



Original Article

Objective Scoring Outcome Analysis of Redo Urethroplasty for Failed Hypospadias

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Abstract

Background: Failed hypospadias refers to any hypospadias repair that leads to complications or causes patient dissatisfaction. One of the commonest major complications of hypospadias surgery is urethrocutaneous fistula.

Objectives: Present study aimed to determine a better procedure of salvage urethroplasty for failed hypospadias, caused by persistent large (>4mm) or multiple -small (<4mm) fistulae, by a randomized comparison.

Patients and Methods. This interventional study was performed in the department of Paediatric Surgery, Rajshahi Medical College Hospital, Rajshahi, Bangladesh, over a period of five years (from July 2011 to June, 2016). A total of 189 patients were included in present study and randomized in the three groups under study. Comparisons were made among three procedures of salvage urethroplasty of failed hypospadias caused by urethrocutaneous fistula using substitution of dorsal skin flap, Flip flap, or buccal mucosal graft in a controlled situation. Outcomes were assessed by means of objective scoring system.

Results: Refistula rate, devascularization of flap and grafts and wound dehiscence rate were significantly less in Buccal mucosal graft (group A) than flip flap (group C) and dorsal transposition flap (group B). This led to a higher success rate and better patient compliance in buccal mucosal graft. The objective scoring evaluation revealed that score gain of BM group (182) was significantly higher than that of dorsal transposition flap (112) and flip flap (89) at P value <0.05.

Conclusion: Staged redo urethroplasty for large or multiple-small fistulae using substitution of buccal mucosal graft revealed as a better option for urethral reconstruction than dorsal transposition flap and flip flap procedures (group A > group B > group C).

Key words: hypospadias, urethrocutaneous fistula, Buccal mucosal graft, dorsal skin flap, Flip-flap, Failed hypospadias,

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Introduction

Successful urethroplasty for a patient who has undergone previous failed hypospadias repair remains a surgical challenge. In some cases the absence of preputial skin, paucity of ventral skin

and residual chordee may all contribute to the risk of failure following salvage hypospadias surgery.¹

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The burden of a failed hypospadias repair can be devastating for a patient and his family. In a series of patients who underwent repair of failed hypospadias, treatment was only successful in 76% of cases, meaning that one in four cases of failed hypospadias could not be fixed, even after repeated surgeries.^{2,3}

Urethrocutaneous fistula after hypospadias surgery is the most common complication and remains a frustrating problem that precludes the goal of hypospadias surgery leading to failure of primary surgery. The reported incidence of urethrocutaneous fistula ranged, from 0 to 30%, varying with the severity of hypospadias, surgical technique, and experience of the operating surgeon.⁴

No matter how well designed the initial hypospadias procedure is, how gently the tissues are handled and how expertly the procedure is done, fistulae continue to occur at an unacceptably high rate. The problem is exacerbated because urethrocutaneous fistulae not only occur but also recur, sometimes requiring many procedures in the same patient.⁵

Numerous surgical techniques have been suggested to repair the complications after failed hypospadias repair, including simple closure, one-stage procedures (flaps-flaps, onlay flaps, tubularized preputial flaps or tubularized incised plate urethroplasties, bladder mucosa graft) or multistage procedures with penile skin or buccal mucosa. But disagreement exists over the best means of reconstructing the urethrocutaneous fistula in this difficult population of patients.⁶

Despite the many operative procedures described for correcting hypospadias, there is no generally accepted system for assessing the surgical results. This lack of an impartial method of documenting the results of hypospadias surgery has made the comparative

evaluation of operative procedures inaccurate and subjective.⁷

In the present study outcome of urethrocutaneous fistula repair in failed hypospadias using buccal mucosal graft and local skin flaps were evaluated to find out a better surgical option. The outcomes were analyzed by objective scoring system and post redo surgery complication rates. Thereby a valid and balanced evaluation was made among traditional and innovative surgical procedures for the salvage repair of hypospadias.

Materials and Methods

It was an interventional study, carried out in the Department of Paediatric Surgery, Rajshahi Medical College Hospital, Rajshahi, Bangladesh, from July 2011 to June, 2016, for a period of five years.

Paediatric patients with previous failed hypospadias repair presented with a persistent fistula and supple dorsal skin were included in the study. A minimum of 1 year was allowed to elapse following the last failed repair.

Patients with single pinhole or small (< 4mm) fistula and Multiple -large (>4mm) fistula; Patients with urethral diverticulum and urethral stricture; Patients with severe other surgical, medical problems; Fistula over coronal, penoscrotal, scrotal or perineal location; Patient with glans deformity and total disruption; Patients with persistent severe chordee were excluded.

Simple Random sampling technique was followed to select groups for each sample by means of lottery. BM GRAFT (Buccal Mucosal Graft) was grouped as group A, DORSAL FLAP (Dorsal transposition flap) was grouped as group B, FLIP FLAP (Distally based flip-flap) was grouped as group C. Each patient in every group received a same standard schedule of management regarding preoperative assessment, Control of infection and analgesia and assessment of outcome.

Results:

The study objectively evaluated the outcomes of three surgical techniques. The ultimate objective was to find out a better procedure of salvage urethroplasty for failed hypospadias repair. 189 patients were

included in present study as per inclusion and exclusion criteria and randomized in the three groups under study.

Distribution of types of hypospadias among three procedures

Different types of Primary hypospadias included in present study were Sub coronal, Distal penile, Mid penile and Proximal penile. Distribution of patients of different types of hypospadias among three procedures was shown in table- 3.1.

Table 3.1: Distribution of primary types of hypospadias among three procedures (n=189)

Site	BM graft	Dorsal flap	Flip flap	Total	Mean \pm SE
Sub coronal	10	14	9	33	11.0 \pm 1.53
Distal penile	19	17	17	53	17.67 \pm 0.66
Mid penile	15	22	21	58	19.33 \pm 2.19
Proximal penile	17	16	12	45	15.0 \pm 1.53

Postoperative complications - urethral diverticulum and anastomotic stricture, meatal stenosis

A small number of patients developed a urethral stricture or diverticulum at the site of the anastomosis as shown in **table: 3. 2**. The differences of values of the postoperative complications were insignificant among the three groups under study.

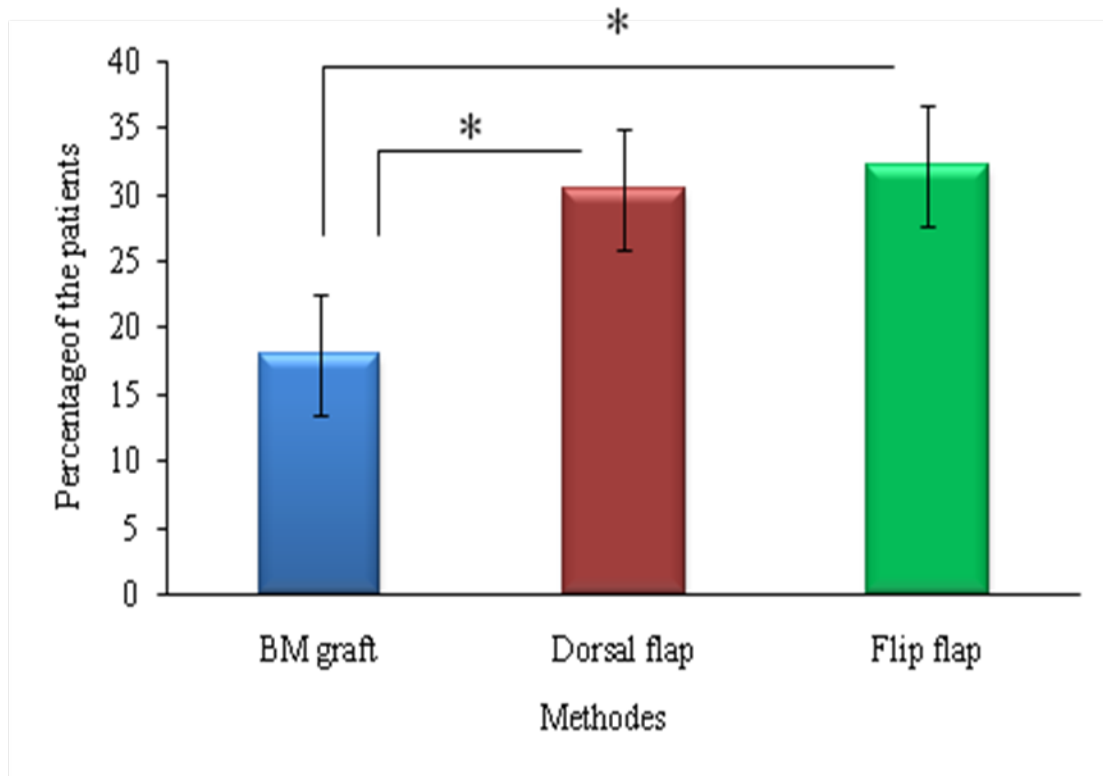
Table 3.2: Postoperative complications for Urethral diverticulum and Anastomotic stricture

Early Complications	Methods						P value
	BM graft		Dorsal flap		Flip flap		
	n	%	n	%	n	%	
Urethral diverticulum	2	3.28	4	5.80	7	11.86	0.743 ^{NS}
Anastomotic stricture	5	8.19	8	11.59	9	15.25	
Meatal stenosis	3	4.91	5	7.24	5	8.47	

NS= Not Significant; P value reached from Chi Square test.

Assessment of outcome by number of re-fistula (urethrocutaneous fistula)

Recurrence of urethrocutaneous fistulae precludes the goal of urethroplasty. The highest re-fistula rate was reported in distally based flip-flap group (group C):32.20%, followed by Dorsal transposition flap group (group B):30.43%. On the other hand the lowest frequency was recorded in Buccal Mucosal Graft group (group A): 18.03%. . The differences of re-fistula rate was significantly less in Buccal Mucosal Graft group (group A) in comparison to Distally based flip-flap group (group C) and Dorsal transposition flap group (group B) , at p <0 .01.



* Significantly different from dorsal transposition flap (group B) and distally based flip-flap (group C), $p < 0.05$

Figure 3.1: number of re-fistula among the different methods.

Comparison of outcome by wound dehiscence

Wound dehiscence was a rare complication and only a few cases were noted. Infection, edema, hematoma, diminished blood supply, tension at suture line might caused wound dehiscence. The differences of wound dehiscence rates were significantly less in Buccal Mucosal Graft group (group A) in comparison to Distally based flip-flap group (group C), $p < 0.05$.

Table 3.3: Comparison of outcome by wound dehiscence

Outcome measures	Methods						P value
	BM graft		Dorsal flap		Flip flap		
	N (61)	%	N (69)	%	N (59)	%	
Wound dehiscence with disruption of repair	5	8.19*	8	11.59	9	15.25	0.041 ^s

* Significantly different from dorsal transposition flap (group B) and distally based flip-flap (group C), $p < 0.05$

P value reached from t test

Comparison of outcome by flap/ graft devascularization

Devascularization of the flaps or graft is a major complication. The differences of devascularization of the flaps or graft rate were significantly less in Buccal Mucosal Graft group (group A) in comparison to dorsal flap method (group C), at $p < 0.05$.

Table 3.4: comparison of outcome by flap or graft devascularization

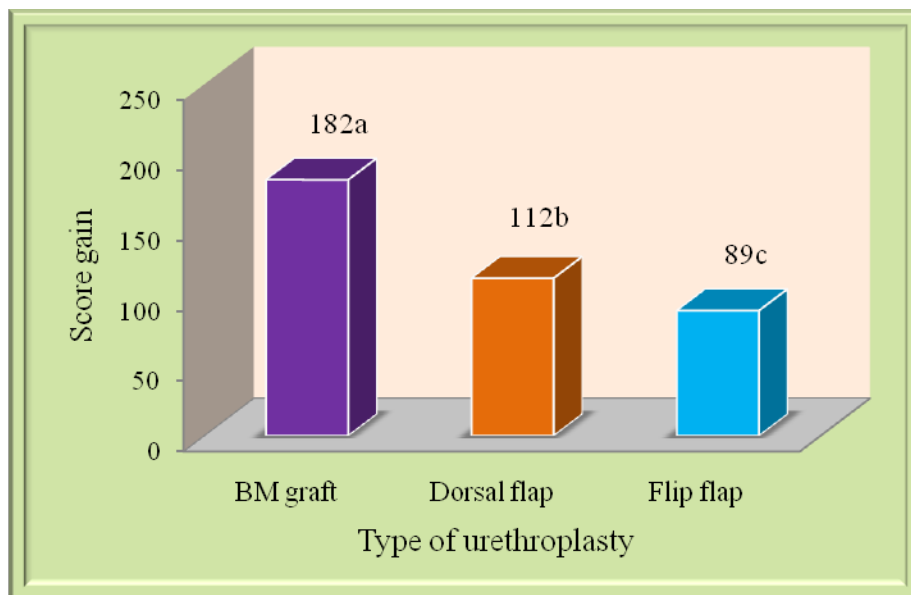
Outcome measures	Methods						P value
	BM graft				Flip flap		
	N (61)	%	N (69)	%	N (59)	%	
Flap/Graft devascularization	2	3.27*	11	15.94	7	11.86	0.017 ^s

* Significantly different from dorsal transposition flap (group B) and distally based flip-flap (group C), $p < 0.05$

P value reached from t test,

Objective scoring evaluation

HOSE (Hypospadias objective scoring evaluation) system was followed in this study to allow an objective appraisal of the outcome of hypospadias repair; based on evaluating meatal location, meatal shape, urinary stream, straightness of erection, and the presence and complexity of any complicating urethral fistula as shown in appendix -I. Pre operative and post operative scores and ultimate score gains were calculated and illustrated in **Figure 3.2**.



(Different letters are significantly different at $p < 0.05$ according to DMRT).

Figure 3.2: Comparison of score gain by different salvage urethroplasty procedures

Distributions of pre and postoperative scores of the three procedures were as follows: BM graft (705) and (887); dorsal flap (790) and (902); Flip flap (682) and (771). Calculated score gain was were BM graft (182), dorsal flap (112), Flip flap (89). Among the three techniques the highest score gain was recorded in BM graft (182) and lowest score gain was (89) for Flip flap. Duncan multiple range test (DMRT) demonstrated that the values of score gains were significantly different at $p < 0.05$.

Discussion

This study was a randomized controlled trial, in a single institute over five years period. In the present study majority of patients had undergone a variety of hypospadias repairs in the past. Among the previous primary urethroplasty types "Tubularized Incised Plate" (TIP) was the commonest procedure. These findings were equivalent to our previous reports^{8,9}. However, the number and types of previous procedures did not negatively influence the comparative analysis, as the differences in percentage distribution of the cases in three groups were insignificant. Similar observations were described by Yassin *et al.*¹⁰.

In the present study, uniformity for randomization in three groups was maintained by excluding wide range of variables by exclusion criteria, mentioned in methodology. Redo surgeries were postponed for at least one year to get excellent results and to enable the scars to mature and also the oedema and induration to subside. This view was suggested by some authors.¹¹

Recurrence of urethrocutaneous fistulae precludes the goal of urethroplasty. The highest re-fistula rate was reported in distally based flip-flap group (group C); 32.20%, followed by dorsal transposition flap group (group B); 30.43%. On the other hand the lowest frequency was recorded in Buccal Mucosal Graft group (group A); 18.03%. The differences of re-fistula rates were significantly less in Buccal Mucosal Graft group (group A) in comparison to distally based flip-flap group (group C) and dorsal transposition flap group (group B). High fistula rate has also been observed by others in re-operative hypospadias surgery. Shehata *et al.*¹² had complication rate of 20.6%. Eliçevik and colleagues¹³ documented that overall complication rate of 26 % in their study of 100 redo-surgery cases, with 18 % fistula rate. Patel *et al.*¹⁴ used

split onlay skin flap salvage with 54.5% postoperative fistulae.

In present study, an outcome without major complications like refistula, flap or graft devascularization and wound dehiscence with disruption of repair was considered as successful outcome. BM graft demonstrated significantly higher success rate in the salvage urethroplasty than the other surgical methods tested. However, Multiple studies have noted that 24-32%, 7-12%, and 3-4% patients needed approximately two, three and even four repairs respectively for a successful outcome¹⁵. Unfortunately, Most groups who report these outcomes, do so in conjunction with pediatric patients and adults, or patients with epispadias or urethral stricture without hypospadias. Therefore, it was not possible to extrapolate from the overall complication rates, the results that the authors obtained.¹⁶

In fact without an objective scoring evaluation Comparison of studies, systematic reviews and meta-analysis comparing different techniques was prone to bias, inaccuracy, and subjectiveness.¹⁷ In present study an objective analysis of repair techniques with a valid comparison was made by using HOSE system.⁷ Among the three techniques the highest score gain was recorded in BM graft (182). Duncan multiple range test (DMRT) demonstrated that the values of score gains were significantly different.

Conclusion:

Objective assessment among procedures using substitution of flaps or buccal mucosal graft in a controlled situation revealed that staged repair using buccal mucosa was a better option for urethral reconstruction in large (>4mm) or multiple -small (<4mm) fistulae, than dorsal transposition flap and flip flap procedures

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APPENDIX 1

HOSE - Hypospadias Objective Scoring Evaluation

Assessor:

Patient:

Date:

Variable	Score	Diagram
1. Meatal location		
Distal glanular	4	
Proximal glanular	3	
Coronal	2	
Penile shaft	1	
2. Meatal Shape		
Vertical slit	2	
Circular	1	
3. Urinary Stream		
Single stream	2	
Spray	1	
4. Erection		
Straight	4	
Mild angulation (< 10°)	3	
Moderate angulation (> 10° but < 45°)	2	
Severe angulation (> 45°)	1	
5. Fistula		
None	4	
Single - subcoronal or more distal	3	
Single - proximal	2	
Multiple or complex	1	

Total

Reference : Holland AJA, Smith GHH, Ross FI, Cass DT. HOSE; an objective scoring system for evaluating the results of hypospadias surgery. *British Journal of Urology international*. 2001;88:255-258.

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