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Urethral Diverticulum After Midurethral Sling Erosion, Excision, and Subsequent Management

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Abstract

Background—Urethral diverticulum formation after midurethral sling placement is a very rare complication. Only 3 previous cases have been reported in the English literature. This is the first reported case of urethral diverticulum formation after midurethral sling excision for urethral erosion.

Case—A 43-year-old female patient presented with recurrent stress incontinence after midurethral tension-free vaginal tape sling removal for urethral erosion. Retrograde urethrogram demonstrated a urethral diverticulum. Video urodynamics showed a Valsalva leak point pressure of 50 cm H₂O at 250 mL. She subsequently underwent urethral diverticulectomy with pubovaginal sling placement.

Conclusions—We present the first reported case of urethral diverticulum formation after midurethral sling excision for urethral erosion. Future consideration must be given to full excision of the sling tract during the sling removal operation in cases of urethral erosion to prevent this rare complication.

Keywords

urethral diverticulum; pubovaginal sling; erosion; stress urinary incontinence; midurethral sling

Urethral diverticulum formation after midurethral sling placement is a very rare complication. Only 3 previous cases have been reported in the English literature.^{1–3} This is the first reported case of iatrogenic urethral diverticulum after midurethral sling excision for urethral erosion. In this report, we also review the literature on the use of pubovaginal sling after urethral diverticulectomy.

CASE

A 43-year-old white female patient with a history of urinary stress incontinence underwent midurethral tension-free vaginal tape (TVT) obturator approach sling placement in 2007.

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She subsequently experienced recurrent urinary tract infections and was found to have urethral erosion secondary to the sling passing through the urethra. She underwent a sling excision in April 2013 and was immediately incontinent after catheter removal. The sling was excised transvaginally from one endopelvic fascia to the other side. She presented to our tertiary care center 3 months later with copious amounts of urinary leakage per urethra in standing position accompanied by recurrent stress urinary incontinence. On average, she required 10 pads per day, which were completely soaked, and 1 pad at night.

Examination and evaluation showed no evidence of urethrovaginal fistula. A video urodynamics study was performed, which revealed appropriate bladder sensation (first sensation at 60 mL), normal bladder capacity (480 mL) without detrusor overactivity, and a low Valsalva leak point pressure (50 cm H₂O at 250 mL) suggestive of intrinsic sphincter deficiency. The patient voided by relaxing the urethral sphincter without the presence of a detrusor contraction with maximal velocity of 24 mL/s. Electromyography and bladder compliance findings were normal, and the patient emptied her bladder completely (post void residual, 0 mL). Fluoroscopy during the voiding phase was consistent with an open bladder neck, and a small amount of contrast highlighted what seemed to be a urethral diverticulum with the opening on the left side.

The patient was taken to the operating room for examination under anesthesia, cystourethroscopy, vaginoscopy, and retrograde urethrogram. She was found to have a dimple at the 4-o'clock position in the midposterior part of the urethra, which was continuous with another dimple at the patient's left hand side. A wire was placed into this dimple and demonstrated a urethral diverticulum extending from 4-o'clock to 7-o'clock position and was confirmed on retrograde urethrogram shown in Figure 1. Vaginoscopy did not demonstrate the presence of urethrovaginal fistula or any other abnormalities.

She underwent a definitive urethral diverticulectomy with concurrent placement of a pubovaginal sling. A cystoscopic image of the ostia of the diverticula is demonstrated in Figure 2. The excision of the diverticulum is demonstrated in Figure 3. A strip of rectus fascia measuring 1.5 cm × 8.0 cm was harvested for the pubovaginal sling. Voiding cystourethrogram performed at 4 weeks postoperatively revealed no evidence of urine leak (Fig. 4). The patient was continent with cough and Valsalva maneuvers.

COMMENT

There are 3 previous case reports in the English literature that discuss urethral diverticulum after TVT procedure.^{1–3} In 2006, Hammad¹ reported the development of a urethral diverticulum just proximal to a polypropylene synthetic sling, discovered via voiding cystourethrography, in a woman with previous vaginal prolapse surgery who presented with incontinence in the form of continuous dribbling. Because the patient's symptoms began just a few months after the sling placement, the author concluded that the difficult and extensive dissection performed during the TVT procedure may have resulted in delayed tissue healing in the setting of slightly obstructed urinary flow, thus predisposing the patient to diverticulum formation or exacerbation.¹

In 2008, Mahdy et al² reported the formation of a urethral diverticulum distal to a sling, discovered via urethroscopy, in a woman who presented with nonspecific storage symptoms and abdominopelvic pain 3 years after TVT procedure. The authors stated that the formation of the urethral diverticulum just distal to the sling site was possibly due to a defect in the periurethral sheath observed intraoperatively.²

Finally, Athanasopoulos and McGuire³ reported a case of urethral diverticulum after TVT in a patient with intrinsic sphincter deficiency. The authors postulated that the high pressure in the proximal urethra from an open bladder neck is a predisposing factor for this complication.

The etiology of urethral diverticulum is chronically obstructed and infected periurethral glands that rupture into the urethral lumen.⁴ Risks factors in our patient include her prior surgery, recurrent urinary tract infections, and need for urethral manipulation.

In the current case, we report the finding of urethral diverticulum from urethral erosion caused by a midurethral sling that was treated with sling excision. In light of the patient's symptoms and urodynamic findings at the time of presentation, she underwent urethral diverticulectomy and simultaneous pubovaginal sling placement. The urethral diverticulum was felt to be related to the prior sling that was coursing through the urethra and allowing the urine to travel in the tissue and over time create an epithelialized tract (or capsule/diverticulum) around the sling and into the tissues. This theory is supported by the shape and location of the diverticulum that mimics the path of the sling. Because we were able to visualize the diverticulum only 12 weeks after the sling removal, we believe that the tract and diverticulum were present at the time of the sling excision. However, it was not clearly identified and excised. This emphasizes the need for a thorough investigation to assess for any other abnormalities that may accompany sling erosion. This workup includes a detailed rigid cystourethroscopy in the operating room at the time of sling excision but before starting the incision. Many of these patients have had a cystoscopy in the clinic, but the evaluation of the urethra is often limited while the patient is awake. We also recommend cystourethroscopy after the sling excision and urethral repair in the operating room before the conclusion of the procedure. In addition, fluoroscopy as part of the video urodynamics evaluation may highlight anatomical abnormalities. Future consideration must be given to fully excising the tract during the initial sling removal operation in cases of urethral erosion to prevent persistence or formation of urethral diverticulum.

CONCLUSIONS

We herein report the finding of urethral diverticulum in the presence of stress urinary incontinence after previous midurethral (TVT) sling removal for urethral erosion. To our knowledge, this is the first reported case of iatrogenic urethral diverticulum formation after midurethral sling erosion and excision. The diverticulum was treated with urethral diverticulectomy and concurrent placement of a rectus abdominus pubovaginal sling. Future consideration must be given to evaluating urethral erosions for possible other complications and fully excising the sling tract during the sling removal operation in cases of urethral erosion to prevent this rare complication of urethral diverticulum.

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FIGURE 1.
Retrograde urethrogram demonstrating urethral diverticulum.

FIGURE 2.
Cystoscopy showing ostia of the urethral diverticulum with a needle demarcating entrance.

FIGURE 3.

Intraoperative picture of the urethral diverticulectomy with the lacrimal probe inserted into the urethral diverticulum.

FIGURE 4.
Voiding cystourethrogram performed 4 weeks postoperatively shows no evidence of urine leak.