CASE REPORT

W-V flap: a new technique for reconstruction of female distal urethral stricture using vestibular mucosa

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SUMMARY

A premenopausal woman having a totally occlusive distal urethral stricture, with suprapubic catheter (SPC) in situ, was referred to us for a definitive procedure. On discussion of the treatment options, the patient refused for a buccal or vaginal flap procedure. Thus, a local W-V flap was fashioned from the periurethral vestibular mucosa with seemingly excellent results, both in terms of resolution of her symptoms and a forwardly directed stream of urine without incontinence.

BACKGROUND

Urethral strictures in females are relatively uncommon as compared with those in males, and only 4–13% of these strictures are severe enough to cause bladder outlet obstruction.¹ Half of all cases of urethral strictures are considered iatrogenic, and in about a third of the cases an identifiable cause is not found.²

Though the problem is often encountered in clinical practice, there is a lack of consensus regarding the optimal treatment that can be offered to such patients. Absence of objective criteria for disease progression and response to treatment precludes comparison between previous studies. Further, there is a lack of standardisation of various procedures that are offered to these patients. The treatment is usually initiated with serial urethral dilations failing which one resorts to urethroplasty.

Here, we describe a new technique of female urethroplasty where, after excising the strictured segment of the distal urethra, the neourethral tube is reconstructed by using the adjoining vestibular mucosa.

CASE PRESENTATION

We report a case of a 34-year-old woman who was having an idiopathic distal urethral stricture and had undergone a suprapubic cystostomy elsewhere to manage acute urinary retention following a failed dilation. She had several failed urethral dilations subsequently and was referred to us for a definitive procedure.

INVESTIGATIONS

During subsequent evaluation by bougienage and a micturating cystourethrogram (MCU), she was found to have a total occlusion of the urethra just proximal to the meatus. The urethra proximal to the stricture as well as the local perimeatal vestibule appeared normal (figure 2A).

TREATMENT

The patient was explained the various treatment options available to her. She refused for a buccal or vaginal graft due to the fear of potential deformation of the donor site, though she consented for a local flap reconstruction. Informed consent was taken. The procedure was performed in the lithotomy position and under regional anaesthesia. A 'W'-shaped area was demarcated on the vestibular mucosa, in front and on the sides of the urethral meatus, with the base of the 'W' pointing towards the clitoris and each half of the 'W' descending nearly 2.5 cm on either side of the urethral orifice (figure 1A). This marking was incised, deepened and the flaps were raised as two separate 'V'-shaped flaps on either side sequentially (figure 1B). The lips of the external urethral meatus were grasped with tissue holding forceps and the distal 2.0 cm of the urethra was circumferentially dissected in the periurethral plane. A curved metal bougie was passed antegradely through the suprapubic tract and guided into the urethra proximal to the stricture. The movement of the tip of the bougie inside the urethra aided the dissection.

The urethral wall was incised posteriorly over the tip of the bougie and as the urethral lumen opened, two stay sutures were placed on the edges of healthy urethra at the 5'o clock and 7'o clock locations to prevent the retraction. After this, the rest of the urethral circumference was excised, and more stay sutures were placed on the edge of the urethra to permit outward pull. Thus, the distal 1.5 cm of the urethra containing the strictured urethral segment was totally excised.

The medial edges of both flaps were approximated by continuous absorbable sutures (4-O polygalactin), thus converting the 'W' to 'V' (figure 1C). A small dorsal slit was given in the urethra at the 12'o clock location for spatulation. The tip of the 'V' flap was approximated to the edge of the spatulated urethra with three preplaced sutures, first at the 12'o clock location and subsequently on either side at the 10'o clock and 2'o clock locations of the urethral edge, the knots of the sutures being kept on the outside. More interrupted sutures were placed to approximate the edges of the flap to the remaining circumference of the distal urethral edge and the remaining portion of the flap was tubularised (figure 1D). The bougie tip lying inside the urethral lumen assisted in easy identification and also in taking an appropriate bite of the urethral wall. A 16 Fr Foley catheter was placed per urethra and another catheter was placed

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Figure 1 (A) W flap of vestibular mucosa planned anterolateral to the urethral orifice. (B) Flap reflected upwards. (C) W flap converted to V flap by approximating the medial edges. (D) V flap ready for tubularisation as distal urethra with marker (a) denoting the proximal end of neourethra and (b) denoting the newly created external opening.

through the pre-existing suprapubic tract for continuous bladder drainage. Haemostasis was ensured and interrupted absorbable 3-0 polygalactin sutures were used to approximate the mucosal edges to cover raw area created on either side of the newly constructed urethral orifice.

The surgery lasted for 80 min and the estimated blood loss was <50 cc.

OUTCOME AND FOLLOW-UP

The patient was kept on indwelling urethral and suprapubic catheters, along with supportive medical therapy for 7 days. Since the flaps showed good healing, SPC was taken out and she

was discharged. On the 10th postoperative day, the urethral catheter was removed and the patient voided well.

On gentle calibration by a Hegar dilator on the 15th postoperative day, no narrowing was noted at the site of anastomosis. Her stream was forwardly directed but splayed due to the absence of regular meatal lips. A micturating cystourethrogram showed a widely patent anastomosis and complete bladder emptying (figure 2B). The patient resumed normal voiding without any evidence of incontinence, with a Qmax of 25 mL/s and no postvoid residual urine. She was followed up for 12 months during which she maintained normal voiding without any complication.

Figure 2 (A) Preoperative MCU showing complete occlusion of distal urethra. (B) Postoperative MCU showing normal voiding. MCU, micturating cystourethrogram.

Figure 3 (A) Distal urethra reconstructed by a vaginal flap creates a posteriorly directed tube. (B) Distal urethra reconstructed by an anteriorly based W-V flap creates a forwardly directed tube.

DISCUSSION

Bladder outlet obstruction is noted in around 3–8% of females with voiding dysfunction, out of which 4–13% cases are attributable to urethral strictures.³ Distal urethral strictures in females are yet to be studied in terms of the criteria for diagnosis or best methods of treatment. Medical treatment for this condition is useful only for symptomatic relief, for example, analgesics for pain, antibiotics for associated recurrent urinary tract infections and topical oestrogen creams for postmenopausal urethral stenosis. One of the least invasive and hence a commonly used method is serial urethral dilation followed up with or without clean intermittent self-dilation.⁴ However, it requires repeated interventions and runs the risk of catheter-related complications such as recurrent urethral/bladder infections and urethral bleeding.⁵ Sometimes, urethral dilation can also cause development of a false lumen, which can then lead to failed urethroplasty or urinary incontinence.⁶

Osman *et al*⁷ reported a 47% success rate for 107 patients who underwent urethral dilations after a mean follow-up of 43 months. Since patients invariably develop recurrence, they are then offered one of the several types of urethroplasties using either a local or distal flap reconstruction. Overall, most of the urethroplasty techniques enjoy a high success rate, albeit with a short follow-up. Blavais *et al*⁸ reported a success rate of 78% at 5 years for vaginal and buccal mucosal graft urethroplasties, whereas Mehra *et al*⁹ reported a success rate of 76.5% for buccal mucosal graft urethroplasty after a mean follow-up of 28 months. In another study by Meeks *et al*,¹⁰ the overall recurrence rate for all reconstructive procedures was reported to be 15.6%.

In an attempt to classify the various techniques, we found that although specific indications for a particular type of urethroplasty have been elucidated in the literature, it appears plausible that flap interposition procedures are used when the meatus is involved in the stricture process and graft interposition procedures are used when the meatus is normal, thus potentially dividing the procedures into ‘meatus replacing’ or ‘meatus conserving’. The latter type of procedures is obviously used for well-localised mid-urethral strictures, but the choice of the graft material—buccal versus lingual—is usually governed by the operating surgeon’s choice and experience.

The route used to perform the reconstruction has also been a subject of debate. For graft substitution, the current trend is to adopt the dorsal approach, and for flap reconstruction the ventral approach is favoured. The dorsal approach minimises sacculations, allows the urethral meatus to remain forwardly directed and leaves the ventral part of the mid-urethra

undisturbed for an anti-incontinence procedure in future.¹¹ A possible adverse effect of the dorsal approach is sexual dysfunction, which theoretically could occur due to damage to the clitoral nerves following dissection between the clitoris and the urethra. However, even after extensive search, we have found no such complication in any of the series.¹² So the fear of sexual dysfunction appears unfounded.

In addition, there is some possibility of donor site morbidity, particularly with buccal mucosa and also with the use of vaginal flaps. With the latter technique, where flaps are taken from the anterior vaginal wall, a backwardly directed urethra is created which results in non-physiological posteriorly directed flow (figure 3A). Also, vaginal flap surgery is not a favoured option in virgin females or in patients having unhealthy and scarred vagina.

Our technique uses native vestibular mucosa to create a short segment neourethra for patients having complete occlusion of the distal urethra. Montorsi *et al*¹³ had used the same vestibular mucosa with good success. This method is technically simple and does not produce any donor site morbidity. By using the described technique, we succeeded in creating a cone-shaped tube, which is forwardly directed, and therefore the direction of the urinary stream remains the same as before (figure 3B).

Patient’s perspective

I am greatly satisfied with the procedure and the kind of care that the doctors have extended towards my recovery. I was scared initially listening to the various options that I had to choose from, but I am happy to have made the right choice.

Learning points

- ▶ Urethroplasties for female urethral stricture disease can be classified as meatus-replacing and meatus-conserving procedures.
- ▶ W-V urethroplasty successfully creates a cone-shaped tube with a physiological forwardly directed urinary stream.
- ▶ It is a good alternative to contemporary distal urethral reconstruction techniques for patients having completely occluded distal urethra.

There is some degree of splaying apparently due to the absence of meatal lips, but since patients void in the squatting or sitting posture, it rarely is a cause for concern. It must be noted that the length of the tube is dependent on the width of the base of each V flap, which will depend on the local anatomy of the vestibule. However, we admit to the limitation of our inability to report our experience on a large number of cases due to the rarity of the clinical situation.

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Contributors DD and PG planned the procedure and carried it out. DD and TG drafted the paper and conducted a review of the literature. PG revised the paper and created the illustrations.

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