Original Article

Access this article online
Website: www.afrjpaedsurg.org
DOI: 10.4103/0189-6725.86054
PMID: 22005357
Quick Response Code:

Tunica vaginalis: An aid in hypospadias fistula repair: Our experience of 14 cases

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ABSTRACT

Background: Urethrocutaneous fistula is the most common complication of hypospadias surgery. The correction of such fistula is associated with a failure rate of 10 to 40%. The step in successful repair of a fistula is separation of the suture lines in the urethra and skin using well vascularized elastic tissue. We report our experience of using the tunica vaginalis flap as a layer between the neourethra and skin suture line in repair of recurrent urethrocutaneous fistula. **Patients and Methods:** We have used the tunica vaginalis flap for the repair of recurrent urethrocutaneous fistula in 14 children with a mean age of 6.5 years (range 3-14 years). All patients had undergone previous hypospadias repair and at least one previous attempt to close the fistula had failed. Surgery was initiated by injecting a povidone solution via urethral meatus to identify all fistulae. The fistulae were closed primarily and urethral suture line was covered with a flap of tunica vaginalis which was harvested either through a small scrotal incision and mobilized via a subcutaneous tunnel into the penile shaft (8/14) or by the same incision as for fistula closure (6/14). The testis was fixed to the scrotum. A urethral catheter was kept for urinary diversion for 10 days. **Results:** The repair was successful in all but one patient in whom there was leak from the fistula site. One patient in whom tunica vaginalis fascia was tunnelled into neourethra developed scrotal haematoma which needed drainage. Penile cosmesis was acceptable without any significant postoperative testicular complication in 13/14 patients. **Conclusion:** Repair of recurrent urethrocutaneous fistula with a tunica vaginalis flap is highly effective regardless of fistula location. This flap is easy to mobilize and provide effective coverage of urethral suture line. Putting a glove drain should be considered into scrotal wound if perfect haemostasis is doubtful.

Key words: Hypospadias repair, tunica vaginalis flap, urethrocutaneous fistula

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INTRODUCTION

Urethrocutaneous fistula is the most common complication after procedures performed to repair hypospadiasis.[1] Spontaneous closure of small fistula has been reported but surgical repair is needed in a majority of cases. The key steps in successful repair of such a fistula are elimination of distal stricture, avoiding surgery on oedematous or inflamed tissue, separation of urethral and skin suture line.[2,3] Various techniques have been used for initial fistula closure including simple repair, application of subcutaneous skin flap and penile dartos.[4-7] However, for repeat fistula closure the penile dartos is fibrotic, thereby eliminating the option of development of a penile dartos flap for suture line coverage. So the closure of recurrent fistula becomes technically difficult even for the expert hands. In such situations a tunica vaginalis flap is a good alternative to augment the fistula repair. This flap was first time introduced by Snow *et al* in primary hypospadias repair as well as in urethrocutaneous fistula cases.[8] We also have the experience of using the tunica vaginalis flap for closure of recurrent urethrocutaneous fistula in 14 patients. Here in this series we are presenting our experience.

PATIENTS AND METHODS

In this study 14 patients over 3 years (January 2007-December 2009) with recurrent urethrocutaneous fistula with a mean age of 6.5 years (range 3-14) were managed with a tunica vaginalis flap. There were a total 23 fistulas in these patients [Table 1]. The techniques used for the initial hypospadias repair are listed in Table 2.

In all the patients, initial first attempt of fistula repair had failed. The duration between attempt at surgical repair of fistula and the current operation was longer than 1 year in all the cases. In this study the fistula location was distal penile/subcoronal in 6 cases, midshaft in 13 cases, proximal penile in 2 and

penoscrotal in 2 cases (14/23).

Surgical technique general anaesthesia was administered to all patients. A povidone–iodine solution was injected into the urethra with a cannula located at the distal meatus to identify all fistulae. Urethral calibration was done with a bougie to rule out stricture distal to fistula. A urethral catheter/infant feeding tube no. 8 was passed into bladder. A skin incision was given around the fistula site and fistula circumcised with sharp dissection down to the level of urethral mucosa, margin freshened and then closed with vicryl 6-0 suture. A second layer of interrupted sutures applied over the surrounding tissue [Figures 1 and 2]. One testicle was brought out through a vertical scrotal incision and its tunica vaginalis was incised and reconfigured as a flap [Figure 3]. The flap was then transferred to the level of fistula site either through the same incision [Figure 4] or via a subcutaneous tunnel [Figure 5]. The distal edges of the tunica were then sutured to the corporal tissues covering the neourethral suture line completely. The penile skin was closed with 5-0 chromic catgut suture [Figure 6]. The respective testicle was fixed to scrotal dartos with 4-0 vicryl sutures attaching the rim of tunica vaginalis which was left on the testicle with the dartos.

Table 1: Showing total number of fistulas

No. of fistulas	No. of patients
1	7(7/7)
2	5(5/10)
3	2(2/6)
	14(14/23)

Table 2: Technique used for the initial hypospadias repair.

Technique used	No. of patients
Tubularized incised plate repair	4
Meatal-based flap	2
Onlay island flap	4
Thiersch Duplay	3
Unknown	1

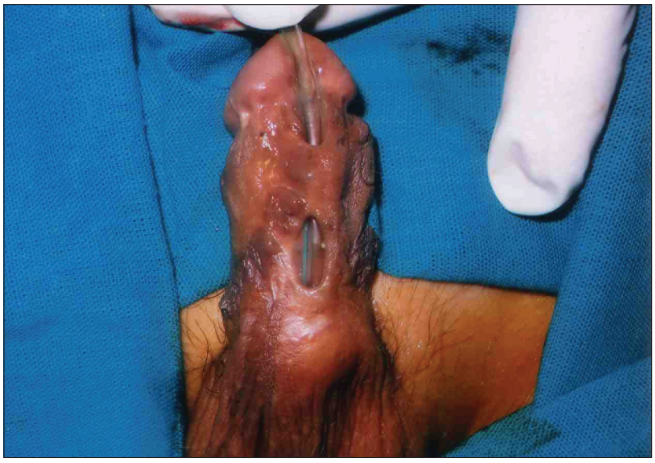


Figure 1: Clinical photograph showing preoperative status of fistulas

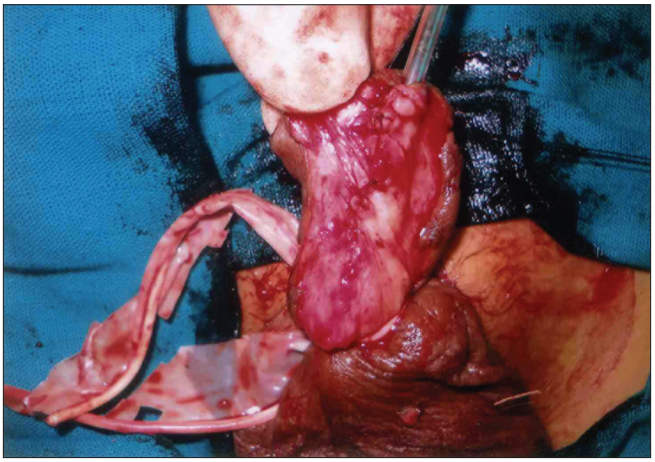


Figure 2: Clinical photograph after dissecting skin flaps and fistulas closed

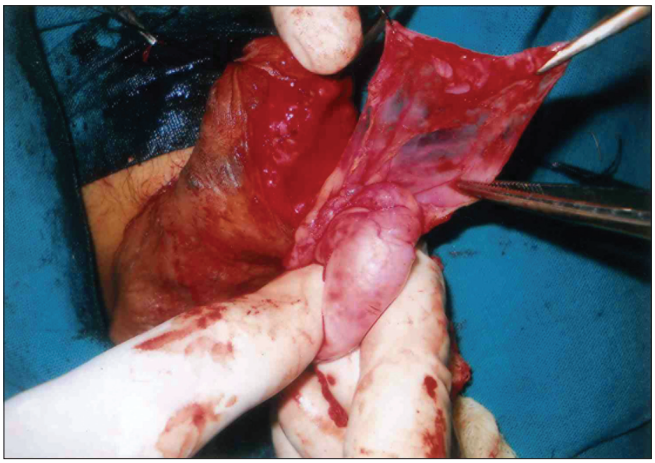


Figure 3: Clinical photograph showing harvested TVF from left testis.

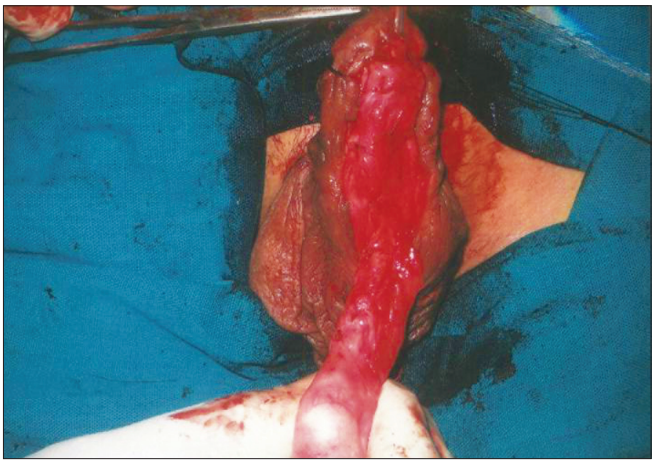


Figure 4: Clinical photograph depicting TVF covering neourethera.

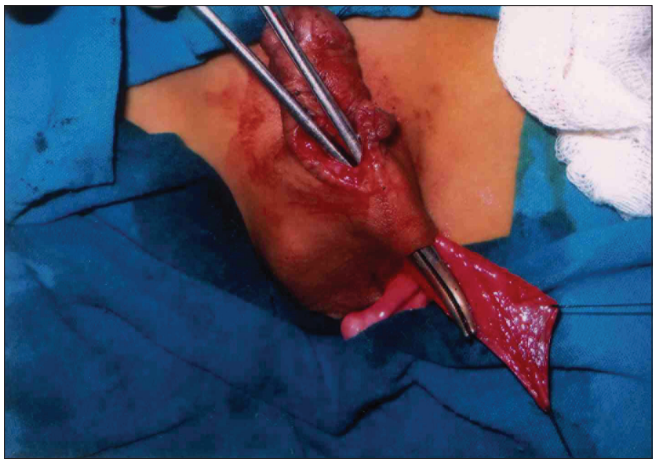


Figure 5: Clinical photograph showing positioning of TVF via subcutaneous tunnel

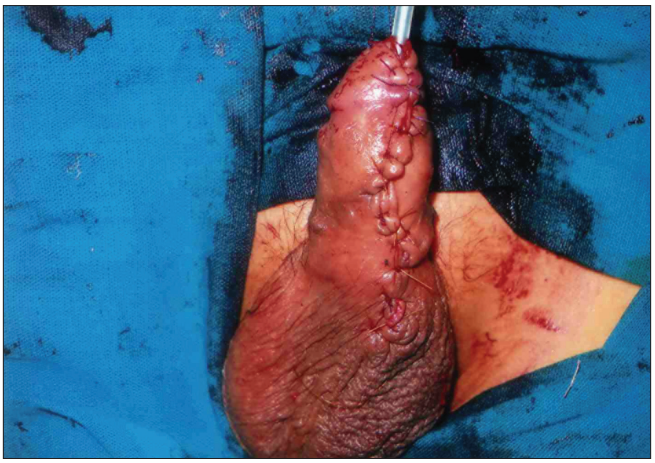


Figure 6: Clincal photograph showing completed repair



Figure 7: Clinical photograph of follow up patient of TVF repair showing good urinary stream as well as scrotal scar.

Scrotal incision was closed. Postoperatively patients were given intravenous antibiotics, cefotaxime and amikacin for 5 to 7 days and the dressings were changed on 4th, 7th and 10th day. In one of the first four patients in which tunica vaginalis was tunnelled developed scrotal haematoma and needed drainage. Afterward we started putting a glove drain for 72 h in all patients who needed tunnelled TVF repair and subsequently no scrotal complications reported. An indwelling urethral catheter was kept for 10 days in all patients.

RESULTS

All patients were followed up in outpatient clinic after 2 weeks of surgery and than three monthly upto a maximum of 2 years. There was a leak from fistula site in one patient who had undergone three earlier surgeries but size of the fistula was reduced to less than 5 mm and penile shaft had good cosmesis as compared to the preoperative state. Rest all fistulas were closed completely [Figure 7]. There was no clinically significant wound or urinary tract infection.

DISCUSSION

Urethrocutaneous fistula is still the most common long-term complication after hypospadias repair with rates less than 5% for distal hypospadias repairs and upto 20% for more complex repairs.[9] Numerous techniques have been used for fistula closure. Simple fistulae can be closed primarily with care taken to separate the skin and urethral layers and closure of each layer with absorbable sutures with reported success rates of 80 to 82.6%.[10] In another series the success rate of fistula closure has been reported to be 92% wherein the authors have used a three layered method as well as dermal subcutaneous flaps for closure of larger fistulas.[11] The problem cases, however, are those patients with a lack of prepuce and excessive fibrous tissue following previous operations. In such cases introduction of a vascular intermediate layer between the neourethra and skin layer becomes mandatory. Various flaps have been used to make as intermediate layer in complex fistula closure namely tunica vaginalis, scrotal dartos and external spermatic fascia with good success rates varying from 0 to 100% in various series.[8,10,12-14]

We have used a tunica vaginalis flap to repair complex fistulas in our series of 14 patients. Snow *et al* used the tunica vaginalis to wrap the neourethra at the time of primary repair of hypospadias as well as in urethrocutaneous fistulas repair for the first time.[8] Since then many authors have augmented the hypospadias repair using the tunica vaginalis flap with satisfactory results.[15-18] Tunica vaginalis has several advantages as an adjunct for closure of recurrent urethrocutaneous fistula. It is thin, elastic, expandable, highly vascular, easy to harvest and close to penile shaft. Tunica vaginalis

free graft have also been used in repair of fistulas but the main advantage of using the tunica vaginalis flap for the repair of recurrent urethrocutaneous fistulas over tunica graft is preservation of its blood supply.[2,19] The technique of harvesting the tunica vaginal is a flap is simple and applicable to a all age groups but meticulous dissection is employed to avoid damaging the spermatic vessels, vas deferens, epididymis or testis. Tunica vaginalis flap harvesting and wrapping on the neourethra can be done either by same incision used for fistula closure or harvesting of flap by scrotal incision and putting it on neourethra via a subcutaneous tunnel.[8,18] In the present study we have used a tunnelled tunica vaginalis flap repair in eight patients and in rest six patients harvesting and wrapping of neourethra was done by same incision. The complications of this procedure which are reported includes scrotal haematoma and abscess in 2.2% of cases in one series.[15] In our study one patient (7%) had scrotal haematoma that needed drainage, this can be avoided by putting a glove drain into scrotum which we are routinely doing after this complication. Others complications like ascent of ipsilateral testis,[17] severe penile torque observed by some authors[20] but we have not encountered these in our series. These can be avoided by careful mobilization of TVF and separating the cremasteric fibres from this flap.

The relatively high success of recurrent urethrocutaneous fistula repair with other techniques raises the question of whether the use of a tunica vaginalis flap is overskill and if a simple procedure may suffice. But as recurrent fistula is rarely simply closed any additional procedure adds sometimes to the duration of the surgery and the additional time required for harvesting of the tunica and positioning it on the urethral suture line is relatively short. Moreover, the fact that we could achieve high success rate (>90%) of fistula closure in recurrent cases convinced us to recommend that TVF is warranted in a majority of cases of recurrent urethrocutaneous fistula.

CONCLUSION

Repair of recurrent urethrocutaneous fistula with a tunica vaginalis flap is highly effective regardless of fistula location and number, type of initial hypospadias repair and number of previous closure attempts. This flap is easily mobilized and provides good coverage for neourethra. It is a simple procedure without any significant postoperative sequelae.

REFERENCES

1. Horton CE, Devine CJ, Graham JK. Fistulas of the penile urethra. Plast Reconstr Surg 1980;66:407-18.
2. Landau EH, Gofrit ON, Meretyk S, Katz G, Golijanin D, Shenfeld OZ, *et al*. Outcome analysis of tunica vaginalis flap for thre correction of recurrent urethrocuteneous fistula in children. J Urol 2003;170:1596-9.
3. Richter F, Pinto PA, Stock JA, Hanna MK. Management of recurrent urethral fistulas after hypospadias repair. Urology 2003;61:448-51.
4. Dennis MA, Walker RD. The repair of uret hral fistulas occurring after hypospadias surgery. J Urol 1982;128:1004-5.
5. Mohamed S, Mohamed N, Esmael T, Khaled S. A simple procedure for management of urethrocutaneous fistulas; post-hypospadias repair. Afr J Paediatr Surg 2010;7:124-8.
6. Ahuja RB. A de-epithelised turnover dartos flap in the repair of urethral fistula. J Plast Recontr Aesthet Surg 2009;62:374-9.
7. Belman AB. De-epithelised skin flap coverage in hypospadias repair. J Urol 1998;140:1273-6.
8. Snow BW. Use of tunica vaginalis to prevent fistulas in hypospadias surgery. J Urol 1986;136:861-3.
9. Amukele SA, Stock JA, Hanna MK. Management and outcome of complex hypospadias repair. J Urol 2005;174:1540-3.
10. Motiwala HG. Dartos flap: An aid to urethral reconstruction. Br J Urol 1993;72:260-2.
11. Hayashi Y, Mogami M, Kojima Y, Mogami T, Sasaki S, Azemoto M, *et al*. Results of closure of urethrocutaneous fistula after hypospadias repair. Int J Urol 1998;5:167-9.
12. Retik AB, Mandell J, Bauer SB, Atala A. Meatal based hypoapadias repair with the use of a dorsal subcutaneous flap to prevent urethrocutaneous fistula. J Urol 1994;152:1229-31.
13. Yamataka A, Ando K, Lane GL, Miyano T. Pedicled external spermatic fascia flap for urethroplasty in hypospadias and closure of urethrocutaneous fistula. J Paediatr Surg 1998;33:1788-91.
14. Churchill BM, Savage JG, Khoury AE, Mclorie GA. The dartos flap as an adjunct in preventing urethrocutaneous fistula in repeat hypospadias surgery. J Urol 1996;156:2047-9.
15. Snow BW, Castwright PC, Unger K. Tunica vaginalis blanket wrap to prevent urethrocutaneous fistula: An 8 years experience. J Urol 1995;153:472-3.
16. Singh RB, Pavithran NM. Tunica vaginalis interposition flap in the closure of massive disruption of the neourethral tube (macrourethocutaneous fistula). Pediatr Surg Int 2004;20:464-6.
17. Handoo YR. Role of tunica vaginalis interposition layer in hypospadias surgery. Indian J Plast Surg 2006;39:15-6.
18. Routh JC, Walpeol JJ, Reinberg Y. Tunneled tunica vaginalis flap is an effective technique for recurrent urethrocutaneous fistulas following tubularised incised plate urethroplasty. J Urol 2006;176:1578-81.
19. Voges GE, Reidmiller H, Honenfellner R. Tunica vaginalis free grafts for closure of urethrocutaneous fistula. Urol Int 1990;45:88-99.
20. Pattaras JG, Rushton HG. Penile torque after the use of tunica vaginalis blanket wrap as an aid in hypospadias repair. J Urol 1999;161:934-5.

Cite this article as: Kadian YS, Rattan KN, Singh J, Singh M, Kajal P, Parihar D. Tunica vaginalis: An aid in hypospadias fistula repair: Our experience of 14 cases. Afr J Paediatr Surg 2011;8:164-7.

Source of Support: Nil. **Conflict of Interest:** None declared.