A simple procedure for management of urethrocutaneous fistulas; post-hypospadias repair

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ABSTRACT

Objectives: The treatment of urethral fistulas is quite challenging. We try to evaluate the results of a simple procedure in post-hypospadias urethral fistula repair. **Materials and Methods:** In the period from 2003 to 2007, 35 patients with 35 fistulas, with an average age 3.5 years [range: 2-8], were classified into coronal 12, mid-penile 13 and proximal 10. Based on the size they were grouped into two - either less than 5 mm (20) or more than 5 mm (15). Midline relaxing incision was used for large fistulas and then covered with a vascularised flap dartos-based flap [flip flap] in 19 and tunica vaginalis in 16. If a patient had more than one small fistula adjacent to each other, they were joined into a large single fistula and then repaired. **Results:** We have successfully repaired all urethrocutaneous fistulas using our protocol, with success rate [97.3] 1/35. **Conclusions:** Dorsal midline urethral incision (DUMI), with dartos flip flap or tunica vaginalis coverage is an appropriate procedure to repair midline and proximal urethral fistulas.

Key words: Dorsal incision, fistula, hypospadias

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INTRODUCTION

Urethrocutaneous fistula after hypospadias repair remains a frustrating problem for surgeons. Furthermore, with the improvement in suture material and surgical techniques, such complications are increasingly unacceptable. The occurrence of urethrocutaneous fistulae precludes a goal of hypospadias surgery.[1,2]

Unfortunately there is no one single perfect technique to repair an urethrocutaneous fistula. Factors that may affect results of their repair may be the conditions of local tissue, duration of time after hypospadias repair, the number, location and size of the fistula, use of magnification, patients age, previous fistula repairs and also the type of suture material used, skill of the operating surgeon and proper inversion of the edges etc. Some failure rate is expected in every type of repair. By providing a water-tight covering layer, the incidence of recurrence in urethrocutaneous fistula repair can be greatly reduced, especially in large urethrocutaneous fistulas.[3,4]

The purpose of this study is to provide a trial for simple management of the urethrocutaneous fistulae regarding to its size, number, and site.

MATERIALS AND METHODS

We have operated on a total of 35 cases with n = 35 urethrocutaneous fistulas during a period from June 2003 to April 2007, age of the patients ranged from 2 to 14 years with an average 5.32 years. All the patients underwent routine preoperative investigations. Out of the 35 fistula cases, five were recurrent after its repair once by routine methods using adjacent local flaps and 30 cases were primary. They were classified into coronal 12, mid-penile in n = 13 and proximal in n = 10, and according to the size into two groups either less than 5mm in n = 20 and more than 5 mm in n =15. All the patients were covered with a vascularised flap dartos-based flap [flip flap] in n = 19 and tunica vaginalis in n = 16. If a patient had more than one small fistula adjacent to each other, they were fused to a large single fistula and then repaired Table 1.

In this study, management for coronal fistulas aimed to convert it into hypospadias and repaired as Snodgrass operation. The second item, the mid-penile fistula, was treated with dorsal midline urethra incision bigger than the size of the fistula with 2 mm on each side as a relaxing incision for large fistulas followed by covering the suture line with dartos flip flap after water-tight closure and finally the proximal hypospadias treated as the mid penile, except that we covered it with tunica vaginalis. In all patients a catheter of size 6-8 French was kept as a stent for 10 to 12 days duration postoperatively.

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Surgical technique

The first step after general anaesthesia and painting of the patients is to determine the actual size and number of the fistulas. We had two patients each with two fistulas in close proximity or adjacent to each other. Then they were converted into a single large fistula to infiltrate subcutaneously with Xylocaine and Adrenaline using a needle of 27 gauges around the fistula edges this for an easy undermining of the fistula edge.

Table 1: Character of preoperative patient

Preoperative patient character	
Age group	No. of cases (%)
< 5 YRS	25 (2.7)
>5 to 12 YRS	10 (34.8)
Size of the fistulas	
< 5mm	20(57%)
>5mm	15(43%)
Site of fistula	
Coronal	12 (42%)
Mid penile	13 (37%)
Proximal	10 (28%)
Number of the fistulas	
Single	31 (94.5%)
Multiple	2 (5.4%)
Fistula conditions	
Primary	20 (57%)
Recurrent	15 (43%)

The second step is to incise the dorsal midline urethrawith a small knife opposite to the fistula site and in larger size 2 mm on both sides then the patient was catheterized with a catheter of size 6-8 French size [Figures 1 and 2].

The third step is the fistula closure - done using 5-0 Vicryl suture on a cutting needle in a continuous manner and under loupe magnification. Covered with dartos flip flap Figures 3-5, it was then harvested in cases of the mid penile fistula in length to breadth ratio 1/3 after skin degloving and we selected the tunica vaginalis for the proximal types [Figures 6 and 7]; those were sutured over the urethrocutaneous fistulae in a water tied closure all around the fistula with interrupted Vicryl 5-0.

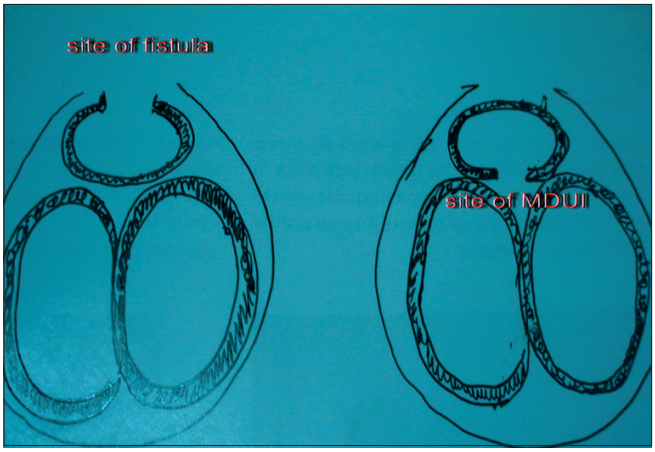


Figure 1: Diagram showing the midline dorsal incision

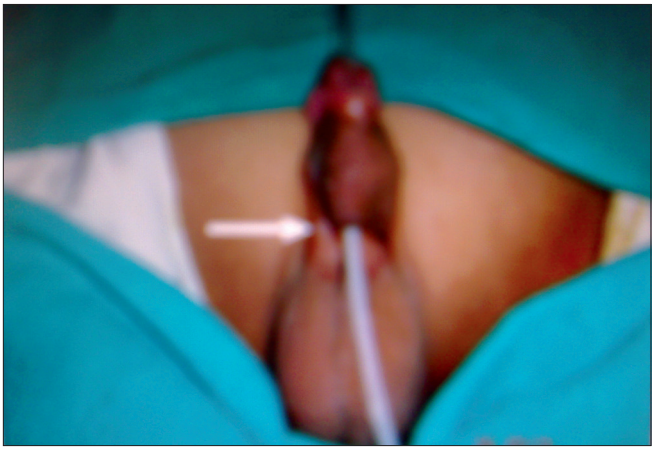


Figure 2: Proximal fistula after TIP operation

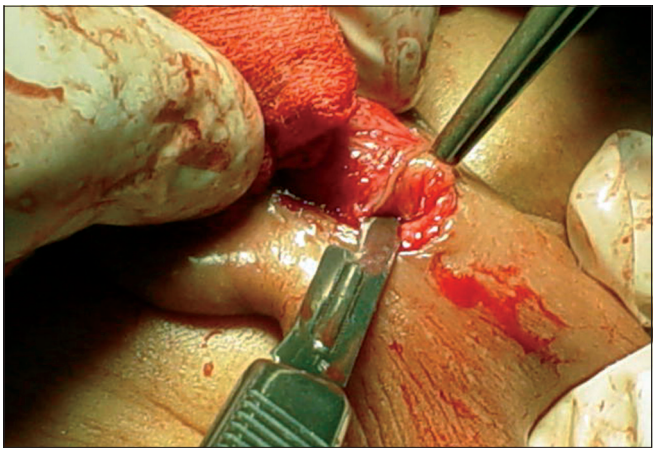


Figure 3: Midline urethral incision by knife



Figure 4: Marking the penile dartos flap as a flip flap

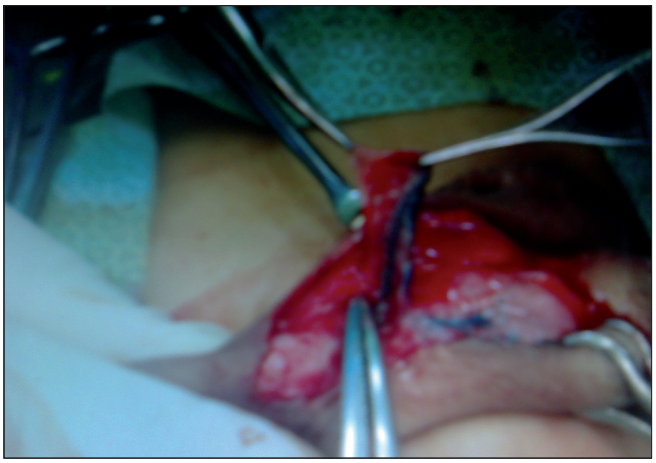


Figure 5: Elevation of the dartos flap as a flip flap

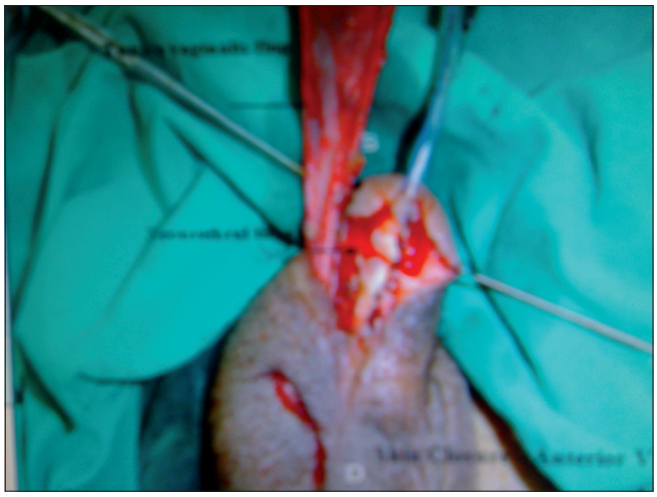


Figure 6: Tunica vaginalis flap

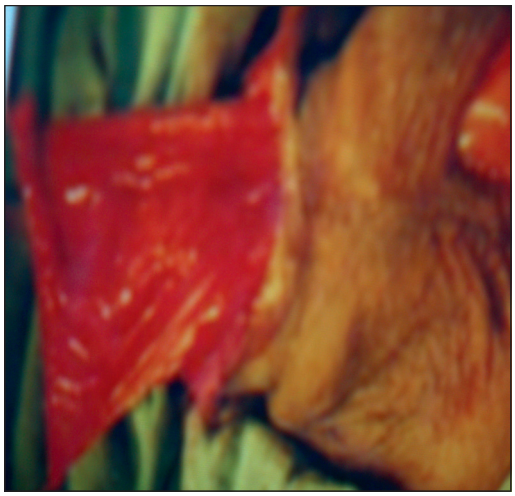


Figure 7: Elevation of the flap



Figure 8: Early fistula after two weeks

Finally the penile skin was closed over the flap and sterile dressing was applied. The urethral catheter was removed after 10 days.

RESULTS

We have successfully repaired all urethrocutaneous fistulas using our protocol, in the period from June 2003 to April 2007, with good cosmetic results In the early postoperative period, we had four [11.4%] cases with urinary retention, three cases with haematoma and five [14.4%] with wound infection. All were treated conservatively without surgical intervention and four [11.4%] cases with immediate fistula or urinary leakage, three [8.7%] were closed after twice dilatation weekly for three weeks, the mean hospital stay, 1.7 ± 1.1 (2–4); all the patients were discharged one day after except cases with retention for assurance of the parents and the mean operative time was in the range of 25.5 ± 11 (30–45) minutes [Tables 2,3]. In the late postoperative time one case of recurrence was noticed [Figure 8].

DISCUSSION

The fistula formation after hypospadias repair continues to be a frustrating complication, thus surgeons have evaluated their techniques, as well as the possible underlying causes that may put the patients at risk of a postoperative fistula.[4] Secrest *et al*,[5] reported on the successful urethrocutaneous fistula repair in 53 (91.4%) of the total 58 patients after hypospadias repair. The investigators emphasized the use of magnification. From a technical standpoint, we do not believe that the use of a microscopic repair will give an advantage over Loupe magnification [3.5-fold Loupe magnification].

Richter *et al.*[6] preferred converting coronal fistulas into coronal hypospadias, followed by tubularisation of the

Table 2: Postoperative patient character

Postoperative patient character	no of cases (%)
Early postoperative	
Urinary retention	4 (11.4%)
Haematoma	3 (8.7%)
Wound infection	5 (14.4%)
Early leakage (fistulas)	4 (11.4%)
Hospital stay	1.7 ± 1.1 (2–4)
Operative time	35.5 ± 11 (30–60)
Recurrence	1(2.8%)
Success rate	11/12(91.6)

Table 3: Postoperative complication regarding to the size and type of fistula

	Early fistula	Late Recurrence/ success %	Retention	Hematoma	Wound infection
Size of the fistulas					
< 5mm (20)	1	(100) 0	1	2	3
>5mm (15)	3	(43) 1	3	1	2
Site of fistula					
Coronal (12)	0	12 (100%)	1	0	2
Mid penile (13)	2	13 (37%) 1	1	1	3
Proximal (10)	2	10 (100%) 0	2	2	0

urethral plate with or without a dorsal midline relaxing incision.[7] The Thiersch tube repair with or without the relaxing urethral plate incision, as described by Reddy,[8] Rich *et al*.[9] and Snodgrass,[10] had a success rate of 92%.

As with hypospadias surgery, there are no perfect techniques for repairing urethrocutaneous fistulae. Many variables could influence the surgical management and outcome the time of occurrence after urethroplasty, the location (glanular, coronal, mid-shaft, etc.), size (pin-point, large), the number and the conditions of local tissue. [11]

We selected all our patients six months, after urethroplasty or after the last operation after consumption of any conservative methods. We prefer to convert the coronal fistula into coronal hypospadias; all cases were tabularised with midline urethral plate incision as a relaxing incision with success rate 91.6% [11/12].

A common error observed is timing of fistula repair. Consensus and logic in this regard dictates a wait and see policy for at least six months of last repair to enable the scars to mature and also the oedema and indurations to subside.[12] We had four cases with immediate postoperative urinary leakage like minor fistula all were healed conservatively before one month except one to be a recurrent fistula later on. During the last decade many principles of an ideal repairing technique have been clarified. Delicate tissue handling, inversion of the urethral mucosa after excising the epithelialised tract of the fistula, a multilayer repair with well-vascularised tissues, avoiding overlapping sutures and nonabsorbable or thick suture materials, a tension-free closure, use of optical magnification and needle-point cautery for coagulation are currently considered mandatory.[13]

We advise the use of bipolar diathermy for meticulous dissection and non bloody field, by infiltration of Zylocain with adrenaline 1 / 2000000 also we used the loop for magnification and perfect subcuticular tissue closure with 5/0 vicryle.

Various methods and techniques have been reported in the literature for the management of these urethrocutaneous fistulae with variable results. Larger the size of these fistulae more difficult is their closure and correction.[14] We had no difference between both patients groups regarding its size. As the larger the size the more difficult closure this due to the closure with tension sutures thus we avoid this problem by making the dorsal midline incision for all large fistulas as a relaxing incision to avoid tension sutures and ischemia.

Some authors advised the use of purse string sutures as a simple method to close fistula this may be of value in small sized fistulas where the larger the fistula the more tension will result this, We disagree as this principle carries the risk of tension at the edge of the fistula opening and ischemia also its interrupted silk sutures; in spite of its simplicity it also had the possibility of impeded urethral epithelium in between the sutures.[15] Sub-cuticular continuous sutures had the benefits for preventing the leakage of the urine and passing the urethral epithelium through the sutures.[16]

Numerous techniques have been devised to counteract this problem and pursuit for an ideal one is still going on. Among these techniques, the most common manoeuvre is to place some intervening layer of tissue between neo-urethra and the skin. [17]

Some authors advised the use of (Tunica vaginalis or scrotal dartos layer) for recurrent fistulas, tissues from an unscarred area 7, but we performed it for both types either the primary or the recurrent types. We selected the penile dartos flap as a random flap with a length to breadth ratio 1/2 to 1/ 3 [flip flap] with good results for fistula repair with success rate more than 96%. The dartos flap is fibro-adipose tissue this flap may reaches the distal penile shaft without tension. Dartos flaps have been used for both the primary waterproofing of hypospadias repair and fistula repair.[17] We selected the *Tunica vaginalis* for the proximal fistula types

this layer was considered waterproofing layer between urethra and skin and well vascularised furthermore we reducing its indication for all types of fistula repair to avoid testicular complications as possible as also we considered it the best choice after dartos flaps.

CONCLUSION

Midline urethral incision as a relaxing incision with the dartos flip flap is the key for successful treatment of urethral fistula.

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