

Tension-Free Vaginal Tape Sling with a Porcine Interposition Graft in an Irradiated Patient with a Past History of a Urethrovaginal Fistula and Urethral Mesh Erosion

A Case Report

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BACKGROUND: Patients with previous irradiation are at high risk for complications following pelvic reconstructive surgery. The treatment of these complications and the patient's initial disorder can be complex and difficult, especially when the use of various graft materials, including mesh, is involved in the original complication.

CASE: A 49-year-old woman with a history of anal and vulvar cancer treated with pelvic irradiation underwent a tension-free vaginal tape (TVT) sling for stress urinary incontinence (SUI) and experienced complications of urethral mesh erosion and urethrovaginal fistula (UVF). The mesh was removed and the urethra repaired, but the repair failed, and she continued to have a persistent UVF. The patient presented to our center, and the UVF was repaired successfully with a Martius flap. Secondary to persistent SUI with intrinsic sphincter deficiency (ISD), the patient underwent a repeat TVT sling with a porcine interposition graft between the mesh and urethra to help prevent urethral mesh erosion. The patient healed without complications and achieved 80% improvement in her symptoms at 3 months, with only occasional SUI. She was eventually able to achieve 100% cure with the addition of periurethral collagen injections.

CONCLUSION: Porcine interposition grafts while constructing a TVT sling may help reduce urethral erosion rates in patients with previous irradiation. (J Reprod Med 2007;52:560–562)

Keywords: vaginal fistula, urethra, tissue grafts, urethrovaginal fistula, tension-free vaginal tape.

Urethrovaginal fistula (UVF) is a dreaded complication of pelvic floor surgery that is often iatrogenic in developed countries.^{1,2} Although rare, urethral erosion with subsequent urethrovaginal fistula is a recognized complication of incontinence surgery or

pelvic reconstruction utilizing mesh or graft materials.^{3–8} The risk factors associated with genitourinary fistula formation are the same factors that predispose to mesh erosion and include a history of pelvic surgery, pelvic irradiation, or history or presence of cancer or infection.¹ Previous studies have shown a benefit to using interposition grafts

to decrease the failure rate of complex urethrovaginal fistula repair and to improve outcomes in vaginal reconstruction.^{2,9–16} We report on a patient with a history of anal and vulvar cancer treated with pelvic irradiation who developed a urethrovaginal fistula following tension-free vaginal tape (TVT) sling (Gynecare, Sommerville, New Jersey) urethral mesh erosion. After successful treatment of the UVF, she was treated for persistent genuine stress urinary incontinence (GSUI) with a repeat TVT sling utilizing a porcine dermal interposition graft.

Case Report

A 49-year-old woman presented with the complaint of persistent, constant urinary incontinence. She had a medical history significant for vulvar cancer with metastasis to the anus (stage III vulvar cancer) diagnosed and treated in 1982 by total abdominal hysterectomy and bilateral salpingo-oophorectomy and abdominoperineal resection. She was also treated with 2 courses of pelvic irradiation, including external beam, to the vagina and vulva. In 2001 she underwent a TVT sling for GSUI. Her postoperative course was complicated by urethral mesh erosion and resultant urethrovaginal fistula diagnosed approximately 6 months postoperatively. Primary repair with removal of the mesh and multilayer closure was unsuccessful, and the patient was referred to our center for further evaluation.

We report a unique use of an interposition graft to help decrease the risk of a recurrent erosion/fistula in an irradiated patient undergoing a repeat mesh TVT sling procedure for GSUI.

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UVF was confirmed on physical examination, and the patient underwent repair. The fistulous tract was excised and the defect was closed in a multilayer technique. Secondary to her history of pelvic irradiation and failure of 1 standard repair, a labial fat pad flap was dissected free with an incision in the labia majora and then tunneled into the vagina and used as an interposition tissue flap to bring in healthy tissue with a good blood supply and cover over the urethral repair (Martius procedure). The vaginal epithelium was closed over this in standard fashion. There was no evidence of infection, and pathology confirmed the absence of malignancy.

Although the fistula repair was successful, the patient continued to complain of constant, severe urinary incontinence. An office visit 3 months postoperatively confirmed that the fistula repair was intact, but a supine cough test was positive for stress incontinence. The patient also had detrusor instability, which was demonstrated on simple urodynamics with uninhibited detrusor contractions during filling at a volume of 210 mL. The patient was treated with Ditropan XL (Ortho Women's Health and Urology, Ortho-McNeil Pharmaceutical, Inc., Raritan, New Jersey) and also with pelvic floor exercises and vaginal estrogen for 3 months and showed an improvement in urgency and frequency but did not have any improvement in the overall leakage. Her physical examination remained unchanged, and cystourethroscopy was normal, without evidence of fistula or malignancy. Complex urodynamics revealed a more stable bladder, but it also revealed low leak point and urethral pressures, consistent with intrinsic sphincter deficiency (ISD).

After extensive counseling, the patient opted for an attempt at surgical repair with a repeat TVT sling. Because of the high risk of recurrent mesh erosion, a porcine dermal interposition graft was placed between the mesh and the suburethral tissues to help minimize this risk. A 3-cm, midline incision was made in the anterior vaginal wall under the midurethra. The vaginal epithelium was dissected laterally, and a 2×2.5-cm graft of porcine dermis was placed under the suburethral tissue and attached laterally with 3-0 Vicryl sutures (Ethicon, Somerville, New Jersey). The TVT sling was then performed in the standard fashion using intraoperative cough provocation testing for tensioning and adjustment of the sling. The procedure was complicated by 2 bladder perforations, and the trocars were redirected without difficulty and the sling ultimately placed with no penetration into the bladder.

The patient had an uneventful postoperative course and resumed normal voiding within 4 days. Four weeks postoperatively her symptoms were significantly improved, but she was still having occasional urinary incontinence with urgency and frequency. She was diagnosed with a urinary tract infection and treated with antibiotics and subsequently Ditropan XL. Follow-up 8 weeks later revealed resolution of her symptoms, with no leakage or evidence of mesh exposure or erosion. Three months later she returned with complaints of occasional stress leakage. This again was confirmed by supine cough test, and ultimately her symptoms were controlled with periurethral collagen injections. Two years postoperatively the patient was doing well, without any evidence of recurrent erosion or fistula.

Discussion

Although many treatments for SUI exist, only retropubic urethropexy and the pubovaginal sling procedures have been shown to have adequate long-term cure rates. Of these, the midurethral tension-free mesh tape sling procedures have

emerged as a relatively new, minimally invasive treatment for SUI.^{17,18} The TVT procedure has been shown to have a cure rate of 90% and a low risk of complications.^{3,18,19} This procedure is effective for the primary treatment of SUI, stress incontinence with ISD and recurrent SUI in patients who have failed previous antiincontinence procedures.^{17,20} Although rare, one of the potential complications of the TVT procedure is mesh erosion into the bladder or urethra causing the formation of a fistulous tract.⁴⁻⁸ Erosion rates have been estimated to be between 0.3% and 23%, but this is inclusive of all pubovaginal slings.⁷

Patients with a history of urogenital cancer and/or pelvic irradiation are challenging to treat surgically for GSUI. They are at higher risk of such complications as infection, healing complications, rejection of graft material and erosion of the sling into the bladder, urethra or vagina. This may be due to receiving radiation treatment in the past, scar tissue caused by radical pelvic surgery or immune response issues secondary to chemotherapy or the cancer itself. When mesh erosion occurs and a fistula develops, the subsequent treatment of not only the fistula but also particularly GSUI in these patients becomes a complex and difficult scenario. The use of a biologic sling or an interposition graft between the high-risk suburethral tissue and a synthetic sling is a possible consideration.

Autologous interposition grafts, such as the Martius labial fat pad, have been used for many years and have been shown to be very effective in the repair of complicated fistulas, especially in irradiated patients.⁹⁻¹³ More recently, allogenic grafts have emerged as a less invasive alternative to autologous grafts in pelvic floor surgery. Cadaveric dermal allografts have been used successfully in rectovaginal fistula repair and more complicated pelvic reconstruction to improve cure rates and to achieve more anatomic results.¹⁴⁻¹⁶ The use of porcine dermis in rectovaginal fistula and pelvic organ prolapse repair has also been described.¹⁷⁻¹⁹ Porcine dermal grafts offer the same advantages as cadaveric dermal grafts but additionally offer an unlimited supply, decreased risk of viral or bacterial prion transmission, easy storage and handling, and excellent strength characteristics.²⁰ In addition, porcine dermis has been shown to be readily incorporated into host tissue. It has been used extensively in dermal grafting for plastic; ear, nose and throat; and general surgery. Recent reports describe its use in gynecologic surgery as well.²⁰

In the present case we report a unique use of an interposition graft to help decrease the risk of a recurrent erosion/fistula in an irradiated patient undergoing a repeat mesh TVT sling procedure for GSUI. The porcine graft was not used to strengthen the repair but rather to provide a buffer of well-tolerated material between the previously repaired suburethral tissue and the polypropylene mesh of the TVT sling. This approach was preferred over an autologous graft, which would have required a more morbid harvesting procedure to retrieve fascia lata or rectus fascia for grafting. Using the porcine graft under the irradiated suburethral tissue in combination with the TVT sling, rather than using the porcine graft or TVT sling alone, allowed the repair to be done with decreased risk of erosion without compromising the cure rate of the procedure.

Further studies are needed to evaluate the long-term success of such repairs in addition to the prophylactic use of interposition grafts in high-risk patients.

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