Pakistan Journal of Intensive Care Medicine
eISSN: 2708-2261; pISSN: 2958-4728
www.pjicm.com
DOI: https://doi.org/10.54112/pjicm.v5i01.76
Pak. J. Inten. Care Med., volume 2025: 76
Original Research Article

COMPARISON OF OUTCOME AFTER OCCLUSIVE HYDROCOLLOID DRESSING AND PETROLEUM-IMPREGNATED GAUZE WITH ZINC OXIDE ADHESIVE PLASTER FOLLOWING HYPOSPADIAS REPAIR

SHAH T*, KHATTAK IU

Department of Burns & Plastic Surgery Centre, Hayatabad Medical Complex, Peshawar, Pakistan
**Corresponding author email address:* doctorsyedtariqshah@gmail.com

(Received, 06th May 2025, Revised 15th May 2025, Accepted 26th May, Published 29th May 2025)

ABSTRACT

Background: *Postoperative dressing plays a vital role in the healing process following hypospadias repair. An ideal dressing should minimize complications such as wound dehiscence, meatal stenosis, and urethrocutaneous fistula. However, the optimal dressing method remains a matter of debate.* ***Objective:*** *To compare the postoperative outcomes between occlusive hydrocolloid dressing and petroleum-impregnated gauze with zinc oxide adhesive plaster in children undergoing primary hypospadias repair.* ***Study Design:*** *Prospective non-randomized controlled trial.* ***Setting:*** *Department of Burns and Plastic Surgery Center, Hayatabad Medical Complex, Peshawar, Pakistan.* ***Duration of Study:*** *03-February-2025 to 03-May-2025.* ***Methods:*** *A total of 158 pediatric patients aged 1–14 years undergoing primary hypospadias repair were enrolled in this study. Participants were randomly assigned to two groups. Group A (n = 79) received an occlusive hydrocolloid dressing, and Group B (n = 79) received petroleum-impregnated gauze with zinc oxide adhesive plaster. A standardized surgical technique was followed for all patients, and dressings were removed on postoperative day 3. Postoperative complications including urethrocutaneous fistula, meatal stenosis, and wound dehiscence were recorded. Statistical analysis was performed using the chi-square test, with a p-value of less than 0.05 considered statistically significant.* ***Results:*** *Urethrocutaneous fistula occurred in 10.1% of patients in Group A and 8.9% in Group B (p = 0.78). Meatal stenosis was observed in 2.5% of patients in Group A and 1.3% in Group B (p = 0.56). Wound dehiscence was reported in 3.8% of Group A and 2.5% of Group B patients (p = 0.64). No statistically significant differences were found between the two groups for any of the assessed outcomes.* ***Conclusion:*** *Both occlusive hydrocolloid dressing and petroleum-impregnated gauze with zinc oxide plaster demonstrated comparable outcomes in terms of urethrocutaneous fistula, meatal stenosis, and wound dehiscence following primary hypospadias repair. Either dressing modality may be considered based on clinical preference, cost, and availability.*

Keywords: Hypospadias, Wound Dressing, Hydrocolloid, Petroleum Gauze, Postoperative Complications, Pediatric Urology

INTRODUCTION

Hypospadias is a medical disorder characterized by urethra opening on ventral aspect of penis, frequently accompanied by penile curvature (1). It ranks as the second leading genital congenital disability within males following cryptorchidism. Hypospadias correction occurs in approximately one in 200 live male births, making it a prevalent surgical procedure for pediatric urologists (2, 3). The criteria for defining and evaluating hypospadias are poorly articulated. The position of meatus is widely regarded as a rudimentary technique for classifying the severity of hypospadias, failing to consider the degree of tissue dysplasia. Factors such as the dimensions of the penis, glans, and urethral plate, the degree of division of the corpus spongiosum, the degree of curvature, and anomalies, as well as the positioning of the scrotum, greatly influence the results of surgical correction. Consequently, a definitive classification can be established during the surgical process (4).

The choice of an optimal wound dressing is an essential component of hypospadias surgery. There is currently no consensus in the literature regarding the selection of different penile dressings used following hypospadias repair (5, 6). Multiple forms of dressing, such as Silastic foam, elastic bandage, Opsite, Cavicare, as well as recently silicone foam sheets have all been utilized for the healing for surgical wounds following hypospadias repair (7). An ideal dressing must be easy to put on and take off, non-adherent to incisions, efficient at absorbing wound leakages, and able to reduce postoperative edema and bleeding, preventing the development of hematoma that could result in infection, while preserving stent placement and serving as a barrier to the environment. Hydrocolloid dressings, which contain moisture-reactive particles, adhere firmly to the skin, providing considerable therapeutic benefits. This dressing has shown effectiveness in wound healing without complications. Petroleum gauze dressing establishes a moist environment to wound healing because of its petroleum content (8-10). According to a study, patients who followed dressing with petroleum gauze and zinc oxide adhesive plaster had an 88.9% rate of no complications, 11.1% reported urethrocutaneous fistulas, and no incidence of wound dehiscence or stenosis was reported (11). Another study observed wound dehiscence in 9.3% of cases, urethrocutaneous fistula in 10%, and no cases of stenosis following the use of hydrocolloid dressings in hypospadias repairs (12).

This study compared postoperative outcomes between occlusive hydrocolloid dressing and petroleum-impregnated gauze with zinc oxide adhesive plaster following hypospadias repair. With a lack of existing literature on this topic, this research fills a crucial gap in understanding optimal wound care strategies for paediatric hypospadias surgery. Patients, families, and surgeons stand to benefit from evidence-based recommendations that may reduce complications and improve postoperative recovery. By identifying the most effective dressing method, this study contributes to enhancing clinical outcomes and guiding future clinical practice in hypospadias repair.

METHODOLOGY

[Citation: Shah,T., Khattak, I.U. (2025). Comparison of outcome after occlusive hydrocolloid dressing and petroleum-impregnated gauze with zinc oxide adhesive plaster following hypospadias repair. *Pak. J. Inten. Care Med.* ***2025****: 76.* doi: https://doi.org/10.54112/pjicm.v5i01.76]

This study employed a non-randomized controlled trial design, conducted at the Burns and Plastic Surgery Center of Hayatabad Medical Complex, Peshawar, from February 3, 2025, to 3 May 2025, after obtaining ethical approval from our institute. The sample was selected based on the assumption of 0% wound dehiscence in Zinc oxide dressing (11) and 9.3% in hydrocolloid dressing (12), with 80% power of the test and a 5% alpha level. A consecutive sampling technique was utilized to enroll 158 pediatric patients aged 1 to 14 years undergoing primary hypospadias repair, with 79 patients allocated to each study group. Patients having secondary hypospadias, who have previous hypospadias surgery or other penile condiiton or immunocompromised status were dropped.

Participants were divided into two cohorts based on the postoperative dressing protocol. Group A received occlusive hydrocolloid dressings while Group B received petroleum-impregnated gauze secured by zinc oxide adhesive plaster. Surgical procedures were performed under general anesthesia with standardized prophylactic antibiotic coverage, and the operative duration ranged between 60 and 90 minutes. The specific surgical technique was determined by the attending plastic surgeon based on individual anatomical considerations including urethral plate characteristics and the availability of foreskin.

Postoperative care was administered according to a standardized protocol for both groups. Dressings were removed on the third postoperative day, after which topical polymyxin-bacitracin ointment was applied until complete wound healing. Urinary catheters were removed one week postoperatively during the follow-up visits. Clinical outcomes were assessed at two-week intervals, and assessments were made for the outcomes such as meatal stenosis, wound dehiscence, and urethrocutaneous fistula formation. Meatal stenosis was objectively evaluated using calibrated probes to determine meatal patency, while wound dehiscence was assessed through direct visual inspection and palpation of the surgical site. Fistula detection involved observing urinary leakage patterns during voiding, with confirmatory cystoscopy or contrast studies performed when indicated.

SPSS 23 was used to analyze the data collected from the patients. Age was calculated as the mean and standard deviation (SD). The type of surgery and type of hypospadias were assessed using frequency and percentage. Outcomes were evaluated between the groups using the chi-squared test. Stratifications were done for age, type of surgery, and type of hypospadias, keeping the P value notable at ≤ 0.05.

RESULTS

Group A received a hydrocolloid dressing, and Group B was treated with a zinc oxide dressing. The mean age of patients was 7.73±3.23 years in Group A and 7.00±4.05 years in Group B.

In terms of the type of hypospadias, we observed that distal hypospadias was more prevalent, observed in 50 (63.3%) of Group A and 52 (65.8%) of Group B cases. In comparison, mid-penile hypospadias was present in 29 (36.7%) and 27 (34.2%) cases, respectively. Surgical techniques varied, with Mathieu's technique performed in 33 (41.8%) of Group A and 36 (45.6%) of Group B patients, whereas the Snodgrass technique was performed in 46 (58.2%) and 43 (54.4%) cases, respectively (Table 1).

Postoperative complications were analyzed, revealing no notable differences between the groups. Urethrocutaneous fistula occurred in 8 (10.1%) patients in Group A and 7 (8.9%) in Group B, p (p=0.78). Meatal stenosis was observed in 2 (2.5%) cases in Group A and 1 (1.3%) in Group B (p=0.56). Wound dehiscence was observed in 3 (3.8%) and 2 (2.5%) cases, respectively (p = 0.64) (Table 2). Stratification of outcomes by age, type of surgery, and type of hypospadias in both groups is shown in Table 3.

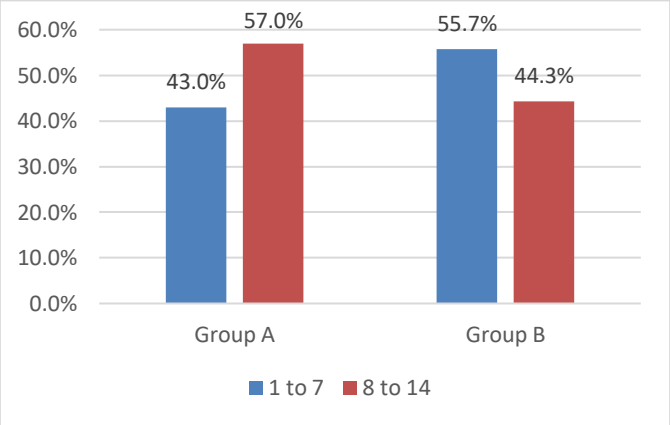

Figure 1: Age distribution (Years).

Table 1: Clinical parameters

Clinical parameters		Groups			
		Group A (Hydrocolloid dressing)		Group B (Zinc oxide dressing)	
		N	%	N	%
Type of hypospadias	Distal hypospadias	50	63.3%	52	65.8%
	Mid penile hypospadias	29	36.7%	27	34.2%
Type of surgery	Mathieu's technique	33	41.8%	36	45.6%
	Snodgrass	46	58.2%	43	54.4%

Table 2: Comparison of outcomes between both groups

Outcomes		Groups				P value
		Group A (Hydrocolloid dressing)		Group B (Zinc oxide dressing)		
		N	%	N	%	
Urethrocutaneous fistula	Yes	8	10.1%	7	8.9%	0.78
	No	71	89.9%	72	91.1%	
Meatal stenosis	Yes	2	2.5%	1	1.3%	0.56
	No	77	97.5%	78	98.7%	
Wound dehiscence	Yes	3	3.8%	2	2.5%	0.64
	No	76	96.2%	77	97.5%	

[Citation: Shah,T., Khattak, I.U. (2025). Comparison of outcome after occlusive hydrocolloid dressing and petroleum-impregnated gauze with zinc oxide adhesive plaster following hypospadias repair. *Pak. J. Inten. Care Med.* ***2025****: 76.* doi: https://doi.org/10.54112/pjicm.v5i01.76]

Table 3: Stratification of comparison of outcomes between both groups w.r.t

				Groups				P value
				Group A (Hydrocolloid dressing)		Group B (Zinc oxide dressing)		
				N	%	N	%	
Type of hypospadias	Distal hypospadias	Urethrocutaneous fistula	Yes	5	10.0%	4	7.7%	P > 0.05
			No	45	90.0%	48	92.3%	
		Meatal stenosis	Yes	1	2.0%	1	1.9%	P > 0.05
			No	49	98.0%	51	98.1%	
		Wound dehiscenece	Yes	3	6.0%	1	1.9%	P > 0.05
			No	47	94.0%	51	98.1%	
	Mid penile hypospadias	Urethrocutaneous fistula	Yes	3	10.3%	3	11.1%	P > 0.05
			No	26	89.7%	24	88.9%	
		Meatal stenosis	Yes	1	3.4%	0	0.0%	P > 0.05
			No	28	96.6%	27	100.0%	
		Wound dehiscenece	Yes	0	0.0%	1	3.7%	P > 0.05
			No	29	100.0%	26	96.3%	
Type of surgery	Mathieu's technique	Urethrocutaneous fistula	Yes	2	6.1%	5	13.9%	P > 0.05
			No	31	93.9%	31	86.1%	
		Meatal stenosis	Yes	1	3.0%	0	0.0%	P > 0.05
			No	32	97.0%	36	100.0%	
		Wound dehiscence	Yes	0	0.0%	1	2.8%	P > 0.05
			No	33	100.0%	35	97.2%	
	Snodgrass	Urethrocutaneous fistula	Yes	6	13.0%	2	4.7%	P > 0.05
			No	40	87.0%	41	95.3%	
		Meatal stenosis	Yes	1	2.2%	1	2.3%	P > 0.05
			No	45	97.8%	42	97.7%	
		Wound dehiscence	Yes	3	6.5%	1	2.3%	P > 0.05
			No	43	93.5%	42	97.7%	
Age distribution (years)	1 to 7	Urethrocutaneous fistula	Yes	2	5.9%	3	6.8%	P > 0.05
			No	32	94.1%	41	93.2%	
		Meatal stenosis	Yes	1	2.9%	0	0.0%	P > 0.05
			No	33	97.1%	44	100.0%	
		Wound dehiscenece	Yes	0	0.0%	2	4.5%	P > 0.05
			No	34	100.0%	42	95.5%	
	8 to 14	Urethrocutaneous fistula	Yes	6	13.3%	4	11.4%	P > 0.05
			No	39	86.7%	31	88.6%	
		Meatal stenosis	Yes	1	2.2%	1	2.9%	P > 0.05
			No	44	97.8%	34	97.1%	
		Wound dehiscenece	Yes	3	6.7%	0	0.0%	P > 0.05
			No	42	93.3%	35	100.0%	

P > 0.05 = Not significant, P < 0.05 = Significant

DISCUSSION

Hypospadias repair remains one of the most technically demanding procedures in pediatric urology, with postoperative outcomes influenced by multiple factors, including surgical technique and wound management strategies. Our findings demonstrate comparable efficacy between both dressing modalities with no statistically notable differences in complication rates. This suggests that wound dressing selection may be guided by factors beyond pure clinical outcomes, including cost availability and the surgeon's preference.

When examining specific complications stratified by dressing type, several important observations emerge. In Group A (hydrocolloid dressing), urethrocutaneous fistula developed in 8 patients (10.1%), while in Group B (zinc oxide dressing), this complication occurred in approximately 7 patients (8.9%). The slightly higher fistula rate in the hydrocolloid group, although not statistically significant (p = 0.78), warrants consideration. This finding contrasts somewhat with the study by Majid et al., which reported lower fistula rates with the Snodgrass technique (2.7%) compared to Mathieu's repair (12.16%), emphasizing how the surgical approach may outweigh dressing effects (13).

Meatal stenosis was present in 2.5% of patients in Group A, compared to 1.3% in Group B; this difference was not statistically significant (p = 0.56). This complication appears more closely tied to surgical factors such as meatal configuration and suture technique rather than dressing selection. Roychoudhury et al. similarly reported a 10% incidence of meatal stenosis following Snodgrass urethroplasty, particularly in cases where the neomeatus was tightly reconstructed (14).

Dehiscence of wound occurred in 3.8% of patients with hydrocolloid dressing while 2.5% of patients with zinc oxide dressing (p=0.64). This finding aligns with the results of Ali et al., who reported no notable differences in wound dehiscence between these dressing types (11).

[Citation: Shah,T., Khattak, I.U. (2025). Comparison of outcome after occlusive hydrocolloid dressing and petroleum-impregnated gauze with zinc oxide adhesive plaster following hypospadias repair. *Pak. J. Inten. Care Med.* ***2025****: 76.* doi: https://doi.org/10.54112/pjicm.v5i01.76]

The comparable performance of both dressing types in our study has important practical implications. Hydrocolloid dressings, while theoretically they are advantageous due to their moisture-retentive properties and bacterial barrier function but showed no clear clinical superiority in our study. This finding echoes the meta-analysis by Singh et al., which, while demonstrating hydrocolloid superiority in chronic wound management, found less conclusive evidence for their advantage in surgical settings (15).

Cost and resource considerations are very crucial factors for dressing. Petroleum-impregnated gauze with zinc oxide represents a more economical choice, particularly relevant in resource-constrained healthcare settings. Ali et al. emphasized that although both dressing techniques are effective, the choice of dressing might be influenced by the financial status of the patients; they preferred petroleum-impregnated gauze due to its lower cost (11). We also support this approach that less expensive dressing alternatives can achieve comparable results to costly hydrocolloid products in hypospadias repair.

CONCLUSION

In conclusion, we found no notable difference between occlusive hydrocolloid dressing and petroleum-impregnated gauze with zinc oxide adhesive plaster following hypospadias repair in terms of wound dehiscence, meatal stenosis, and urethrocutaneous fistula. Both the dressings represent viable options for postoperative management following hypospadias repair.

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. (IREB-1979)

Consent for publication

Approved

Funding

Not applicable

CONFLICT OF INTEREST

The authors declared an absence of conflict of interest.

AUTHOR CONTRIBUTION

TARIQ SHAH (Postgraduate Resident)

Data entry, Data analysis, Data Collection, Conception of Study, Development of Research Methodology Design, Review of manuscript, Manuscript drafting, Review of Literature.

IRFAN ULLAH KHATTAK (Associate Professor)

Conception of Study, Critical Input, Final approval of manuscript.

.

REFERENCES

1. Sparks TN, Society for Maternal-Fetal Medicine (SMFM. Hypospadias. Am J Obstet Gynecol. 2021;225(5):18-20.
2. Nelson CP, Park JM, Wan J, Bloom DA, Dunn RL, Wei JT. The increasing incidence of congenital penile anomalies in the United States. J Urol. 2005;174(4):1573-6.
3. Schnack TH, Poulsen G, Myrup C, Wohlfahrt J, Melbye M. Familial coaggregation of cryptorchidism and hypospadias. Epidemiology. 2010;21(1):109-13.
4. Snodgrass W, Macedo A, Hoebeke P, Mouriquand PD. Hypospadias dilemmas: a round table. J Pediatr Urol. 2011;7(2):145-57.
5. Steven L, Cherian A, Yankovic F, Mathur A, Kulkarni M, Cuckow P. Current practice in paediatric hypospadias surgery; a specialist survey. J Pediatr Urol. 2013;9(6):1126-30.
6. Méndez-Gallart R, García-Palacios M, Rodríguez-Barca P, Estévez-Martínez E, Lema-Carril A, Bautista-Casasnovas A. A simple dressing for hypospadias surgery in children. Can Urol Assoc J. 2017;11(1-2):58-9
7. Chendake S, Kale T, Manavadaria Y, Motimath AS. Evaluation of Banana Leaves (Musa paradisiaca) as an Alternative Wound Dressing Material Compared to Conventional Petroleum Jelly Gauze Dressing in Contused, Lacerated and Sutured Wounds Over the Head, Neck and Face Region. Cureus. 2021;13(10):e18552.
8. Chaby G, Senet P, Vaneau M, Martel P, Guillaume JC, Meaume S, et al. Dressings for Acute and Chronic Wounds: A Systematic Review. Arch Dermatol. 20071;143(10):1297-304
9. Holmes SP, Rivera S, Hooper PB, Slaven JE, Que SKT. Hydrocolloid dressing versus conventional wound care after dermatologic surgery. JAAD Int. 2021;6:37-42
10. Subramaniam R, Spinoit AF, Hoebeke P. Hypospadias repair: an overview of the actual techniques. Semin Plast Surg. 2011;25(3):206-212.
11. Ali SW, Aslam U, Khalid S, Jahangeer SM, Khan MA. Comparison of simple penile dressings following hypospadias repair: Does it matter? Pak J Med Health Sci. 2023;17(05):87-9
12. Indriasari V, Evila Y, Diposarosa R, Syukriani YF, Rachmadi D. Outcomes of a 3-day transparent film dressing protocol after hypospadias repair. Sci Rep. 2024;14(l):24192-94.
13. Majid F, Siddique M, Yasmeen T, Tayyaba F, Zafar S, Attiq-ur- Rahman. Comparison of Outcome Complications between Snodgrass Technique and Mathieu's Repair in Distal Hypospadias Repair. *Med Forum*. 2021;32(2):102-106.
14. Roychoudhury A, Patra R, Saha S, Sinhababu A, Rangari P. A Clinical Study of Complications of Snodgrass Urethroplasty for Hypospadias. *IJMSDR*. 2019;3(4):63-72.
15. Singh A, Halder S, Chumber S, Misra MC, Sharma LK, Srivastava A, et al. Meta-analysis of Randomized Controlled Trials on Hydrocolloid Occlusive Dressing Versus Conventional Gauze Dressing. *Asian J Surg*. 2004;27(4):326-32.

[Citation: Shah,T., Khattak, I.U. (2025). Comparison of outcome after occlusive hydrocolloid dressing and petroleum-impregnated gauze with zinc oxide adhesive plaster following hypospadias repair. *Pak. J. Inten. Care Med.* ***2025****: 76.* doi: https://doi.org/10.54112/pjicm.v5i01.76]