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Original Research Article

Use of transverse penile fasciocutaneous flap in management of long segment anterior urethral stricture at the Jos university teaching hospital, Jos Nigeria

Chimaobi G. Ofoha*, Samaila I. Shu'aibu, Victor E. Onowa, Zingkur Z. Galam, Nuhu K. Dakum

Department of Surgery, Jos University Teaching Hospital, Jos Nigeria

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***Correspondence:**
Dr. Chimaobi G. Ofoha,
E-mail: drchimao@yahoo.com

ABSTRACT

Background: Urethral stricture may be defined as a narrowing of the lumen of the urethra due to scar tissue formation. It results from fibrosis and loss of compliance of the urethra leading to bladder outlet obstruction. Treatment of long segment urethral stricture is a huge challenge to the reconstructive Urologist. This study is to determine the aetiology of long segment urethral stricture, location of the stricture, use of distal transverse penile fasciocutaneous flap and the complications associated with the use of the flap.
Methods: Twenty two patients with long segment anterior urethral stricture from 2014 to 2017 at the Jos University teaching hospital were included in the study. Patient assessment included complete history including past interventions for the urethral stricture disease, physical examination and radiological examination. Patient's age, aetiology of stricture, stricture length, location of stricture, surgical management and complications were recorded.
Results: Twenty two consecutive patients were involved in the study. The mean age was 48.8years with a range of 35 to 70 years. Post infection accounted for 64% of the strictures while catheter induced inflammatory stricture accounted for 36%. The mean length of the stricture was 9.4cm, with a range of 5cm to 15cm. Penile fasciocutaneous flap was used in all the repairs. Overall complication was 27.3%.
Conclusions: Transverse penile fasciocutaneous flap is a well-vascularized pedicle and skin island. It is mobile and can be adapted to repair long segment anterior urethral strictures. Surgical complications include ring stenosis, penile skin necrosis and urethrocutaneous fistula.

Keywords: Anterior, Complications, Long segment, Transverse penile flap, Urethral stricture

INTRODUCTION

Urethral stricture may be defined as a narrowing of the lumen of the urethra due to scar tissue formation. It results from fibrosis and loss of compliance of the urethra leading to bladder outlet obstruction.[1] Urethral strictures could be Infective (inflammatory), traumatic, congenital or idiopathic in origin. Infective/ inflammatory causes include urethritis due to sexually transmitted infections, tuberculosis and balanitis xerotica obliterans. Traumatic causes include urethral instrumentation, perineal or straddle injuries, gunshot, stab wounds, pelvic fracture, transurethral resection of the prostate, prostatectomy, brachytherapy, hypospadias repair etc.[2,3]

Bladder outlet tract obstruction is characterized by poor urinary stream, straining at micturition, interrupted flow

and feeling of incomplete bladder emptying. These may culminate into urinary retention and other urinary tract complications such as bladder stones, urethral fistulae, abnormalities of the upper tract and renal failure.[4]

Urethral stricture disease impacts negatively on patients and their families. It affects their self-esteem. The psychological burden is quite significant especially when suprapubic cystostomy is done and patient has to use catheter for voiding while awaiting surgery. Sexual life is impaired and reproductive capacity is affected.

Treatment of long segment urethral stricture is a huge challenge to the reconstructive Urologist. The treatment might be single stage or a multi staged approach. It involves various forms of tissue transfer. These might be in the form of graft or flaps. The attending reconstructive Urologist must be versatile in the various aspects of tissue transfer for a successful outcome.[5]

The aim of this study is to determine the aetiology of long segment urethral stricture, location of the stricture, use of distal transverse penile flap and the complications associated with the use of the flap at the Jos University Teaching Hospital.

METHODS

Twenty two patients with long segment anterior urethral stricture from Jan 2014 to Dec 2017 at the Jos University Teaching Hospital were included in the study. Patient assessment included complete history including past interventions for the urethral stricture disease, physical examination, urine analysis, urine culture, blood sugar, serum electrolyte, urea and creatinine, abdominopelvic ultrasonography, micturating cystourethrogram and retrograde urethrogram (Figure 1). Chest X-ray and electrocardiography were done in patients above 50years or at risk of cardiovascular disease.

Figure 1: Retrograde urethrogram of long segment partial penobulbar stricture.

Surgical method

The patient is placed in a lithotomy position and the surgical area is prepared in the usual manner. We use a combined perineal and penile approach. An inverted Y-incision is made in the perineum and corpus spongiosum exposed. The stricture length is defined using antegrade and retrograde sound. A ventral urethrotomy is made on the stricture and the length of penile skin island flap required is assessed (Figure 2). The perineal wound is packed and penile dissection is commenced.

Figure 2: Ventral urethrototomy of a long segment stricture with penis invaginated.

Figure 3: Transverse penile fasciocutaneous flap, slit on the dorsum.

Figure 4: Penile skin necrosis, postoperative day four.

A distal transverse penile skin is marked, a circum coronal incision is made down to the Buck's fascia and the penis is degloved. The dissection is carried close to the corpus spongiosum into the perineum. A transverse penile skin island is measured (1-1.5cm) and mobilized on a circumferential based pedicle of dartos fascia (Figure 3).

The flap is slit on the dorsum and transposed into the perineum for the ventral onlay repair. The ventrally based penile skin island flap is anastomosed to the urethra using one layer technique with a 4.0 running vicryl suture. A 16-Fr silicone stenting catheter is passed after completion of one lip of the urethrotomy before completion of the anastomosis. The periurethral area is drained using a closed passive drain. The perineal and penile wounds are closed. Pressure dressing is applied to the perineal and penile wounds. A suprapubic tube is left for urinary diversion. Penile wound is inspected on day four after surgery (Figure 4). A pericatheter urethrogram is done twenty one days after surgery. If there's no evidence of extravasation, the silicone stenting catheter is removed. A uroflow is subsequently done to ascertain the flow characteristics before the suprapubic tube is removed. Routine follow-up is for twelve months.

RESULTS

Twenty-two consecutive patients were involved in the study. The mean age was 48.8years with a range of 35 to 70 years. The aetiology of the stricture was catheter induced urethral inflammation and post infection. Post infection accounted for 64% of the strictures (Figure 5). Penobulbar stricture was the commonest followed by penile stricture (Figure 6).

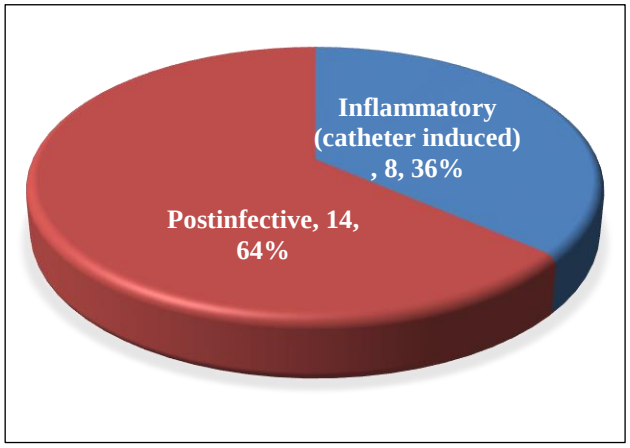

Figure 5: Aetiology of long segment urethral stricture.

The mean length of the stricture was 9.4cm, with a range of 5cm to 15cm. Penile fasciocutaneous flap was used in all the repairs, 82% (n=18) were transverse distal penile flap while 18% (n=4) were Q-flap. Overall complication was 27.3%. The complications were, ring stenosis (n=3), penile skin necrosis (n=2) and urethrocutaneous fistula (n=1) (Table 1).

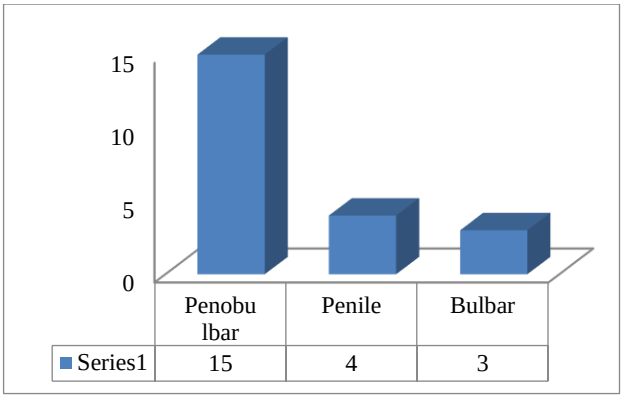

Figure 6: Distribution of the urethral stricture.

Table 1: Complications of ventral onlay penile fasciocutaneous flap.

Complication	Frequency
Ring stenosis	3(50%)
Penile skin necrosis	2(33.3%)
Urethrocutaneous fistula	1(16.7%)
Total	6(100%)

DISCUSSION

The mean age in this study was 48.8yrs. This is similar to the mean age in patients with inflammatory stricture in a study by Udoh et al.[4] However other authors have reported lower ages.[6,7] This can be explained by the preponderance of posttraumatic strictures in their studies.

In this study, stricture aetiology was either inflammatory reaction due to prolonged catheterization or postinfective from sexually transmitted infections. The commonest aetiology was postinfective from sexually transmitted infections. Postinfective urethral strictures typically arise from gonococcal urethritis. The paraurethral glands are abundant in the anterior urethra.[8] Bacteria invasion of this glands lead to periurethritis and abscesses. Resolution of the infection results in fibrosis and subsequent stricture formation.

Indwelling catheters elicit an inflammatory reaction from the urethral mucosa leading to stricture formation. Different materials are employed in the production of catheters. Materials such as latex play significant role in stricture formation. The chemical substances that dissolve from the catheter material can cause inflammatory reaction.[9] The pressure on the urethral epithelium, due to the presence of the catheter produces ischaemic necrosis with subsequent inflammatory reaction leading to fibrosis and narrowing of the urethral lumen.[10] Impaired drainage of the periurethral glands results in stasis. Bacterial colonisation leads to periurethritis. Healing is by fibrosis and stricture formation. Other proposed mechanisms include local allergic reaction to the catheter or lubricant used at time of placement of the catheter.[11]

Penobulbar stricture was the commonest in this study. It accounted for 68.2% of the strictures. This is similar to the findings by Alsagheer et al, who reviewed 56 patients with long segment anterior urethral stricture. He found that penobulbar stricture accounted for 68% of the strictures.[12]

Strictures greater than 8.5cm are described as long segment or panurethral stricture. They may be single or multifocal diseased areas of the penile and bulbar urethra.[13] These strictures are not ideal for anastomotic urethroplasty. Even where adequate mobilization of the stricture is possible, penile chordee is an ever-present risk that can affect the sexual well-being of the patient. Tissue transfer using flaps and grafts are viable alternatives to an otherwise bleak situation. The distal transverse fasciocutaneous penile flap, in suitably selected patient is an adequate choice for substitution urethroplasty. Its adaptability comes from its mobile, well-vascularized pedicle and elastic skin island that can be used from the membranous urethra to the fossa navicularis. Additionally, by dividing the flap it can provide two shorter flaps to reconstruct noncontiguous strictures.[14]

The Q-flap is a modification of the distal transverse penile flap. It has a ventral longitudinal extension thus appearing like a Q. This extension increases the length of the flap available making it easier to handle anterior panurethral stricture.

The mean stricture length in this study was 9.4cm. All the repairs employed the distal transverse penile fasciocutaneous flap and the Q-flap. The transverse fasciocutaneous flap reliably provided 12-15cm of length for reconstruction of the urethra. The use of distal transverse penile fasciocutaneous flap was popularised by McAninch.[15] It has been shown to be reliable in the management of long segment anterior urethral stricture. Atan et al, in his study of seventeen patients with long segment urethral stricture revealed that penile fasciocutaneous flap urethroplasty seemed to be a reasonable treatment option in the treatment of long segment urethral stricture.[16] Nadeem et al, in his study noted that the excellent results of the penile skin flap both in anterior urethral strictures and combined penile and bulbar urethral strictures are quite encouraging.[17]

The overall complication rate in this study was 27.3%. Ring stenosis at the point of anastomosis was the commonest (50% of the complications). Other complications encountered include penile skin necrosis and urethrocutaneous fistula. Ring stenosis was managed by visual internal urethrotomy. Urethrocutaneous fistula was treated by simple closure while penile skin necrosis required wound care. This is similar to the findings by Kim et al who reported surgical failure in 31.1% of their patients. He noted that focal recurrence occurred mainly at the anastomotic margin.[18] Nadeem et al, had a lower complication rate (16.7%). There was no urethral stenosis however he had infection with loss of flap and urethrocutaneous fistula.[17]

CONCLUSION

Panurethral strictures result from catheter induced urethral inflammation and post urethritis. This underscores the need for prevention and proper treatment of STIs. Use of appropriate catheter will reduce the incidence of catheter induced urethral stricture. Distal transverse penile fasciocutaneous flap is a well-vascularized pedicle and skin island. It is mobile and can be adapted to repair long segment anterior urethral strictures.

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REFERENCES

1. Temple CO, Vincent OO, Edwin O. The changing pattern of urethral stricture disease in Mid-western Nigeria. JMBR. A peer-review J Biomed Sci. 2006:5(2):50-4.
2. Lumen N, Hoebeke P, Willemsen P, De Taylor B, Pieters R, Oosterlinck W. Etiology of urethral stricture disease in the 21st century. J Urology. 2009;182(3):983-7.
3. Tritschler S, Roosen A, Füllhase C, Stief CG, Rübben H. Urethral Stricture: Etiology, Investigation and Treatments. Dtsch Arztebl Int. 2013;110(13):220-6.
4. Udo E. Is Post-Inflammatory Urethral Stricture Commoner Than Post-Traumatic Urethral Stricture? A Study in South-South Nigerian Hospital. Sch J App Med Sci. 2016;4(7F):2690-4.
5. Martins FE, Kulkarni SB, Joshi P, Jonathan Warner J, Natalia Martins N. Management of Long-Segment and Panurethral Stricture Disease. Advances in Urology. 2015.
6. Stein DM, Thum DJ, Barbagli G. A geographic analysis of male urethral stricture aetiology and location. BJU Int. 2013;112(6):830-4.
7. Ofoha CG, Shu'aibu SI, Akpayak IC, Dakum NK, Ramyil VM. Anastomotic Urethroplasty for Short Segment Bulbar Urethral Stricture; Experience at the Jos University Teaching Hospital, Jos. IOSR-JDMS. 2015;14(1):1-5.
8. Singh M, Blandy JP. The pathology of urethral stricture. J Urol. 1976;115(6):673-6.
9. Liedberg H. Catheter induced urethral inflammatory reaction and urinary tract infection. An experimental and clinical study. Scand J Urol Nephrol Suppl. 1989;124:1-43.
10. Latini JM, McAninch JW, Brandes SB, Chung JY, Rosenstein D. SIU/ICUD Consultation on Urethral Strictures: Epidemiology, Etiology, Anatomy, and Nomenclature of Urethral Stenoses, Strictures, and

Pelvic Fracture Urethral Disruption Injuries. Urology. 2014;83(3):S1-7.
11. Kulkarni S, Joshi P, Surana S, Hamouda A. Management of panurethral strictures. Afr J Urol. 2016;22(1):33-9.
12. Alsagheer GA, Fathi A, Abdel-Kader MS, Hasan AM, Mohamed O. Management of long segment anterior urethral stricture (≥8cm) using buccal mucosal (BM) graft and penile skin (PS) flap: outcome and predictors of failure. Int Braz J Urol. 2018;44(1):163-72.
13. Warner JN, Malkawi I, Dhradkeh M, Joshi PM, Kulkarni SB. Amultiinstitutional evaluation of the management and outcomes of long-segment urethral strictures. Urology. 2015;85(6):1483-8.
14. Buckley J, McAninch JW. Distal penile circular fasciocutaneous flap for complex anterior urethral strictures. BJU International. 2007;100(1):221-31.
15. McAninch JW. Reconstruction of extensive urethral strictures: Circular fasciocutaneous penile flap. J Urology. 1993;149(3):488-91.
16. Atan A, Tuncel A, Balcı M, Aslan Y, Köseoğlu E, Erkan A. Penile fasciocutaneous flap urethroplasty in long segment urethral stricture. Ulus Travma Acil Cerrahi Derg. 2014;20(6):427-31.
17. Nadeem A, Zafar MR, Alvi MS, Kiani F, Asghar M. Use of Penile Skin Flap in Complex Anterior Urethral Stricture Repair: Our Experience. Pak Armed Forces Med J. 2017;67(1):89-92.
18. Kim KR, Suh J, Paick J, Kim SW. Surgical Outcome of Urethroplasty Using Penile Circular Fasciocutaneous Flap for Anterior Urethral Stricture. World J Mens Men Healt. 2014;32(2):87-92.

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