

Surgical Steps of Transvaginal Urethral Diverticulectomy

Woojin Chong*

MD, FACOG, FPMRS, CPE. Inspira Urogynecology. Inspira Health Vineland/Mullica Hill, NJ, U.S.A. Assistant Clinical Professor at Rowan University School of Osteopathic Medicine, NJ and Icahn School of Medicine at Mount Sinai, NY, U.S.A.

***Corresponding Author:** Woojin Chong, MD, FACOG, FPMRS, CPE. Inspira Urogynecology. Inspira Health Vineland/Mullica Hill, NJ, U.S.A. Assistant Clinical Professor at Rowan University School of Osteopathic Medicine, NJ and Icahn School of Medicine at Mount Sinai, NY, U.S.A.

Received: August 19, 2023; **Published:** August 30, 2023

Abstract

Although urethral diverticulum is rare, it can cause a variety of bothersome symptoms and possible malignancy. The objective of this article is to present detailed surgical steps of female urethral diverticulectomy.

Keywords: Urethral Diverticulum; Urethral Diverticulectomy; Urethral Discharge; Periurethral Mass; Recurrent Urinary Tract Infection

Introduction

Female urethral diverticulum (UD) is an outpouching of the urethral lumen into the surrounding connective tissue [1]. The presentation of female UD can range from incidental findings to vaginal bulge and pain, urethral discharge with periurethral mass (See Figure 1), lower urinary tract symptoms, frequent urinary tract infections (UTIs), dyspareunia, urinary incontinence (UI), or malignancy [2]. The vaginal wall cysts, leiomyoma, Skene's gland abnormalities, Gartner's duct abnormalities, urethral prolapse, and urethral caruncle can present as periurethral masses in addition to UD [2]. It is known that up to 10% of UD show atypical pathological findings without any obvious imaging findings, with malignancy being found in 1~6% of UD [3]. The most common malignancies reported are adenocarcinoma, urothelial carcinoma, and squamous cell carcinoma [3].

UD and Stress UI often co-exist: 10~ 57% of patients with UD also presenting with Stress UI [4]. The accurate assessment and diagnosis with adequate radiographic imaging (preferably with magnetic resonance imaging) is an integral part of the management for UD.

Once the diagnosis is confirmed, the usual treatment is surgical excision and reconstruction, most often through a transvaginal approach, although multiple techniques have been described for both open and endoscopic repair of UD. Spence and Duckett described a marsupialization procedure for distal UD, which creates a generous meatotomy [5].

The principles of transvaginal urethral diverticulectomy include (1) removal of the entire UD wall, (2) watertight closure of the urethra, (3) multi-layered (with or without vascular pedicle or graft placement) and non-overlapping closure of surrounding tissue with absorbable suture, and (4) preservation or creation of continence [2].

When treating concomitant UD and Stress UI, some surgeons prefer a staged procedure, while others recommend simultaneous pubo-vaginal fascial sling placement. There is no consensus on appropriate timing of surgical management of these two conditions: therefore,



Figure 1: Urethral diverticulum bulging through the anterior vaginal wall (upper arrow, urethral meatus with yellow discharge with “milking” action; lower arrow, diverticulum).

it should be decided on an individualized basis after appropriate preoperative counselling. Of note, use of synthetic sling is not recommended at the time of UD repair due to the risk of mesh erosion.

Results of surgical repair of UD are usually excellent; however, long-term recurrence of these UD lesions may occur. Complications of urethral diverticulectomy include but not limited to urethrovaginal fistula, UI, and rarely urethral stricture [6]. The objective of this short article is to present detailed surgical steps of transvaginal urethral diverticulectomy.

Surgical steps of transvaginal urethral diverticulectomy

1. Under general anesthesia, the patient is placed in dorso-lithotomy position and prepped with standard sterile technique.
2. Antibiotic prophylaxis is given intravenously.
3. A proper visualization of the surgical field is important: Vaginal retractor (i.e. LoneStar retractor with hooks) can be utilized.
4. Cystourethroscopic surveillance can be performed using 0- or 30-degree scope to visualize the location of ostium from the urethral lumen.
5. A 16-F urethral Foley catheter is placed.
6. A posterolateral episiotomy may be beneficial in some patients for additional exposure if they have very tight introitus. Most UD's are in the midurethral location therefore, this step can be obviated.
7. An inverted 'U' is marked out along the anterior vaginal wall with the base of the 'U' at the level of the distal urethra and the limbs extending to the bladder neck. Some surgeons utilize inverted "T" incision: however, inverted "U" incision gives better lateral exposure at the level of the mid-vagina and can be extended proximally toward the bladder neck if needed [2].

8. Normal saline or vasoconstrictive agents (ex. Lidocaine with epinephrine) can be injected along the incision line beneath the vaginal wall for hydrodissection. Vasoconstrictive agents should be utilized with caution since it may increase the risk of delayed hemorrhage.
9. Using sufficient counter-traction with Allis clamps, careful dissection of the anterior vaginal wall is performed with Metzenbaum or Iris scissors, this will separate the anterior vaginal wall from the periurethral fascial layer. The proper plane will be confirmed by identifying the glistening internal side of the vaginal wall flap. Extra care should be taken to preserve the periurethral fascia and avoid inadvertent entry into the UD.
10. Once the anterior vaginal wall flap is dissected, the periurethral fascia can be incised transversely or vertically over the UD and dissected down to the external UD wall (Figure 2). The periurethral fascia is then dissected off the UD circumferentially to delineate the margins of the UD, with care taken to avoid entry into the UD; however, it may be necessary to open the UD to facilitate dissection.

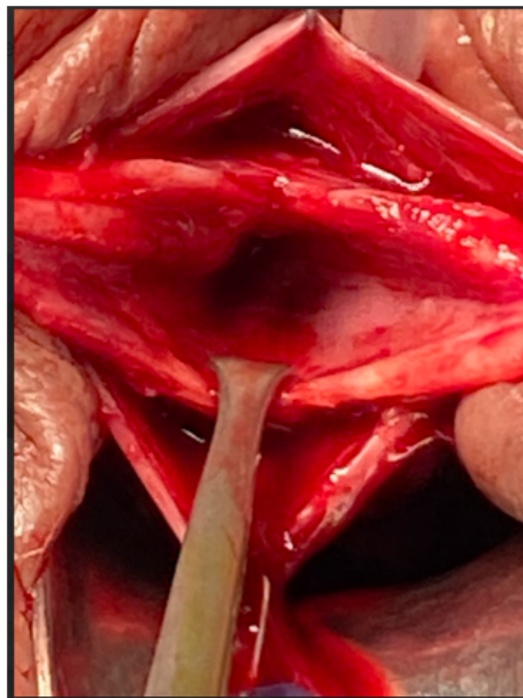


Figure 2: Once the anterior vaginal wall flap is dissected, the periurethral fascia can be incised transversely or vertically over the Urethral diverticulum and dissected down to the external Urethral diverticulum wall.

11. The UD should be dissected to the ostium where it connects to the urethra. The surgeon should try to remove the entire epithelialized surface of the UD to prevent recurrence. However, it is acceptable to remove a small component of inflamed or adherent urethral wall, especially at the ostium. If the ostium is difficult to locate, normal saline with or without dye can be infused into the urethral meatus to aid the visualization of the ostium.
12. The urethra can then be reconstructed over the Foley catheter in a watertight fashion with 4-0 synthetic absorbable sutures with a tension-free and watertight closure. The periurethral fascia is then re-approximated with interrupted 3-0 synthetic absorbable sutures perpendicular to the orientation of urethral closure, with care taken to close all dead space.

13. In patients with poor quality tissues, attenuated periurethral fascia, or significant scarring, a vascularized adjuvant flap such as a Martius flap or biologic graft may reduce the risk of wound breakdown and subsequent complications such as urethrovaginal fistula. If the surgeon decides to utilize the biologic graft, the graft should be placed without tension and secured with multiple interrupted stitches (Figure 3).

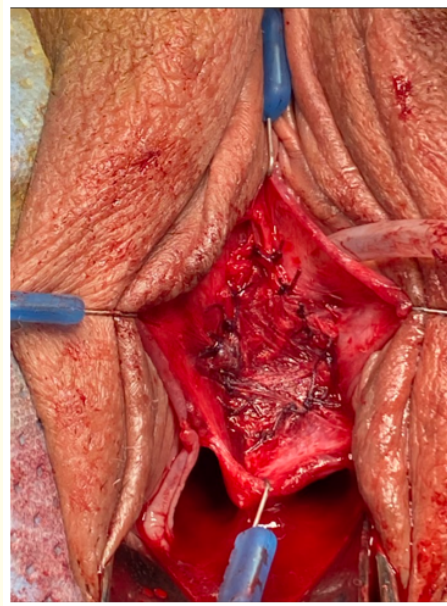


Figure 3: If the surgeon decides to utilize the biologic graft, the graft should be placed without tension and secured with multiple interrupted stitches.

14. The anterior vaginal wall flap is then re-approximated with 2-0 absorbable sutures to complete a three-layer closure (Figure 4).
15. Cystourethroscopy is performed.
16. The Foley catheter is left indwelling with or without vaginal packing.

Postoperative care after transvaginal urethral diverticulectomy

1. The patient can be discharged home same day or stay overnight for observation. Vaginal packing should be removed before discharge home.
2. The patient is discharged with an indwelling urethral catheter for 10 - 14 days.
3. Oral anticholinergics can be prescribed to reduce bladder spasms.
4. Stool softeners are encouraged to reduce straining.
5. Oral antibiotics may be prescribed until the urinary catheter is removed, if the patient has a history of recurrent UTIs.
6. Before removing the catheter, postoperative voiding cysto-urethrogram (VCUG) may be performed 10 - 14 days after the procedure: if no extravasation is observed, the catheter is removed. If extravasation is seen VCUGs are performed every 1 - 2 weeks until resolution of extravasation. In most cases, extravasation will resolve in several weeks with conservative management.

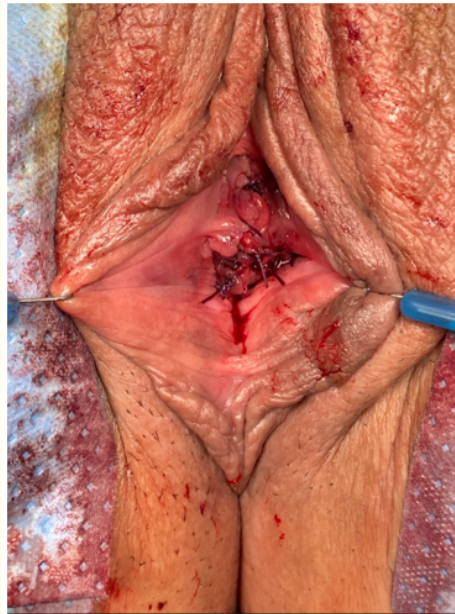


Figure 4: The anterior vaginal wall flap is re-approximated with 2-0 absorbable sutures to complete a three-layer closure.

7. The patient should avoid anything per vagina or heavy lifting for 6 weeks.

Conclusion

Although UD is a rare condition (affecting 1~6% of adult women [2]), it can cause a variety of bothersome symptoms and possible malignancy. Proper assessment and diagnosis of UD is principal. The principles of transvaginal urethral diverticulectomy include careful dissection, complete removal of UD wall, preservation of the vascular supply of flaps, avoidance of overlapping suture lines, and water-tight closure. Utilization of postoperative indwelling catheter can reassure the proper healing of the UD repair site and reduce the risk of urethrovaginal fistula.

Funding Support

No financial support acknowledgement to be reported.

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