



ORIGINAL RESEARCH PAPER

Gynecology

OUTCOME OF DORSAL ONLAY BUCCAL MUCOSAL GRAFT URETHROPLASTY IN THE MANAGEMENT OF FEMALE STRICTURE URETHRA

KEY WORDS: Dorsal onlay, female urethral stricture, buccal mucosal graft

Dr. Sandeep Maheswara Reddy Kallam

M.S., General Surgery, Post Graduate in Department of Urology, Guntur Medical College, Guntur

Dr. Prakasa Rao Busam*

M.S., M.Ch., Urology, Professor & Head of Department of Urology, Guntur Medical College, Guntur *Correspondin Author

ABSTRACT

Introduction: Urethral stricture disease is an under diagnosed cause of bladder outlet obstruction in females. The possible etiology may be idiopathic, infection, difficult catheterisation with subsequent fibrosis, prior urethral surgery or trauma. We present our technique and results of dorsal onlay Buccal Mucosal Graft Urethroplasty (BMGU) for stricture urethra in females.

Materials and Methods: A prospective study was performed on 15 female patients with stricture urethra who underwent dorsal onlay buccal mucosal graft urethroplasty from May 2015 to May 2018. All the patients had previously undergone multiple dilatations. The preoperative evaluation included detailed voiding history, local examination, uroflowmetry, calibration with 10 Fr Infant Feeding tube and Micturating Cystourethrogram (MCUG).

Results: Mean age of presentation was 46.5 years. Mean Qmax improved from 6.9 to 24.2 ml/s and mean residual volume decreased from 161 to 17.3 ml. Mean operative time was 81.4 min and mean hospital stay was 3.8 days. Mean duration of follow-up was 18 months (6 months to 2 years). None of the patient was incontinent.

Conclusion: Dorsal onlay Buccal Mucosal graft urethroplasty could be considered as an effective way to treat female urethral strictures.

INTRODUCTION:

Female urethral stricture usually is an underdiagnosed cause of bladder outlet obstruction. It occurs in 2.7% to 8% of females presenting with lower urinary tract symptoms and surgical treatment is still debatable.¹ Because of its rare incidence, strict diagnostic criteria has not been documented. However, Defreitas et al. stated that a detrusor pressure (Pdet) of 25 cm of water and maximum urinary flow rate (Qmax) of less than 12 ml/s is consistent with obstruction.² Common etiology for female urethral stricture may be infection, repeated instrumentation, trauma, previous surgeries for stone disease or incontinence, radiation for pelvic malignancy, and idiopathic. As similar to the male urethral stricture disease, results of repeated urethral dilatation and internal urethrotomy are not good in females as subsequent fibrosis occurs due to bleeding and extravasation.³ Surgery is the definitive treatment in such cases in the form of meatoplasty for distal urethral strictures and grafts or flaps for mid and proximal urethral strictures. Several methods of female urethroplasty have been reported in various small series. We present our experience of management of female urethral stricture with dorsal onlay Buccal Mucosal Graft Urethroplasty (BMGU) in 15 patients at a single center.

Methodology: This was a prospective study performed on 15 female patients with stricture urethra from May 2015 to May 2018. Informed consent was taken from all the patients for surgery and consent for inclusion into the study. The diagnostic criteria were maximum urinary flow rate (Qmax) of less than 10 ml/s, inability to calibrate urethra with 10 Fr catheter, and narrowing of urethra on Micturating Cystourethrogram (MCUG). All patients had preoperative evaluation including detailed history, physical examination, uroflowmetry, residual volume and Micturating Cystourethrogram. Calibration was not attempted with 16 or 18 Fr catheter as it could dilate some soft strictures and make interpretation of MCUG difficult. Almost all patients presented with poor flow and incomplete sense of voiding. One patient had recurrent urinary tract infections as main presenting complaint. All the patients had previously undergone multiple dilatations. The etiology was idiopathic in 13 cases, one had undergone multiple transurethral resections for a bladder tumor, and one patients underwent cystolithotripsy for bladder stone. None of the patients had preoperative incontinence or prolapse. All patients had normal urine examination and serum creatinine preoperatively.



Figure 1: MCUG showing stricture in mid-urethra

Harvesting the graft: The operative procedure consisted of harvesting of free buccal mucosal graft and urethral reconstruction. The free buccal graft was harvested similar to the technique described by Goel et al.⁴ For harvesting buccal mucosal graft, the cheek mucosa was infiltrated with lidocaine mixed with 2% adrenaline along the line of incision and on the undersurface of the area of mucosa that was to be harvested. A rectangular shaped piece of mucosa was excised depending on the length and caliber of the stricture. Donor area was then packed with gauze soaked in lidocaine mixed with epinephrine.

Operating technique: The patient was placed in dorsal lithotomy position and operative field was cleaned and draped with strict aseptic measures. The anus was adequately covered and sealed from the operative area. Cystoscopy was done with 6 Fr paediatric cystoscope to see the stricture area and assess its length from bladder neck. Normal saline mixed with 1% adrenaline was injected in periurethral tissues, an inverted U-shaped incision was given and urethra was dissected dorsally and laterally from 3 to 9'o' clock position by sharp dissection with scissors. Stay sutures were taken at urethral angles to help in dissection. Dissection was done with care so as not to damage the vestibular bulbs and the clitoral body by staying close to the fibrous tissue of the urethra. An 18 Fr Foley was inserted up to the stricture segment and urethra was dissected proximally above the stricture in retropubic space. A full-thickness urethrotomy was then made over the stricture site at 12' 0 clock position with scissors. Urethra was now again calibrated with an 18 Fr Foley catheter to ascertain that there is no proximal stenosis beyond the incised stricture site. An 18 Fr Foley

catheter was placed in urethra over which buccal mucosal graft has to be sutured to urethrotomy site. The buccal mucosal graft was then sutured on the dorsal surface of urethra as onlay graft with 4-0 Vicryl sutures in interrupted fashion and excess graft was tailored to achieve a normal meatus like appearance. Foley's catheter was removed 14 days after surgery and MCUG done at 3 weeks after surgery. All patients were advised once weekly self-calibration up to 3 months.

Follow up: Postoperative follow-up included every 3 monthly assessment of voiding and storage lower urinary tract symptoms, uroflowmetry and post void residual urine.

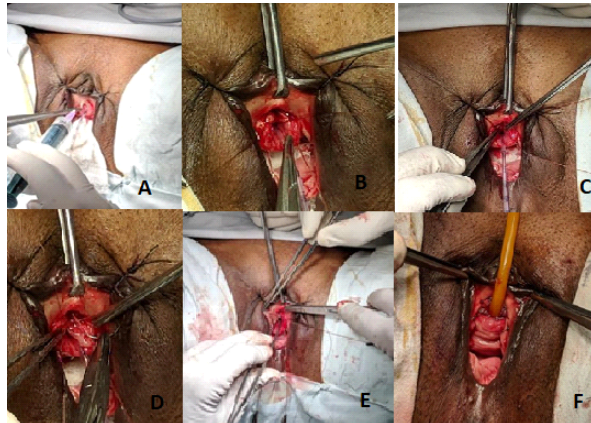


Figure 2: (A) Injection of 1% adrenaline saline in the periurethral tissues (B) Dorsal urethrotomy at 12 O' clock position (C) Stay sutures to cut urethra (D) Buccal Mucosal Graft suturing to urethra (E) Buccal mucosal graft urethroplasty (F) Final outcome

RESULTS: Site of stricture was in mid urethra in all 15 patients. Mean age of patients was 46.5 years (39-56 years). Mean preoperative and postoperative Qmax were 6.9 ml/s and 24.2 ml/s respectively and mean preoperative and postoperative post void residual urine were 161 ml and 17.3 ml respectively. Mean stricture length was 1.3 cm (0.8cm-2cm), mean operative time was 81.4 minutes and mean hospital stay was 3.8 days (3-5 days). Mean duration of follow-up was 18 months (6months - 2yrs). None of the patients required blood transfusion and none of them had any complications from graft harvested site. Patients did not report any significant postoperative pain or discharge suggestive of wound infection and were advised to return to their normal daily activities after 4 to 5 days. The criteria of successful reconstruction was a postoperative Qmax greater than 15 ml/sec with minimal post void residue (<30 ml) and normal appearing voiding Cystourethrogram. Once weekly self-calibration is advised for initial 3 months. At follow-up 3 weeks after surgery, Micturating Cystourethrogram showed a normal urethra.

Table 1: Baseline characteristics and parameters of patients (n=15)

Characteristic	Value
Mean age	46.5 years
Mean preoperative Qmax	6.9 ml/s
Mean postoperative Qmax	24.2 ml/s
Mean preoperative residual volume	161 ml
Mean postoperative residual volume	17.3 ml
Mean stricture length	1.3 cm
Mean operative time	81.4 minutes
Mean hospital stay	3.8 days

At 1 year of follow-up, all patients had Qmax >20 ml/sec without any significant residual urine or voiding and storage lower urinary tract symptoms. At mean follow-up of 18 months, all patients voided well with good flow without recurrence of stricture. None of the patients reported incontinence during follow-up.

DISCUSSION:

Female urethral stricture is usually an underdiagnosed condition.¹ It was treated in past with repeated urethral dilatations and

internal urethrotomy. As in males, urethral stricture disease in females can cause voiding difficulties and lower urinary tract symptoms, recurrent urinary tract infections and even renal impairment. These symptoms are usually of long duration and severe which cause significant impairment in quality of life. Stricture is usually distal to external urethral sphincter and can occur in any part of urethra, although it seems to occur most commonly in mid and distal urethra and less in proximal urethra.³ Often these females are referred by physicians and surgeons as there is no means by which they can be relieved medically. These patients may be evaluated by detailed voiding history including symptoms of stress and urge incontinence and recurrent urinary tract infections. Local examination should be done along with uroflowmetry and measurement of residual volume. Surgical treatment of female urethral stricture disease has not been adequately addressed in literature and few small series describing various techniques of female urethroplasty are available. Smith, et al. reported their experience with dilatation and intermittent catheterisation in seven female urethral stricture patients with seemingly good results, as amongst patients declared cure, none required more than four dilatations.³ However, he stated that for patients who are not compliant or cannot self-catheterize, this procedure is inadequate and urethroplasty could be a better option. Various types of urethroplasty have been tried in women. These include vaginal graft urethroplasty, vestibular flap urethroplasty, labia minora urethroplasty, pedicled labial flap urethroplasty and lingual graft urethroplasty. Buccal mucosa has been extensively used as graft in male urethroplasty because of easy availability, harvesting and excellent physical, viscoelastic and vascular characteristics. Many surgeons have described the use of free buccal mucosal graft through ventral and dorsal approach in female stricture disease. The technique of dorsal urethroplasty in females using buccal mucosal graft was initially described by Migliari et al.⁵ They performed urethrotomy along the whole length of the dorsal urethra up to the bladder neck and then placed the graft. Unnecessary manipulation of the urethra may lead to iatrogenic stricture later on. In our study we have placed the graft only in the strictured urethra as we feel it is unnecessary to place the graft in the normal urethra. A review of literature regarding success of various urethroplasty technique using flaps or grafts in female urethral stricture have shown good outcomes.^{6,7} However most of the series included a small number of patients and short duration of follow up. Migliari argued that BMGU through the dorsal plane minimizes sacculations and leads to more physiological urethral meatus directed upwards and keeps the ventral part of mid urethra intact leaving the possibility of anti-incontinence procedure if needed later.⁹ Berglund et al. presented the technique of ventral onlay buccal mucosal graft urethroplasty for recurrent urethral stricture disease.⁸ After surgery one of the two patients developed a recurrence of LUTS because of meatal stenosis.

We did not observe incontinence in any patient during follow-up. Whole of the procedure can be completed in spinal anesthesia. This procedure of dorsal onlay buccal mucosal graft seems to be an effective way to treat female urethral stricture. It may be done in cases of proximal and mid urethral stricture.

CONCLUSION:

Dorsal onlay buccal mucosal graft urethroplasty for stricture urethra in females is a simple and effective technique which can avoid repeated painful dilatations and multiple urethrotomies. Further studies with more patients and long follow-up are required to ensure the success of this procedure.

REFERENCES

- Keegan KA, Nanigian DK, Stone AR. Female urethral stricture disease. *Curr Urol Rep.* 2008;9:419-23. [PubMed: 18702927]
- Defreitas GA, Zimmern PE, Lemack GE, Shariat SF. Refining diagnosis of anatomic female bladder outlet obstruction: Comparison of pressure-flow study parameters in clinically obstructed women with those of normal controls. *Urology.* 2004;64:675-81. [PubMed: 15491697]
- Smith AL, Ferlise VJ, Rovner ES. Female urethral strictures: Successful management with long-term clean intermittent catheterisation after urethral dilatation. *BJU Int.* 2006;98:96-9. [PubMed: 16831151]
- Goel A, Dalela D, Sinha RJ, Sankhwar SN. Harvesting buccal mucosa graft under local infiltration analgesia—mitigating need for general anesthesia. *Urology.* 2008 Sep 1;72(3):675-6.

5. Migliari R, Leone P, Berdondini E, De Angelis M, Barbagli G, Palminteri E. Dorsal buccal mucosa graft urethroplasty for female urethral strictures. *The Journal of urology*. 2006 Oct;176(4):1473-6.
6. Tsivian A, Sidi AA. Dorsal graft urethroplasty for female urethral stricture. *The Journal of urology*. 2006 Aug;176(2):611-3.
7. ÖnoI FF, Antar B, Köse O, Erdem MR, ÖnoI ŞY. Techniques and results of urethroplasty for female urethral strictures: our experience with 17 patients. *Urology*. 2011 Jun 1;77(6):1318-24.
8. Berglund RK, Vasavada S, Angermeier K, Rackley R. Buccal mucosa graft urethroplasty for recurrent stricture of female urethra. *Urology*. 2006 May 1;67(5):1069-71.