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Case Series

## Circumferential excision with vaginal flap reconstruction and mucocutaneous anastomosis: a novel surgical technique for adult female urethral prolapse

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### ABSTRACT

Urethral mucosal prolapse in adult women is an uncommon and often underdiagnosed condition presenting as circumferential eversion of the urethral mucosa through the external meatus. Existing surgical techniques vary in recurrence risk and cosmetic outcome, with no universally accepted approach. We describe the Circumferential Excision with Vaginal Flap Reconstruction and Mucocutaneous Anastomosis (CVMA) technique and present a prospective case series of ten adult women with confirmed urethral mucosal prolapse who underwent CVMA between August and November 2025 after failure of conservative therapy. Patients were followed at 1, 3 and 6 months. Results: The mean patient age was 42 years. Complete circumferential prolapse was confirmed in all cases, with redundant tissue ranging from 1.5 to 3 cm. Mean operative time was 45±10 minutes with no intraoperative complications. Transient urinary urgency was noted in 3 patients (30%) in the first postoperative month, resolving with conservative management. All patients reported satisfactory cosmetic outcomes with no recurrence at six months. CVMA is a safe and reproducible technique offering durable anatomical correction, periurethral reinforcement, and favourable cosmetic results. Larger prospective studies are warranted to validate these findings.

**Keywords:** Female urethra, Mucosal prolapse, Surgical excision, Vaginal flap, Mucocutaneous anastomosis, Case series

### INTRODUCTION

Female urethral mucosal prolapse is a rare but clinically distinct condition characterised by circumferential eversion of the urethral mucosa through the external urethral meatus.<sup>1</sup> Although most frequently documented in prepubertal girls and postmenopausal women, the condition remains underreported in the broader adult population, contributing to diagnostic delays and misidentification. Its classic presentation an erythematous, “doughnut-shaped” periurethral mass accompanied by serosanguinous spotting may closely mimic other

urogenital pathologies including urethral caruncle, condylomata, periurethral cyst, or even low-grade malignancy.<sup>2,3</sup>

Despite its recognisable morphology, the optimal management of urethral prolapse in adult women remains controversial. Conservative therapy with topical oestrogen and sitz baths is often sufficient in paediatric cases owing to the transient hypoestrogenism of that age group; however, adult patients with persistent or complicated disease more frequently require surgical intervention.<sup>4</sup> Surgical options described in the literature encompass

simple circumferential excision, four-quadrant excision with primary anastomosis, catheter ligation, and laser ablation, each with distinct trade-offs in recurrence risk, cosmesis, and technical complexity.<sup>5,6</sup>

In this context, we developed the circumferential excision with vaginal flap reconstruction and mucocutaneous anastomosis (CVMA) technique, an anatomically restorative procedure combining complete excision of redundant mucosa with vascularised periurethral reinforcement and a tension-free mucocutaneous anastomosis. This paper presents our case series of ten adult women who underwent CVMA, describes the operative technique in detail, and reports functional and cosmetic outcomes over a six-month follow-up period.

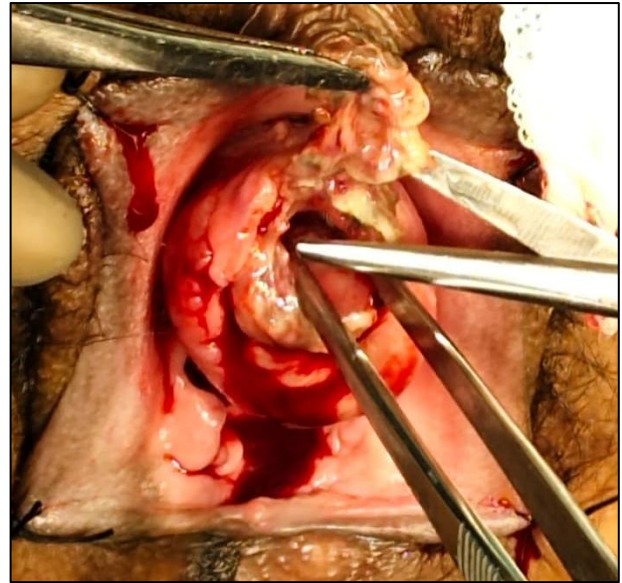
## CASE SERIES

### *Patient characteristics and preoperative assessment*

Between August 2025 and November 2025, ten adult women with confirmed urethral mucosal prolapse were prospectively enrolled following Institutional Review Board approval and receipt of written informed consent from all participants. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. All ten patients had failed a minimum four-week course of conservative therapy (topical oestrogen and/or corticosteroid cream) before being considered for surgical intervention. Patients were excluded if they had evidence of urethral malignancy on histology or cystoscopy, a prior urethral reconstructive procedure, or active pelvic radiotherapy.



**Figure 1: Complete circumferential urethral mucosal prolapse presenting as an erythematous, doughnut-shaped periurethral mass at the external meatus.**



**Figure 2: Intraoperative photograph showing circumferential excision of the prolapsed mucosa with the anterior vaginal flap raised and visible in the lower field.**



**Figure 3: Post operative image showing the mucocutaneous anastomosis.**

The mean patient age was 42 years (range 28-61 years). The predominant presenting complaint was a visible periurethral mass with serosanguinous spotting, noted in nine of the ten patients (90%); one patient (10%) additionally reported significant dysuria. All patients underwent preoperative uroflowmetry and diagnostic cystoscopy to exclude coexisting urethral diverticula,

caruncles, or intraluminal pathology that might modify the surgical plan.

### ***Surgical technique - CVMA***

All procedures were performed under spinal or general anaesthesia with the patient in the dorsal lithotomy position following standard aseptic preparation. Hydrodissection was performed circumferentially in the submucosal plane approximately 1 cm proximal to the prolapsed mucosa using a solution of 1% lidocaine with 1:200,000 epinephrine; this both defined tissue planes and provided haemostasis before incision.

The prolapsed mucosa was then delineated with electrocautery at the hydro dissection margin, and extra mucosal tissue was excised sharply in a circumferential fashion, preserving the underlying muscularis propria and periurethral fascia. Haemostasis was confirmed at each quadrant. Subsequently, a well-vascularised anterior vaginal flap was raised by submucosal dissection of the anterior vaginal wall immediately beneath the urethra and mobilised to allow tension-free advancement to the meatal region without compromise of its blood supply.

The vaginal flap was anchored at the 3, 6, 9, and 12 o'clock positions to the periurethral tissue using interrupted 4-0 polyglactin (Vicryl) sutures, constituting the structural reinforcement step of CVMA and replacing the excised mucosa with well-vascularised tissue. Finally, the residual proximal urethral mucosa was approximated to the vestibular skin in a tension-free, interrupted mucocutaneous anastomosis using 4-0 polyglactin sutures, re-establishing a normal urethral meatal contour.

### ***Postoperative management and follow-up***

A 14 Fr Foley catheter was placed at the close of surgery and removed uneventfully at 48 hours in all patients. Warm sitz baths were commenced on postoperative day 3, twice daily. Follow-up assessments were conducted at 1, 3 and 6 months, comprising clinical examination of the meatus, a standardised urinary symptom questionnaire, and uroflowmetry at the 3- and 6-month visits.

### ***Intraoperative findings and outcomes***

Complete circumferential prolapse of the urethral mucosa was confirmed intraoperatively in all ten cases, with redundant tissue ranging from 1.5 to 3.0 cm. Hydro dissection consistently produced well-defined tissue planes facilitating precise excision. No intraoperative complications including inadvertent urethral injury or vascular injury were recorded in any case, and no procedure required conversion to an alternative technique. Mean operative time was 45±10 minutes.

All Foley catheters were removed at 48 hours without incident. Transient urinary urgency during the first postoperative month was reported by three patients (30%);

this resolved fully in all three with a structured programme of pelvic floor exercises (Kegel training) and a short course of anticholinergic therapy in two of the three patients, while the third resolved spontaneously with pelvic floor exercises alone. No patient developed urinary retention, wound infection, or dehiscence. At each follow-up visit, all ten repairs were intact with well-healed mucocutaneous junctions, no visible scarring, and no distortion of urethral contour. Patient-reported cosmetic satisfaction was uniformly high across the cohort.

At one-month follow-up, all patients had intact repairs with no signs of early recurrence. At the three-month and six-month reviews, 100% of the cohort remained asymptomatic with normal urinary function on uroflowmetry and no clinical evidence of prolapse recurrence.

## **DISCUSSION**

Urethral mucosal prolapse in adult women is an uncommon entity whose diagnosis is frequently delayed. The characteristic circumferential, erythematous periurethral mass is usually sufficient for clinical diagnosis, yet the condition may be mistaken for urethral caruncle, malignancy, or condylomatous lesions, and in adults this diagnostic confusion is not unusual.<sup>4,5</sup> Cystoscopy is therefore a valuable adjunct when clinical uncertainty exists, as it excludes concurrent intraluminal pathology.

Management strategies range from conservative measures including topical oestrogen and sitz baths to surgical excision.<sup>4,8</sup> Conservative therapy has a high success rate in prepubertal girls, for whom hypoestrogenism is typically transient, but performs substantially less well in adult women with persistent or complicated prolapse.<sup>7</sup> Among surgical options, simple circumferential excision and the four-quadrant technique described by Shurtleff and Barone are the most widely reported; catheter ligation and laser ablation have also been described, though longitudinal outcome data remain limited.<sup>6,8</sup> Conventional techniques, while generally effective, may be associated with recurrence, meatal stenosis, or suboptimal cosmetic outcomes, particularly when repair relies solely on primary approximation of cut mucosal edges.<sup>6</sup>

The CVMA technique addresses several of these limitations. Complete circumferential excision under direct vision ensures removal of all redundant mucosa, eliminating residual tissue that might predispose to recurrence. The anterior vaginal flap step is the distinguishing element: by replacing the excised periurethral tissue with well-vascularised tissue rather than relying on primary mucosal closure alone, CVMA provides a more robust biological scaffold for wound healing and long-term anatomical support. The tension-free mucocutaneous anastomosis avoids ischaemia and suture-line stress, both of which predispose to meatal stenosis and wound breakdown in conventional repairs.

In our series, no recurrences were observed at six-month follow-up and cosmetic outcomes were uniformly satisfactory, consistent with expectations from anatomically restorative techniques. The 30% rate of transient postoperative urgency is comparable to published rates following similar periurethral surgery and reflects localised tissue oedema rather than de novo detrusor overactivity; all three affected patients achieved full resolution with conservative measures.<sup>5</sup> The mean operative time of 45±10 minutes is consistent with performance within a standard urological list.

The present series is limited by its small sample size (n=10) and follow-up duration of six months, which, while capturing the interval of greatest recurrence risk, does not permit conclusions about long-term durability. The absence of a comparative arm is a further limitation; a randomised controlled comparison with the four-quadrant excision technique would be the natural next step. Standardised validated quality-of-life instruments were not used, and this should be addressed in future prospective studies.

## CONCLUSION

Urethral mucosal prolapse in adult women, though uncommon, is a clinically identifiable condition that warrants a high index of suspicion and systematic evaluation including cystoscopy when diagnostic uncertainty exists. Timely recognition and appropriate management are essential to prevent persistent symptoms and complications.

The CVMA technique-combining complete circumferential excision, vascularised anterior vaginal flap reinforcement, and tension-free mucocutaneous anastomosis-appears to be a safe and reproducible surgical option that offers durable anatomical correction and consistently favourable cosmetic outcomes. The absence of recurrence and minimal postoperative morbidity observed in this case series support its potential as a valuable alternative to conventional approaches. Further prospective studies with larger cohorts and longer follow-up durations are required to validate these findings and to

define its role in the standard management of adult female urethral prolapse.

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