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Tunica vaginalis flap cover in repair of recurrent proximal urethrocutaneous fistula: A final solution

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ABSTRACT

Background: The objective of this study was to assess the significance of tunica vaginalis flap cover in cases of recurrent proximal penile fistula. **Materials and Methods:** This retrospective study included complicated cases of proximal penile hypospadias with recurrent fistula. Recurrent fistula was defined as fistula after at least two previous attempts of closure. Group 1 included cases with tunica vaginalis flap and Group 2 included cases with local flap. Outcome was assessed at day 10 after stent removal and at first follow-up. Fistula closure was considered successful in case with no leak. **Results:** Out of 39 cases of recurrent fistulas, 20 cases in Group 1 and 18 cases in Group 2 formed the study group. The mean age at fistula repair was 7.2 ± 0.9 years (range: 2.1-12 years) and 7.1 ± 0.7 years (range: 2.3-12 years) in Group 1 and 2 respectively. Leak at the time of stent removal was present in 1/20 (5%) and 3/18 (16.67%) cases in Group 1 and 2 respectively (P = 0.04). Leak at the time of first follow-up was present in 2/20 (10%) and 4/18 (22.22%) cases in Group 1 and 2 respectively (P = 0.03). Complete disruption of fistula closure was present in 1/20 (5%) and 2/18 (11.11%) cases in Group 1 and Group 2 respectively (P = 0.1). The overall success rate in Group 1 and 2 was 16/20 (80%) and 9/18 (50%) respectively (P = 0.01). **Conclusions:** Tunica vaginalis flap reinforcement is a viable and reliable option. With proper use cases of recurrent fistula can be managed successfully.

Key words: Leak, local flaps, recurrent fistula, tunica vaginalis flap

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INTRODUCTION

Hypospadias is one of the common congenital anomaly of urethra with a reported incidence of 1 in 300.[1] Management of proximal penile hypospadias offers a technical challenge to the operating surgeon both in terms of cosmesis and association with a high fistula rates. A number of techniques have been described. We tried to compare the results of management of recurrent fistulas using tunica vaginalis flap reinforcement and the use of local flaps.

The objective of this study was to assess the significance of tunica vaginalis cover in cases of recurrent proximal penile fistula.

MATERIALS AND METHODS

This was a retrospective analysis. Case records of complicated cases of proximal penile hypospadias with recurrent fistula [Figure 1] managed between January 2008 and May 2013 were analysed. Recurrent fistula was defined as cases with fistula after at least two previous attempts of fistula closure. All the cases were operated by a single senior surgeon experienced in harvesting the tunica vaginalis flap and applying it and also in other techniques of fistula closure. Cases were divided into two groups, Group 1 included cases of fistula closure with tunica vaginalis flap reinforcement [Figure 2] and Group 2 included fistula closure with local flap used as second layer. All the cases were managed by a uniform protocol of fistula closure using 6-0 interrupted polydioxanone sutures for fistula closure and 5-0 vicryl for flap reinforcement followed by compression dressing for 4 days. Dressing was removed on day 4. All the fistula closures were done over 7 Fr infant feeding tube as stent. Stent was removed on day 10. All patients received tab lynoral (0.01 mg bedtime) and tab luminal (5 mg/kg/dose bedtime) to prevent erections. Cases with incomplete data or where dressing was removed before day 4 or stent was removed/came

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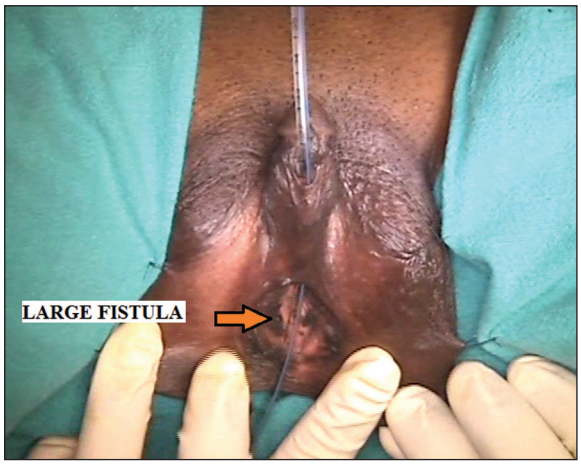

Figure 1: large recurrent fistula

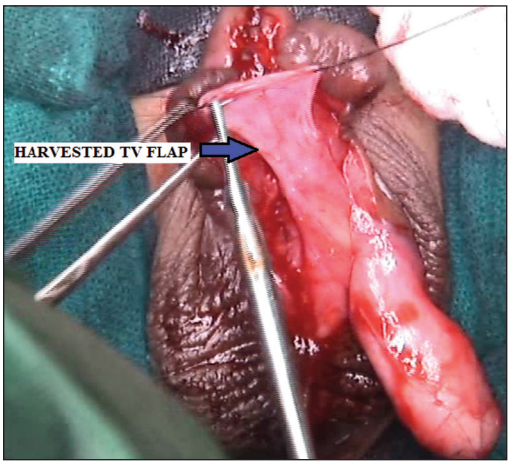

Figure 2: Fistula repaired and a tunica vaginalis cover applied

out before day 10 or where lynoral/luminal intake was irregular were excluded. Outcome was assessed at day 10 after removal of the stent and at first follow-up visit. Fistula closure was considered successful in case of no leak and no splaying of urine. While any leak from the site of fistula closure or disruption of closure was considered as failure.

The data analysis was performed using STATA software version 11 (STATA Corp LP Texas USA). The statistical tests applied were Chi-square test, Wilcoxon signed rank test. *P* value was calculated using fisher exact test owing to the small sample size and the value <0.05 was considered to be statistically significant. Institute's ethical committee approval was taken for the study.

RESULTS

In the defined period of January 2008 and May 2013 a total of 129 cases of hypospadias and 67 cases of fistula closure were operated. Out of these 67 cases of fistula 39 cases were of recurrent fistulas. Among these 39 cases 21 cases were managed by tunica vaginalis and remaining 18 cases were managed by local flap reinforcement. One case with tunica vaginalis flap reinforcement was excluded as stent came out accidently at day 7 (though he didn't have fistula). Thus, 20 cases in Group 1 and 18 cases in Group 2 formed the study group. The mean age at fistula repair in Group 1 was 7.2 ± 0.9 years (range: 2.1-12 years) and that in Group 2 was 7.1 ± 0.7 years (range: 2.3-12 years). The outcome difference between the two groups was as shown in Table 1.

As seen in Table 1 leak at the time of removal of stent was present in 1/20 (5%) case in Group 1 while it was present in 3/18 (16.67%) cases in Group 2 and this difference was significant ($P = 0.04$). There were 2/20 (10%) cases in Group 1 and 4/18 (22.22%) in Group 2 where there was no leak at the time of stent removal, but had leak at first follow-up. This difference was also significant ($P = 0.03$). Complete disruption of fistula closure was present in 1/20 (5%) and 2/18 (11.11%) cases in Group 1 and Group 2 respectively and this difference between the two groups was however not significant ($P = 0.1$). The overall success rate in Group 1 was 16/20 (80%) while it was 9/18 (50%) in Group 2 and this difference was significant ($P = 0.01$).

DISCUSSION

The incidence of hypospadias is 1 in 300 live births.[1] Management of proximal penile hypospadias is challenging for a managing surgeon in terms of demanding cosmesis and high incidence of associated fistulas. A number of procedures have been devised for the management of these cases. Despite the improvements in the techniques of hypospadias surgery, some patients still present with failed repairs.[2] Managing these cases is a challenging task. Many techniques have been introduced in the management of such situations, which includes burying the repaired urethra in the scrotum,[3] staged repair,[4,5] overlapping denuded subcutaneous tissue,[6] rotating skin flaps.[7,8] Successful outcomes are usually associated with the unwanted problems such as scarring, defective vascularity and lack of the prepuce after failed previous repairs. An alternative technique is the use of tissues such as dartos fascia of ventral side of the penis or tunica vaginalis flap reinforcement. Furness and Hutcheson reported a success rate of 98% for dartos fascia use and of 109 patients, only 2

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Table 1: Outcome of cases managed for recurrent fistulas with or without tunica vaginalis flap reinforcement

Outcome	Group 1 (n=20) (%)	Group 2 (n=18) (%)	P value
Failure			
Leak at stent removal on d10	1 (5)	3 (16.67)	0.04
Leak at first follow-up	2 (10)	4 (22.22)	0.03
Complete disruption	1 (5)	2 (11.11)	0.1
Total	4 (20)	9 (50)	0.03
Success			
No leak	16 (80)	9 (50)	0.01

developed fistulas.[9] A study in Turkey demonstrated better cosmetic results using mucosal collars. In that study, fistula and meatal stenosis rates were 8.3% and 14%, respectively.[10] In another study, the success rate with tunica vaginalis flap was 100% without a significant complication.[11] In a study by Snow *et al.*, most of the post tunica vaginalis flap complications were related to scrotal hematoma and abscess, a rate of 5% was reported for urethrocutaneous fistula.[12] Therefore, Snow *et al.* recommended tunica vaginalis flap as a second layer for primary hypospadias repair. In our study, the rate of fistula was higher (20%) this could be due to the selection of cases with complicated fistulas and poor local tissue. By performing complete haemostasis and good anatomical dissection, we did not encounter scrotal complications. Chatterjee *et al.* used snodgrass method alongside dartos fascia in 20 patients and tunica vaginalis flap in 29 patients as a second layer for hypospadias repair.[13] They used flaps as second layer in fresh cases of hypospadias and saw a fistula rate of 20% and 10% in the dartos fascia group and the tunica vaginalis flap group respectively. The leakage was visible only during voiding. A urethral catheter was replaced in all seven patients and kept for another 7-14 days. In three patients with a dartos wrap, leaking tracts gradually increased in size to 1-2 mm and epithelialised into fistulae around the corona. However, in three patients in the tunica vaginalis group the wound healed and urinary leakage stopped. There was no meatal stenosis in either group. Interestingly, in the above-mentioned study, placement of a urethral catheter (urethral re-catheterisation) for another 7-10 days resulted in urinary leakage improvement as well as prevention of permanent fistula formation. In contrast, those subjects in whom a dartos fascia was used as the second layer, urethral re-catheterisation could not prevent permanent fistula formation. We however did not attempted re-catheterisation so we can't comment on this issue.

Fistula rate in our cases was higher as compared to the previously published reports because of the selection of complicated redo cases where local tissue was very bad owing to repeated surgeries in the region. However, it is pretty evident that tunica vaginalis flap cover was superior to any other tissue cover in the management of these cases. Landau *et al.* studied the results of fistula closure using tunica vaginalis flap reinforcement in 14 cases and observed no fistula;[14] however they performed all the cases under operating microscope. A high fistula rate in our study (20%) may be attributed to patients with complicated fistulas and fistula repair without operating microscope or magnification. Unfortunately, there is no such study comparing the results of these two groups in the management of complicated redo cases. We in our study documented a superior result with the use of tunica vaginalis flap in the management of these cases over the use of other flaps (P = 0.01). Thus, tunica vaginalis flap appears to be a superior option in the management of complicated and redo cases. Tunica vaginalis flap have also been used in cases of recurrent recto urethral fistula with very good results [15] apart from its excellent results in fresh cases of hypospadias.

CONCLUSIONS

Tunica vaginalis flap reinforcement in cases of recurrent proximal penile fistulas is a viable and reliable option. With the proper use of this flap, these cases can be managed successfully.

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