Research Article

Surgical outcomes and complications of buccal mucosal graft and penile skin flap in treatment of long segment penile urethral stricture

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Abstract

Objective: To evaluate surgical outcomes and complications of local penile flap (LPF) urethroplasty and buccal mucosal graft (BMG) urethroplasty in management of long segment penile urethral strictures. **Patients and methods:** A total of 28 adult patients with long segment penile urethral stricture were included. We randomised patients to undergo either buccal mucosa dorso-lateral onlay graft or ventral onlay local penile skin flap urethroplasty. Successful treatment outcome was defined as no further treatment of the urethral stricture required after urethroplasty and peak flow rate > 15 ml/s. We compared the surgical outcomes and complication rate in both groups. **Results:** Mean follow up was 16.5 months in BMG group and 13.1 months in LPF group. Median intra-operative stricture length (67.5 mm in BMG group Vs. 85 mm in LPF group) was not statistically different between the two groups. Mean operative time was 197.14 min and 192.14 min in BMG group and LPF group respectively. Regarding complications, two patients (14.3%) in each group developed wound infection, one patient (7.1%) in LPF group had urinary fistula, one patient (7.1%) in LPF group showed recession of the meatus ending in subcoronal position and one patient (7.1%) presented by ventral chordee post operatively. In BMG group, only one patient (7.1%) developed mild limitation of mouth opening. The success rate in the BMG group was 92.9% while in the LPF group was 85.7%, this difference was statistically insignificant. **Conclusion**: On intermediate follow up, dorso-lateral onlay buccal mucosal graft and ventral onlay penile skin flap urethroplasty provide similar success rates. Since no statistically significant difference in outcomes and complication rates were observed between BMG and LPF, both techniques are recommended for the treatment of penile urethral strictures, based on the surgeon's expertise.

Key Words: buccal mucosal, penile skin flap, penile, urethral stricture

Introduction

Various surgical techniques are currently being used to repair penile urethral strictures with the goal of reducing morbidity and obtaining the best outcome with few complications.[1, 2]

The urologist is thus requested to be familiar with the use of various surgical techniques to deal with any condition of the urethra that might emerge at the time of surgery. Urethral reconstruction is a continuing challenge and excellent results can be obtained with today's techniques, with single-stage repairs on the increase and continued improvements in patient outcome[3].

Unlike bulbar strictures, length-sparing urethroplasty is essential in the reconstruction of a penile urethral stricture irrespective of the stricture length due to the risk of ventral curvature resulting from the shortened urethral length. Since the publiccation of the Orandi technique in 1968, urethroplasty using a penile skin flap has been the mainstay treatment. Unlike the Orandi technique, which used a longitudinal penile skin flap, McAninch suggested a circular fasciocutaneous flap for the recon-

struction of a penile urethral stricture in 1993. It is a useful technique with excellent cosmetic and functional outcomes because it is a hairless, flexible tissue having a rich vascular supply from the surrounding tissues.[4- 6]

Buccal mucosa graft (BMG) was first described for urethral reconstruction by Humby in 1941. It has become an ideal urethral substitute because of ease of harvest, surgical handling characteristics, and hairlessness, compatibility in a wet environment, and its early in-growth and graft survival. Because of these unique characteristics, buccal mucosa has endeared itself to the realm of reconstructive urology.[7, 8]

Methodology

This study was performed prospectively on patients with long segment penile urethral stricture from October 2014 to August 2017 at urology department, Kasr Alaini hospital and Minia university urology and nephrology hospital. Twenty eight patients with long segment penile urethral stricture were randomized to receive either dorso-lateral onlay buccal mucosa urethroplasty[14] or ventral onlay local penile skin flap urethroplasty[14]. Patients with lichen sclerosus and those with history of hypospadias repair were excluded.

Pre-operative evaluation included proper clinical history, physical examination, full preoperative laboratory investigations, urine analysis and urine culture, pelvi- abdominal ultrasonography for assessment of residual urine and upper tract affection, uroflo-wmetry, retrograde urethrography, voiding cysto-urethrography and urethra-scopy when needed. For Buccal mucosal graft group, Three days prior to surgery, the patient should repeatedly cleanse the mouth with a chlorhexidine mouth wash and continue to do so for the 3 days following surgery.

We randomized patients to undergo either buccal mucosa dorso-lateral onlay graft or ventral onlay local penile skin flap urethroplasty.

In both groups, the patient ambulates on the first postoperative day, and is discharged on the first or second postoperative day. In buccal mucosa graft group; the patient initially consumes a clear liquid diet and ice cream before advancing to soft diet then regular diet. All patients are maintained on oral antibiotics until the catheter is removed, four weeks later, pericatheter urethrography is done and the catheter is removed if no extravasation detected, patients with wound infection at the level of suture line had extended catheterization for 1 or 2 more weeks. Uroflowmetry, retro-grade urethrography and micturating cysto-urethrography were done after 3&6 months, or earlier if obstructive symptoms arise. The follow up thereafter included symptomatic assessment and uroflowmetry every 6 months. Urethrography was done only if symptoms or uroflowmetry suggested recurrent stricture.

Successful treatment outcome was defined as no further treatment of the urethral stricture required after urethroplasty and peak flow rate > 15 ml/s. We compared the surgical outcomes and complication rate in both groups.

Results

A total of 28 patients presented with long segment penile urethral stricture were enrolled in our study. 14 patients underwent buccal mucosal grafting (BMG) and 14 patients underwent local penile flap (LPF) urethral reconstruction, with mean age of 37.1±17.4 years for buccal mucosal graft group and 47.4±17.9 years for local penile skin flap group. The mean follow up period was 16.5±7.3 months for BMG group, and 13.1±5.4 months for LPF group.

Mean operative time in the BMG group was 197.1±23.7 min, while in the LPF group it was 192.1± 34.4min.

As regard postoperative complications, two patients (14.3%) in each group had wound infection, which was treated by frequent dressing and antibiotics, according to wound swab culture and sensitivity. In local penile flap group, one patient (7.1%)

developed small distal penile fistula, and another one (7.1%) developed mild chordee (penile curvature) postoperatively, for both of which no surgical intervention was done, no patient in the buccal mucosal graft group developed penile curvature. In the LPF group, one patient (7.1%) had recession of the meatus ending in subcoronal position of the meatus; the patient was offered correction, but he refused ensuring that he is satisfied with this outcome. Except for one patient in the LPF group who complaint of urge incontinence secondary to primary neurogenic bladder pathology, none of our patients suffered from any type of continence affection. In buccal mucosa graft group, as regard oral complications; all of our patients had just mild pain at the donor site which was self limited within the first week postoperative. One patient showed mild limitation in mouth opening that improved with time. Mouth numbness and salivary disturbance didn't occur in any of our patients. Only one patient (7.1%) in LPF group performed direct vision internal urethrotomy post repair to ring urethral stricture at site of proximal anastomosis, after which the patient was managed conservatively with good flow and maximum flow rate 20 ml/sec. at 3 months follow up.

The success rate in the BMG group was 92.9% with only one patient considered failure due to occurrence of small urethral stricture at the site of proximal anastomosis. The success rate in the LPF group was 85.7% with two patients considered failure; the first one due to occurrence of long urethral stricture, the second case was considered failure due to occurrence of small urethral stricture at the site of proximal anastomosis. The success rates in BMG group and LPF group showed insignificant difference (p-value = 0.5).

Discussion

Barbagli et al., stated that: "In our opinion, reporting on a small group of homogeneous urethral conditions may provide more information and make a stronger “surgical” statement".[9]

Barbagli et al., reported that the utilization of grafts for one-stage penile urethroplasty showed a higher success rate (80%) than LPF (67%).[10] However, other studies stated similar or nearly similar success rate in both groups as Dubey and colleagues who reported that the success rate in the LPF group was 85.6% and in theBMG group was 89.9%.[11] Also, SA Ying-long and colleagues mentioned that the success rate was 81.7% (67 of 82 patients) in BMG group, and 82.3% (28 of 34 patients) in LPF group with no statistically significant difference between the two groups.[12]

Comparing the above mentioned results with our study, this series shows that the success rate in the BMG group was 92.9% while the success rate in the LPF group was 85.7%. These results show higher success rate of the BMG group, however, this difference was statistically insignificant (p-value = 0.5).

As regard postoperative complications, Dubey et al., in a prospective study on fifty five patients with anterior urethral strictures who were randomized to undergo BMG[27] or LPF[28] urethroplasty, reported that 2 patients in each group had post operative hematoma, and one patient in the LPF group had wound infection. In the LPF group 6 patients developed superficial penile skin necrosis that healed within 6 weeks postoperatively. One patient developed extensive skin loss managed by split skin grafting. Two patients in the LPF group and one in the BMG group showed mild extravasation of dye on VCUG at 3 weeks after surgery, and additional week of catheterization was needed. Two patients in the LPF group developed slight penile torsion that did not interfere with sexual intercourse. In the BMG group, six patients (25.7%) complaint minor oral morbidity, which was settled 4 weeks postoperatively. Four patients developed perioral numbness and 2 complaint changes in salivation in the immediate postoperative period. One patient developed a mucus retention cyst which resolved spontaneously.[11]

Aldaqadossi H. and colleagues mentioned the following complications following dorsal only buccal mucosal graft urethraplasty in 25 cases: Three cases showed postoperative wound infection; all were

successfully managed using antibiotics according to culture and sensitivity test using a wound swab. Two patients had significant chordee after surgery that was managed by dorsal plication. Four patients complaint bothersome post-void dribbling, which was managed conservatively by manual urethral compression. There were no long-term complications in regard to the donor site.[13]

Raj Kumar Mathur et al., in their study to evaluate single-stage penile skin flap urethroplasty for long-segment urethral strictures mentioned that two patients (3.4%) had post operative hematoma and one patient (1.7%) showed wound infection, two patients (3.4%) developed superficial penile skin necrosis which did not require treatment, two patients (3.4%) had self ..0 healing urethrocutaneous fistula. One patient (1.7%) complaint reduced sensation over penile skin. Two patients (3.4%) developed urethral diverticulum and two patients (3.4%) complaint post-void dribbling.[14]

In our study, two patients (14.3%) in each group had wound infection that was managed by frequent dressing and antibiotics according to wound swab culture and sensitivity. In LPF group, one patient (7.1%) developed small distal penile fistula, and another one (7.1%) developed mild chordee (penile curvature) postoperatively, for both of which no surgical intervention was done, no patient in the buccal mucosal graft group developed penile curvature. In the LPF group, one patient (7.1%) had recession of the meatus ending in subcoronal position of the meatus; the patient was offered correction, but he refused ensuring that he is satisfied with this outcome. Except for one patient in the LPF group who complaint of urge incontinence secondary to primary neurogenic bladder pathology, none of our patients suffered from any continence affection. In BMG group, as regard oral complications; all of our patients had just mild pain at the donor site which was self limited within the first week postoperative. One patient showed mild limitation in mouth opening that improved with time. Mouth numbness and salivary disturbance didn't occur in any of our patients.

Conclusion

On an intermediate term follow up, dorsolateral onlay buccal mucosal graft and ventral onlay penile skin flap provide similar success rates in penile urethroplasty, with essentially comparable post-operative morbidity. However, reconstructive urologists should gain familiarity and try to get enough experience in variable techniques of urethral reconstruction, as the need for one technique may vary according to different circumstances. Further studies with higher sample sizes & longer term follow-up periods may be required to determine subtle differences between both techniques.

References

1. Mundy AR, Andrich DE: Urethral strictures. BJU Int. 2011; 107: 6-26.
2. Gonzalez C. Penile urethral stricture reconstruction- flap or graft? Flap. J Urol. 2011; 186: 376–7.
3. Carson CC: Editorial. Urethroplasty: a model for international progress in urology. Contemp Urol. 2006; 18: 11.
4. Orandi A. One-stage urethroplasty. Br J Urol. 1968; 40: 717–19.
5. McAninch JW. Reconstruction of extensive urethral strictures: circular fasciocutaneous penile flap. J Urol. 1993; 149:488–91.
6. Whitson JM, McAninch JW, Elliott SP, Alsikafi NF. Long-term efficacy of distal penile circular fasciocutaneous flaps for single stage reconstruction of complex anterior urethral stricture disease. J Urol.2008; 179:2259–64.
7. Humby G. A one-stage operation for hyposadius repair. Br J Surg. 1941; 29: 84–92.
8. Bhargava S, Chapple CR. Buccal mucosal urethroplasty: Is it the new gold standard? BJU Int. 2004; 93: 1191–3.
9. Barbagli Guido and Massimo Lazzeri. Can reconstructive urethral surgery proceed without randomised controlled trials?. 2008: 709-11.
10. Guido Barbagli, Guiseppe Morgia and Massimo Lazzeri, Retrospective outcome analysis of one-stage penile

urethroplasty using a flap or graft in a homogeneous series of patients. BJU Int. 2008; 102: 853-60.
11. Dubey D, Vijjan V, Kapoor R et al., Dorsal onlay buccal mucosa versus penile skin flap urethroplasty for anterior urethral strictures: results from a randomized prospective trial. J Urol. 2007; 178: 2466-9.
12. SA Ying-long, XU Yue-min, QIAN Yong, JIN San-bo, FU Qiang, ZHANG Xin-ru, ZHANG Jiong and GU Bao-jun. A comparative study of buccal mucosa graft and penile pedical flap for reconstruction of anterior urethral strictures, Chinese Medical Journal, 2010; 123(3):365-8.
13. Aldaqadossi H, El Gamal S, El-Nadey M, El Gamal O, Radwan M, Gaber M: Dorsal onlay (Barbagli technique) versus dorsal inlay (Asopa technique) buccal mucosal graft urethroplasty for anterior urethral stricture: a prospective randomized study. Int J Urol. 2014, 21 (2): 185-8.
14. Mathur RK, Nagar M, Mathur R, et al., Single-stage preputial skin flap urethraplasty for long-segment urethral strictures: evaluation and determinants of success. BJU Int. 2014; 113: 120-6.