

Use of Circumferential Fasciocutaneous Penile Skin Flap In The Reconstruction of Complex Urethral Strictures

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ABSTRACT

- Objective* To find out stricture free rate of penile circumferential fasciocutaneous skin flap use in complex urethral strictures.
- Study design* Descriptive case series.
- Place & Duration of study* Surgical Unit Khyber Teaching Hospital and Hayatabad Medical Complex Peshawar, from January 2000 to December 2009.
- Methodology* All patients with complex urethral strictures, more than 4cm long, were included. Patients were followed-up for two years and on each visit ascending urethrogram was performed.
- Results* A total of 48 patients with complex urethral strictures were managed. The average length of the stricture was 06cm (range 04-12cm). Total operation time was 01-03 hours (mean 02 hours). Late postoperative complications included recurrent strictures (25%), urethrocutaneous fistula (4.2%), erectile dysfunction (8.3%) and mild postmicturition dribbling (8.3%). The overall success rate at the end of two years follow-up was 75 % (n=36).
- Conclusion* Circumferential fasciocutaneous penile skin flap for urethroplasty is a good option for managing complex urethral strictures with acceptable postoperative morbidity.
- Key words* Fasciocutaneous skin flap, Complex urethral stricture, Urethroplasty.

INTRODUCTION:

Reconstruction of complex urethral strictures is a major challenge to surgeons. There is extensive urothelial scarring and fibrosis of the surrounding corpus spongiosum that is difficult to handle. Various methods are in vogue for the management of these strictures. It includes dilatation, internal optical urethrotomy, urethral stenting and urethroplasty.¹ For extensive scarring, urethroplasty gives best results.² It can be in the form of excision and end to end anastomosis for shorter strictures (<2 cm). For longer strictures, in order to bridge the gap, skin or mucosa is needed as onlay or substitution urethroplasty.¹⁻³

Circumferential fasciocutaneous penile skin flap

urethroplasty was described in 1993.⁴ This technique was the modification of method described by Quartey.⁵ This was indeed a breakthrough technique to manage the complex urethral strictures in one stage. In this technique a 2.5 cm wide circumferential island of distal penile skin or foreskin is mobilized on a vascularized pedicle for urethral substitution. This provides a strip of hairless skin which is harvested from the same scrubbed surgical field. Other advantage is that it provides a long strip of skin of about 13-15 cm (even in circumcised patients).

Early reports have proven the skin to be a reliable urethral substitution, particularly when the dorsal urethral plate is preserved. This technique is easy to learn and has minimal complications at donor site.⁶ Buck's fascia provides support to vascular pedicle, penile nerve and deep dorsal veins remain intact with resultant no neurovascular deficit to the shaft or glans penis. Controversy over the best means of reconstructing the penile urethra has been renewed

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and in recent years, free grafts especially buccal mucosa have been revisited, with fewer surgeons using genital flaps.⁷⁻⁹

The purpose of the current study was to evaluate the results of circumferential fasciocutaneous flap urethroplasty for complex urethral strictures in terms of postoperative morbidity.

METHODOLOGY:

This descriptive case series was conducted at Surgical Unit Khyber Teaching hospital and Hayatabad Medical Complex Peshawar, from January 2000 to December 2009. Patients with confirmed diagnosis of anterior and posterior urethral strictures (more than 04 cm) were included. Patients were investigated and an informed consent was taken regarding the type of operative procedure and possible postoperative complications.

Surgery was performed in lithotomy position. All patients were already circumcised. These patients had extensive spongiosal fibrosis where onlay technique was not possible. Midline incision was made to approach the bulbar urethra, while those with extensive stricture extending into the penile urethra were approached after degloving the shaft, scrotal bridge left intact. Patients having bulbomembraneous stricture with significant displacement of prostate needed simultaneous transpubic approach to gain access to the prostatic urethra.

A wide skin flap of 2-2.5cm was harvested from distal penis and mobilized to perineum via a tunnel created across the scrotum. After excision of the strictured urethra, skin tube was fashioned over a silicon catheter. The skin tube was anastomosed to the widely spatulated proximal and distal intact urethra. All patients had prior suprapubic catheter which was replaced during surgery. Suction drain was only used during transpubic approach.

Patients were mobilized on the first postoperative day and discharged on the third and fourth postoperative days. Patients were followed-up in OPD for two years. At first visit after one month, urethral catheter was removed and ascending urethrogram was performed. Patients with extravasation of urine were recatheterized for another two weeks. At second follow-up visit (2-3 months), if ascending urethrogram was normal, suprapubic catheter was removed. Further visits were at 4th, 8th, 12th, 18th and 24th months after surgery. At each visit, patients had ascending urethrogram and were inquired about any postoperative complications. Data was analyzed through SPSS Version 11.

RESULTS:

In this study of 48 patients, the age range was 12-56 year with a mean age of 24 +2.4 year. All patients were males. The etiology of stricture was trauma (61.8%), instrumental injury (17.7%) and infection (5.9%). In 14.7% cases, the stricture was idiopathic in nature. The average length of the stricture was 6 cm (range 04-12 cm). The total operation time was 01 -03 hours (mean 02 hours). There was no significant early complication like penile skin necrosis. Only one patient having transpubic approach needed evacuation of hematoma due to blockage of suction drain.

Late complications included recurrent stricture in 12 (25%) cases as shown in table I. Eight (66.6%) had stricture at the proximal anastomotic site and 02 (16.7%) had proximal and distal strictures, while 02 (16.7%) had complete urethral stricture. Nine cases were successfully managed with 1-2 sessions of internal optical urethrotomy. In 02 (25%) patients dilatation continued for 6-7 months and one (8.3%) patient underwent urethroplasty as two staged procedure. Urethrocutaneous fistula occurred in 02 (4.2%) cases along with recurrent stricture. This was successfully closed after 03 months under local anesthesia. Four (8.3%) patients had erectile dysfunction but all of them improved with passage of time and at the end of two years follow-up none of the patients had permanent impotence. Post operative mild urinary dribbling occurred in 04 (8.3%) cases. There was no neurovascular complication to the penile shaft or glans penis. The aesthetic result at donor site was excellent. At the end of two years follow-up, the overall success in terms of stricture free rate was 75% (n=21).

Table I: Postoperative Morbidity (n=48).

Complications	No. of Patients	%
Recurrent Strictures	12	25
Urethrocutaneous Fistula	02	4.2
Erectile Dysfunction	04	8.3
Postoperative Dribbling of Urine	04	8.3
Total	22	45.8

DISCUSSION:

Penile skin flap is a reliable urethral substitute for the management of complex urethral structures.⁶ It can be combined with other reconstructive techniques when necessary, like inferior pubectomy and corporal split, enabling one stage reconstruction

possible in majority of the cases.⁸ It also has superior results in cases where previous urethroplasty has failed. This technique is superior because it brings well vascularized tissue to the scarred area. Redundant or hair bearing urethral tissue from previous repair may be completely excised because the circumferential fasciocutaneous flap provides abundant tissue that is ideally suited for urethral substitution.

Wessells H et al compared outcomes of studies using free grafts and penile skin flap urethroplasty with similar success rates for both techniques (84.3% free grafts vs 85.9% for penile skin flaps).⁷ Traditionally penile skin flaps are preferred to free grafts for pendulous urethral reconstruction.^{10, 11} It is believed that a deficient corpus spongiosum and poor vascularity of this segment would not support graft take. Wessells H et al reported a high failure rate for graft placement in the penile urethra.⁷ Moreover, for strictures associated with significant spongiosal scarring, skin flaps are preferred to grafts due to poor quality graft bed. The main advantage of circumferential fasciocutaneous penile skin flap is its versatility and ease of technique since it can be used in all parts of urethra, that is from meatus up to the membranous urethra. In three cases, we constructed the urethra from meatus up to the membranous urethra. It is used both as onlay or transformed into tube for substitution of complex urethral structure. It can be used to cover simultaneously more than one area of stricture, as one stage reconstruction.

In our series two cases were successfully managed by splitting the flap to cover two different strictured areas. Cosmetic and functional aspect of donor site was least disturbed. In our study none of the patients had necrosis of penile skin or altered sensations of shaft. The reported incidence of superficial penile necrosis in various studies varies between 4-27%.¹² Kessler TM et al reported a higher incidence of reintervention for complications (hematoma evacuation, debridement of necrotic tissue, fistula excision and diverticulum resection) following skin flap procedures compared to free grafts.¹³

We also disagree with some authors who have moved against penile flaps due to complications of penile scar, torsion and ventral webbing.¹⁴ We did not experience any of the above complications. The circumferential flap leaves only a circumcising incision scar. Penile torsion and ventral webbing are rare complications of tubularized fasciocutaneous flap urethroplasty but it is avoidable

if flap is adequately mobilized.

Pedicled skin flaps have better long term results after urethral stricture surgery than free graft.¹⁵ Recurrent stricture is a main complication especially with tubularization. We had 12 (25%) patients with recurrent stricture which is comparable with international studies where recurrence rate of up to 48.7% is reported.^{5, 6, 12, 16} The 4.2% cases of urethrocutaneous fistula in the current study is acceptable by comparing to 0-4.7% reported in literature.^{5, 6, 16-18} The reason might be the use of polyglycolic instead of polydioxanone. Erectile dysfunction occurred in 8.3% cases, this figure is again higher than 0% reported in other studies for posterior bulbar and membranous urethra.⁴ This complication may be attributed to extensive dissection but with the passage of time these patients completely recovered. Postoperative mild dribbling was noted in 8.3% cases which is comparable to an international study.¹⁹ At the end of two years follow-up, the overall success in terms of stricture free rate was 75%. This figure is comparable to 79-86% reported in different studies.^{6, 10, 13}

CONCLUSION:

Fasciocutaneous flap technique is a good alternative for reconstruction of urethra in complex urethral strictures with acceptable postoperative morbidity.

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