

Long anterior urethral stricture: Reconstruction by dorsally quilted penile skin flap

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Abstract

Objectives: We'd like to present our experience in treating long (>5 cm) anterior urethral stricture by penile skin flap as dorsal on-lay in one-stage procedure.

Patient and Methods: Between January 1998 and December 2010, 18 patients (aged from 28-65 years) presented with long urethral stricture, 5.6-13.2 cm, (penile in 6, bulbar in 2, and combined in 10 cases), those were repaired utilizing long penile skin flaps placed as dorsal on-lay flap in one-stage (Orandi flap 6 cm in 6 cases, circular flaps 7-10 cm in 8, and spiral flaps 10-15 cm in 4). Uroflowmetry and RUG were done following catheter removal and at 6 and 12 months.

Results: The urethral patency was achieved in 77% of patients. The complications were fistula in 1 patient (5.5%), re-stricture occurred in 3 patients (16.6%) that required visual internal urethrotomy (VIU), and 2 patients (11%) showed curvature on erection that did not interfere with sexual intercourse. Diverticulum (penile urethra) was seen in 1 patient (5.5%) containing stones and was excised surgically. There was penile skin loss in 3 patients (16.6%). All patients completed at least one year follow-up period.

Conclusion: Free penile skin flaps offer good results (functional and cosmetic) in long anterior urethral stricture. Meticulously fashioned longitudinal, circular or spiral penile skin flaps could bridge urethral defects up to 15 cm long.

Key Words: Dorsally quilted flaps, urethroplasty, urethral stricture

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Received: 25.02.2012, Accepted: 07.04.2012

INTRODUCTION

No single approach is appropriate for all urethral strictures. For surgical repairs, proper procedure selection and surgical expertise are of paramount importance.^[1] The reconstructive surgeon should be fully familiar with the use of both flaps

and grafts to deal with any condition of the urethra at time of surgery.

Controversies exist over the best means of reconstructing the anterior urethra.^[2] Penile skin flaps, which have ample vascular pedicle, were considered the most reliable material for reconstruction of long or complex stricture.^[3] Dorsal placement of penile skin flaps and free grafts has yielded superior outcomes compared to ventral placement.^[4]

The objective of this prospective study is to present the results of reconstruction of long (>5 cm), anterior urethral stricture by penile skin flap as dorsal on-lay in one-stage procedure.

Access this article online	
Quick Response Code:	Website: www.urologyannals.com
	DOI: 10.4103/0974-7796.115735

PATIENTS AND METHODS

During the period from January 1998 to December 2010, 18 patients having long anterior stricture were repaired utilizing long penile skin flaps placed as dorsal onlay flap in one stage. All patients underwent routine laboratory investigations (e.g., complete blood count, blood urea and serum creatinine, bleeding profile, and random blood sugar), upper tract evaluation by ultrasonography (US), uroflowmetry (the mean peak flow rate was 7.3 ml/s.), retrograde urethrography (RUG) both dynamic and static, micturating cystourethrography (MCUG), and sonourethrography in some cases.

The age of patients was 28-65 years (mean 39.3 year). The etiology of stricture was iatrogenic in 8 cases and post-inflammatory in 10 cases. The stricture length was 5.6-13.2, located at the penile urethra in 6 cases, bulbar urethra in 2 cases, and was combined in 10 cases. All patients were primarily repaired and had ample healthy penile skin with variable flap length where it was 6 cm in 6 cases subjected to Orandi flap [Figure 1], 7-10 cm in 8 cases with circular fasciocutaneous penile flap [Figure 2], and 10-15 cm in 4 cases with spiral flaps [Figure 3], as was summarized in Table I. Regarding the technique, the urethra was completely mobilized from the underneath corpora cavernosa and rotated 180 degrees; then, dorsal stricturotomy was done, penile skin flap was applied as a dorsal onlay, and the urethra was fixed to its bed. If penile skin is deficient, U-shaped scrotal flaps were raised for coverage. Indwelling urethral catheter was left for 3 weeks plus supra-pubic cystocath, which was left clamped under dressing. Pericatheter urethrogram was done three weeks; was there any leakage, the catheter was left inside. The cystocath was removed after voiding well with minimal residual urine. Uroflowmetry and RUG were done following catheter removal and at 6 and 12 months.

RESULTS

All 18 patients were subjected to flap urethroplasty. The urethra was patent in 14 patients (77%). The mean peak flow rate improved to 22.7 ml/s. The radiographic picture of the reconstructed urethra in RUG was excellent and close to that of a normal urethra in 14 patients in terms of caliber and a smooth transition of the dye into the urethra at both ends. The post-operative complications were as follows; fistula in 1 patient (5.5%), re-stricture occurred in 3 patients (16.6%) and required visual internal urethrotomy. Failure was considered when there was a need for any subsequent urethral procedure as visual internal urethrotomy, urethral dilatation, or urethroplasty. Two patients (11%) showed curvature on erection that did not interfere with sexual intercourse. Diverticulum (in penile urethra) was seen in 1

patient (5.5%) with stones, and was surgically removed and the urethra reconstructed [Figure 4]. There was penile skin loss in 3 patients (16.6%). All patients completed at least one year follow-up period.

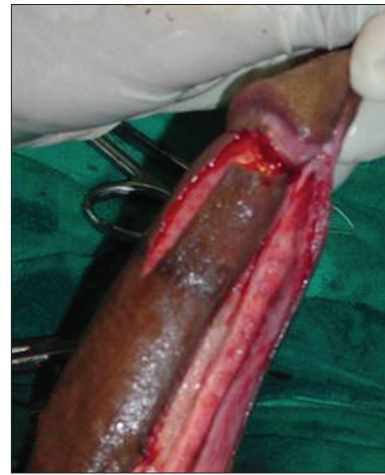


Figure 1: Orandi (longitudinal) penile skin flap



Figure 2: Circular penile skin flap



Figure 3: Spiral penile skin flap

Table 1: Flap characters and outcomes of urethroplasty

Type of skin flap	Length of the flap	Complications (%)
Longitudinal flap (n=6)	6 cm	Urethral patency 14/18 (77)
Circular flap (n=8)	7-10 cm	Fistula 1 (5.5)
Spiral flap (n=4)	10-15 cm	Restricture 1 (5.5)
		Curvature on erection 2 (11)
		Penile skin loss 3*(16.6)
		Diverticulum 1 (5.5)

* After completing repair, the penis was covered by U-shaped scrotal flaps



Figure 4: Ascending urethrography showed a diverticulum in the penile urethra

DISCUSSION

Penile island flap urethroplasty provides well-vascularized, versatile, and reliable tissue for urethral substitution. It is an ideal procedure for long stricture in the distal urethra.^[5]

In our small series of patients, circular (7-10 cm in 8 patients) and spiral flaps (10-15 cm in 4 patients) were fashioned and rotated to be dorsally quilted into the dorsally opened strictured part of the urethra, either in penile, bulbar or bulbopenile urethra without vascular compromise. The longitudinally fashioned flaps (6 cm in 6 patients) (Orandi) were comfortably used for penile stricture.^[6-8] The success rate for all penile skin flaps was 77% in our hands approaching that recorded by others.^[9-11]

Although there is no reported comparison of dorsally and ventrally quilted onlay flap urethroplasty, in our initial experience, dorsal placement was better than ventral placement because: (a) The postoperative radiographic studies showed a near normal restoration of the anatomical appearance of the urethra; (b) There is no sagging, sacculation, and resultant post-void dribbling as seen in ventral placements because of the flap sits on the roof of the urethra and fuses with crura; (c) The incidence of postoperative fistula is very low. Dorsal

placement of the flap has many advantages; it can be extended to reconstruct meatal or glanular stricture, can be extended proximally up to the bulbo-membranous region, and can be combined with free graft.^[12]

Most of the complications with skin flap urethroplasty are recurrent stricture, troublesome post-void dribbling, and diverticulum formation.^[13]

In our study, 1 patient only developed a diverticulum (5.5%) containing stones, which was removed surgically. In other studies, the stricture recurred in 5 patients (11%) within a median follow-up of 27.5 months, and of 30 patients with pedicled dorsally quilted penile skin flaps, urethral stricture recurred in 5 patients (16.6%). Re-stricture in our study was encountered in 16.6% (3/18) of patients.^[12,14]

Any kind of substitution urethroplasty deteriorates over time. Long-term results with skin flap urethroplasty show a decreasing success rate with time.^[15] Dorsally quilted penile skin flap urethroplasty seems anatomically more logical; in our hands, the early outcome of this technique is encouraging, but long term follow-up is needed to evaluate the outcomes, especially the recurrence of the stricture.

Free penile skin flaps offer good results (functional and cosmetic) in long penile and/or bulbar urethral stricture. Meticulously fashioned longitudinal, circular, or spiral penile skin flaps could bridge urethral defects up to 15 cm long.

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How to cite this article: Abdel-Kader MS, Gadelmoula M, Elderwy A, Elgammal M, Abuzeid AM. Long anterior urethral stricture: Reconstruction by dorsally quilted penile skin flap. Urol Ann 2013;5:163-6.

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

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