adjunct to local preoperative preparation in children undergoing hypospadias repair. Br J Urol Int. 2001;88:259–62.
20. Guo Y, Ma G, Ge Z. Comparison of the Mathieu and the Snodgrass urethroplasty in distal hypospadias repair. Zhonghua Nan Ke Xue. 2004;10:916–8.
21. Imamoğlu MA, Bakirtaş H. Comparison of two methods - Mathieu and Snodgrass - in hypospadias repair. Urol Int. 2003;71:251–4.
22. Elbakry A, Shamaa M, Al-Atrash G. An axially vascularized meatal based flap for the repair of hypospadias. Br J Urol. 1998;82:698–703.
23. Kogan SJ, Reda EF, Smey PL, Levitt SB. Dermal graft correction of extraordinary chordee. J Urol 1983; 130:952–954.
24. Lindgren BW, Reda EF, Levitt SB, Brock WA, Franco I. Single and multiple dermal grafts for the management of severe penile curvature. J Urol 1998;160:1128–1130
25. Caesar RE, Caldamone AA. The use of free grafts for correcting penile chordee. J Urol 2000; 164:1691–1693.
26. Gershbaum MD, Stock JA, Hanna MK, Baskin L, Hanna M, Khoury A. A case for 2-stage repair of perineoscrotal hypospadias with severe chordee. J Urol 2002; 168:1727–1729.
27. Ozturk H, Onen A, Otc¸u S, Kaya M, Ozturk H. The outcome of one-stage hypospadias repairs. J Pediatr Urol 2005; 1:261–266.
28. Snodgrass WT, Lorenzo A. Tubularized incised-plate

urethroplasty for proximal hypospadias. BJU Int 2002; 89:90–93.

29. Pope JC IV, Kropp BP, McLaughlin KP, Adams MC, Rink RC, Keating MA, Brock JW III. Penile orthoplasty using dermal grafts in the outpatient setting. Urology 1996; 48:124–127.
30. Snodgrass W, Ziada A, Yucel S, Gupta A. Comparison of outcomes of tubularized incised plate hypospadias repair and circumcision: a questionnairebased survey of parents and surgeon. J Pediatr Urol 2008; 4:250–254.

Authors' Contribution Statement

SMH contributed to the conception, design, acquisition, analysis, interpretation of data, and drafting of the manuscript. HKS contributed to the analysis, interpretation of data, drafting of the manuscript, and critical review of the manuscript. MS contributed to the conception, design, acquisition, analysis, drafting of the manuscript, critical review, and final approval of the version to be published. FK contributed to the analysis, interpretation of data, drafting of the manuscript, and critical review of the manuscript. HF and SA contributed to the analysis, interpretation of data, and drafting of the manuscript. All authors are accountable for their work and ensure the accuracy and integrity of the study.

Confilct of Interest

Authors declared no conflict on interest

Grant Suppport and Financial Disclosure

None

Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.