

DISTAL PENILE FASCIOCUTANEOUS FLAP FOR STRICTURE DISEASE OF ANTERIOR URETHRA

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ABSTRACT

Objectives:

To develop curative treatment for complex stricture disease involving anterior urethra.

Patients and methods:

A series of 20 patients with a median age of 35 years with history of repeated optical internal urethrotomies >5, underwent surgery. Stricture site and length was evaluated by Retrograde and Antegrade urethrogram. Stricture calibration was done by retrograde ureteric catheter insertion of variable sizes. Onlay or tubular flap applied over partial or blind stricture respectively ranging from 5 cm to 15 cm.

Results:

Period of follow up 24 months. Complications like patchy necrosis of penile skin (3) ext. meatal stenosis (2), Fistula (1) stricture at anastomotic site (1) and post void dribbling (5) were noted. Patient's quality of life improved.

Conclusion:

Distal penile fasciocutaneous flap is effective tool for recurrent stricture disease involving anterior urethra.

Keywords: Fasciocutaneous flap (FCF), optical internal urethrotomy, retrograde, antegrade, urethrogram.

INTRODUCTION

Complex anterior urethral strictures are challenging cases even for experienced reconstructive urologist. Stricture disease causes a great suffering to the affected person because of its recurrent nature. Direct perineal trauma, urethral catheterization, urethral instrumentation and sexually transmitted diseases commonly lead to stricture formation. Some cases may be idiopathic like straddle injury in childhood,

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forgotten later on in adulthood (1). However urethral stricture if left untreated may lead to voiding dysfunction, urinary tract infection,

bladder thickening, bladder diverticulum, urethral diverticulum and urinary fistula.

The distal penile circular fasciocutaneous flap technique of urethroplasty was first reported in 1993 by McAninch (2). Short bulbar stricture may be cured with a single optical internal urethrotomy. In those patients where optical internal urethrotomy fails, end to end anastomotic urethroplasty is highly successful when stricture length is <2 cm. In long complex stricture involving the anterior urethra, there is no general consensus on the management. However 1-stage repair is preferred over traditional management of 2-stage repair. With the advancement in tissue transfer technique, free grafts made of skin or mucosa and pedicled flaps or combined approaches are practised these days.

We used distal penile FCF-technique because of its different advantages. It is close to the urethra, hairless and reliable. Stricture length up to 15 cm can be managed. The main

advantage is that operation involves only one area and there is no second wound involving other part of the body like mouth in case of oral mucosal graft. This technique is also suitable for previously circumcised men. Here we present our experience with FCF-technique used for radical treatment of stricture disease involving the anterior urethra in 20 patients.

PATIENTS AND METHODS

The study was conducted in Department of Urology Tertiary Care Hospital. A series of 20 male patients with age range 12 years to 50 years both circumcised and uncircumcised were included in the study. The patients with diseased prepuce skin like lichen sclerosus (Balanitis xerotica obliterans) and history of hypospadias surgery were main exclusion from our study.

Patients were evaluated by relevant history and focused physical examination to assess about number of surgical procedures done in the past and also to assess about the availability of healthy penile skin. Stricture site and length was evaluated by antegrade and retrograde urethrogram. Urethral stricture was considered blind which did not allow 3 Fr. ureteric catheters to pass during cystourethroscopy. Distal penile fasciocutaneous onlay or tubular-flaps applied over partial or blind strictures respectively ranging from 5–15 cm.

Neourethra made over silicon catheter selected according to patient's age. Corrugated drain removed next day. Silicon catheter removed on 20th Post operative day. Patients were followed 3 monthly for 2 years. Evaluated clinically (by asking questions about the caliber and force of stream) and radiologically (by urethrogram). Urethroscopy was also performed if indicated.

RESULTS

There were 20 patients in our study. The patients ranged in age from 12 to 50 years with mean age 35 years. Peak age incidence 85% (17/20) was between 20 to 45 years. Among 20 patients 18 were with partial strictures and 2 were with blind strictures. All patients underwent repeated internal urethrotomies (>5 times) in the past and one

patient also underwent end to end bulbar urethral anastomosis.

Among 20 patients 18 were with strictures involving penile part of urethra and 2 were at bulbar level. Eighteen strictures involving penile part of urethra, were ranging 8-15 cm in length while 2 strictures involving bulbar part of urethra were 5 cm in length.

The onlay Flap applied in 18 patients with partial strictures while tubularized flap was prepared and applied in 2 patients with blind strictures. Duration of surgery was 2-3 hours. Post operative period was uneventful. Catheter removed on 20th post operative day. Patients were voiding satisfactorily and were followed 3 monthly for 2 years. Three patients (3/20) developed patchy necrosis of penile skin on 6th post operative day and it healed with dressing only. Two patients (2/20) developed external meatal stenosis that responded to dilatation and one patient developed fistula that healed with catheterization. One (1/20) patient developed stricture at anastomotic site, it required optical internal urethrotomy. Five (5/20) patients complained post void dribbling. In one patient (1/20) with tubularized flap, ischemia was observed.

Apart from these complications, all patients were voiding satisfactorily with adequate caliber and force of stream. Final success rate of our study was (19/20) 95% at the end of two years including one optical internal urethrotomy.

DISCUSSION

Treatment of stricture disease of urethra is among the oldest medical practice by the human beings. In ancient medical history Indians and Egyptians used wood, papyrus, feathers and metals as urethral dilators or as hollow stents to overcome urinary obstruction approximately 600 BC (3). Even now treatment of complicated and extensive urethral stricture disease is still a challenging task and tests the skill of a urological surgeon.

In recent years still there is no widely accepted standard approach for repair of long and complicated stricture disease of anterior urethra. With the advancement in tissue

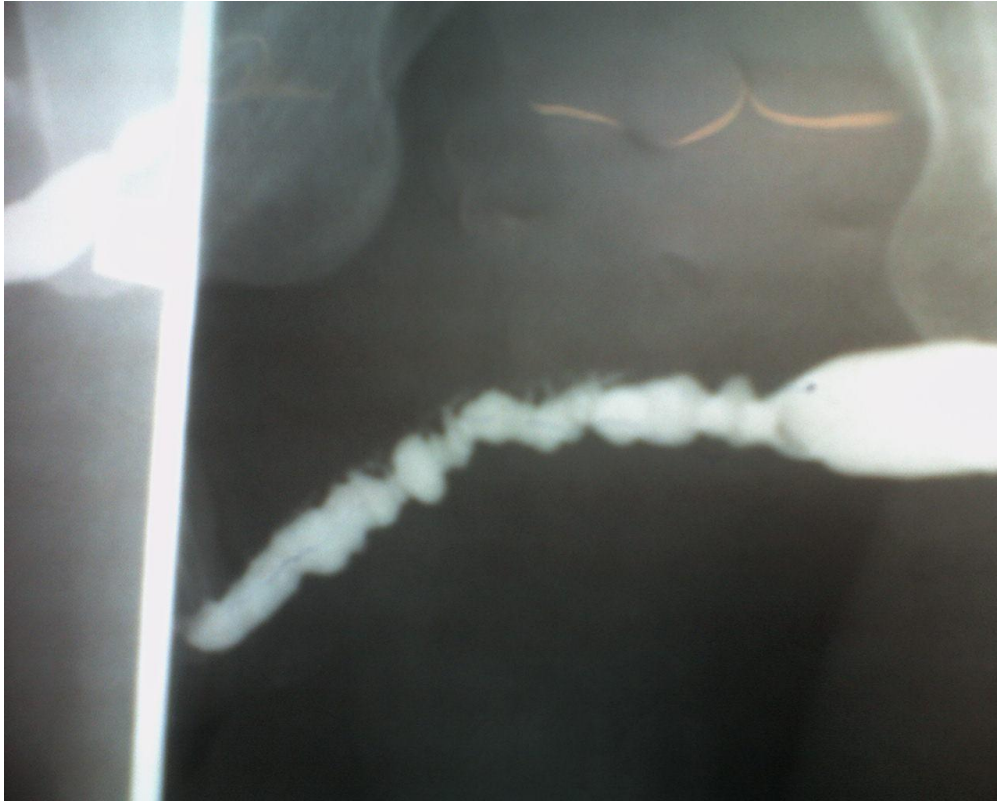


Figure 1. Ascending urethrogram revealing complicated stricture involving anterior urethra



Figure 2. Ascending urethrogram after fasciocutaneous flap application

Table 1 Complications of fasciocutaneous flap

Complications	No. of patients	Total patients	%age
Patchy necrosis	3	20	(3/20) 15%
Ext.Meatal stenosis	2	20	(2/20) 10%
Fistula	1	20	(1/20) 5%
Stricture at anastomotic site requiring urethrotomy	1	20	(1/20) 5%
Post void dribbling	5	20	(5/20) 25%
Tubularized Flap Ischemia	1	20	(1/20) 5%

Table 2. Different kind of etiologies in complicated strictures

Etiology of strictures	No. of patients	Total patients	% Age
Trauma RTA	2	20	10%
Instrumentation	11	20	55%
Idiopathic	2	20	10%
Infection	1	20	5%
Catheterization	4	20	20%

mobilization technique, a variety of tissues have been used for urethral reconstruction like full thickness penile skin pedicled flaps, penile skin grafts, scrotal skin flaps, bladder, buccal colonic and lingual mucosal grafts (4). However, no single technique or single tissue is appropriate for all cases. The ideal characteristics of tissue used for reconstruction urethroplasty should be:

1. Simple, safe
2. Reliable, reproducible
3. Causing less morbidity to the donor site
4. Vascularity should be adequate
5. Physical characteristics of flap/graft should be compatible with recipient site.

We preferred distal penile fasciocutaneous flap because it is hairless, reliable, durable causing less morbidity to donor site, and having adequate blood supply. It can be prepared from 5 to 15 cm in length according to the length of stricture involving the anterior urethra extending from external urinary meatus upto membranous urethra. Jill Buckley and Jack McAninch (5) described similar characteristics of penile fasciocutaneous flap in their experience.

Free genital skin grafts can also be used for short strictures <5 cm but their deterioration over time leading to progressive fibrosis is major disadvantage. The pedicled flap has its superiority because of its continuous blood supply and its deterioration over time leading to stricture formation has rarely been reported (2).

In other series oral mucosa and even Tunica albuginea were used for pan urethral strictures claiming comparable success (6,7), but we have reservations regarding other urethroplasty approaches.

Oral mucosa graft urethroplasty is current reference standard for short strictures <5 cm although long term studies are lacking. In long strictures, extensive graft harvesting from both cheeks as well as the lower lip is required, leading to bleeding and post operative morbidity. However, oral graft harvesting of any size is not without complication. In one series, 50% of the patients had donor site pain worse than expected, 26% had perioral numbness lasting longer than six months and 9% of the patients have permanent changes in mouth opening (5). Moreover increasing patient's age, poor oral hygiene, long term tobacco use, leukoplakia and dental prosthesis are presumed contraindications for oral mucosa graft.

Penile fasciocutaneous flap technique is used for all types of strictures preferably for long strictures >5 cm. Importantly only contraindication is lichen sclerosis. Plastic surgeons involved in oral mucosal grafting accept that skin is easy to harvest but its keratinized character lead to postoperative contracture and stricture formation in cases when used as a graft (6). In contrast to free genital skin graft, flaps does not develop contracture due to their continued blood

supply. In our 2 years follow up we have not observed flap deterioration leading to stricture formation. In only one case, stricture at the site of union of flap end with normal urethra-anastamotic site-was observed.

In literature the complications are reported differently (2, 3, 8). Olajide *et al.* described commonest complication being infection like wound infection 9.1%, urosepsis 3.6% and epididymo orchitis in 8.1% of the patients. They also reported recurrence of stricture in 1.8% requiring substitution urethroplasty, Fistula in 3/55 (closed spontaneously on conservative therapy) and urethral diverticulum in 3/55. However, overall success rate was 93 %.

Zaki M. reported scrotal oedema 3/30, infection 2/30, transient neuropathy 1/30, flap ischemia 1/30, fistula 1/30, chordee 2/30 and restructre 4/30 in his series. Transient neuropathy was ascribed to lithotomy position when prolonged for more than 5 hours. Success rate in his series was 85.8%. The operative time in his series was 4-5 hours.

Similarity Christian Schwentner *et al.* reported penile hematoma 2/30, post void dribbling 9/36 glandular dehiscence 2/36 and stricture recurrence 1/36. However success rate in his series was 94.4% including single urethrotomy.

When compared to our series minor complications are almost similar but we have not encountered infective complications, and transient neuropathy. Moreover average duration of surgery in our series was 160 minutes. It is to mention that surgery is performed in lithotomy position. With regard to the development of neuropathy lithotomy position is prolonged up to 4-5 hours (3).

More over we have vast experience in hypospadias surgery which contributed to short learning curve and limited operative time. It may also explain why we did not observe injuries related to lithotomy position like, peripheral nerve injury or thromboembolic events. It may also explain why we did not encounter infective complications. It has been reported that penile skin flap urethroplasty has post operative highest incidence of sexual dysfunction when compared to primary urethral anastomosis and buccal mucosal grafting (9). It was attributed to extensive fibrosis in periurethral tissues and extensive genital dissection.

In our series and after 2 years follow up we have not observed such incidence of sexual dysfunction. Christian *et.al* also reported that sexual function was preserved in all his cases. We have the opinion that best results of fasciocutaneous flaps are obtained when used as onlay reconstruction it is also reported by other series as well (2, 5). Post void dribbling was observed in 25% of cases which is comparable to other series (2). However some degree of post void dribbling may occur after any kind of substitution urethroplasty. Even normal patients also complain this problem. It may be attributed due to lack of appropriate flap width leading to redundancy and sacculation. However, further experience in this field may decrease this bothersome complication.

Despite all the success with results up to 95%, however the substitution urethroplasty is delicate and prolonged procedure, associated with complications. In future there is need to develop some medicine which should prevent stricture formation although experimental work is underway on animal model (10).

CONCLUSION

Distal penile fasciocutaneous flap is straight forward procedure when performed in skilled hands. It can be used for any length stricture but is optimal for longer >5 cm or multiple anterior urethral stricture. Application of onlay reconstruction is preferable over tubularized flap whenever possible. Non-hirsute nature, predictable blood supply, adequate mobility, donor site acceptable cosmesis and preservation of sexual function are main characteristics of penile fasciocutaneous flap. We advocate distal penile fasciocutaneous flap technique an important and effective tool for radical treatment of stricture disease of anterior urethra where extensive spongiofibrosis is associated.

REFERENCES

1. Waxman Steve W, Morey and Allen F. Management of urethral strictures. *The lancet* 367. 9520, (April 29-May 5, 2006): 1379-80.

2. Christian Schwentner, Joerg Seibold and Daniela Colleselli *et al.* Anterior urethral reconstruction using the circular fasciocutaneous flap technique: Long term follow up. *World J Urol* 2011, 29: 115–120.
3. Zaki M and El Dahshoury. Modified annular penile skin flap for repair of pan-anterior urethral stricture: *Int. Urol. Nephrol* (2009) 41: 889–894.
4. Yue Min Xu, Ying-Longsa and Qiang Fu. *et al.* Oral mucosal grafts urethroplasty for the treatment of long segmented anterior urethral strictures. *World J. Urol* (2009) (27): 565–571.
5. Jill Buckley and Jack McAninch. Distal penile circular fasciocutaneous flap for complex anterior urethral strictures. *British Journal of Urology* 2007; 100: 221–231.
6. Mungadi, I and Ughoko V. Oral mucosa grafts for urethral reconstruction. *Annals of African Medicine* 8. 4 Dec. 2009: 203–9.
7. Mathur Raj K, Sharma and Adilthy. Tunica Albuginea urethroplasty for panurethral strictures. *Urology Journal* 7.2 (spring 2012) 120–4.
8. Olajide Abimbola O, Salako, Abdulkader A, Aremu, Ademola A *et al.* Complications of transverse distal penile Island flap Urethroplasty of complex anterior urethral stricture. *Urol J* 2010; 7: 178–2.
9. Joshua Carlton, Maharshi Patel and Allen F. Morey. Erectile function after urethral reconstruction. *Asian Journal of Andrology* 2008; 10(1): 75–78.
10. Andersen HL, Duch BU, Gregersen H *et al.* The effect of the somatostatin analogue lanreotide on the prevention of urethral strictures in a rabbit model. *Urol. Res.* 2003; 31: 25–31.

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