

# Abdominal sacrohysteropexy for large iatrogenic early postpartum vesicouterine fistula: An innovative technique

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## Abstract

Sacrohysteropexy is a surgical technique employed for the surgical treatment of uterine prolapse when uterine preservation is desired. Vesicouterine fistulae are rare iatrogenic complications of difficult operative childbirth, typically via caesarean section. If further childbearing is planned, uterus-sparing fistula closure in layers, with interposition grafts, has been described. To further decrease recurrence rates, temporary suspension of the uterus away from the fistula site can be achieved via sacrohysteropexy with absorbable biologic graft. The graft eventually resorbs with return of the uterus to its normal pelvic anatomic location.

Abdominal sacrohysteropexy for large iatrogenic early postpartum vesicouterine fistula: An innovative technique

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**Running title:** Sacrohysteropexy for uterus-sparing postpartum fistula repair

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**Tweetable abstract:**

Biologic graft sacrohysteropexy is an innovative technique used to cure postpartum vesicouterine fistula.

## Main body of text:

### Background:

Iatrogenic fistulae between female urinary and reproductive tracts are rare, but their incidence may be increasing with the universal increase in challenging or repeat caesarean deliveries.<sup>1</sup> Fistulous tracts occur between bladder and uterus or vagina because of absorbable sutures placed for hemostasis or uterine closure in close proximity to, or inadvertently through the bladder wall. They can also occur through thermal injury to the bladder wall during hemostasis attempts. Vesicouterine fistulae are the second most common abnormal communications between urinary and genital tracts post childbirth.<sup>1</sup>

Symptoms of a vesicouterine fistula can be distressing to new mothers, typically trying to cope with the aftermath of a difficult operative delivery while caring for a newborn. These symptoms include various degrees of urinary leaking per vagina and gross hematuria plus or minus amenorrhea.<sup>2</sup> By the time symptoms occur, a diagnosis is made and surgical repair is planned, patients are often at least three months postpartum. The early postpartum period is characterized by a rapid decline in circulating estrogen, with estradiol reaching postmenopausal levels at three months post childbirth in fully breastfeeding mothers.<sup>3</sup> While high estrogen levels encourage wound healing in the immediate postpartum period, the postmenopausal or low estrogen state of breastfeeding mothers is associated with suboptimal or delayed wound healing and possible fistula recurrence. Surgical innovation involves the use of new materials, devices or surgical techniques to improve patient outcomes. With rare conditions such as vesicouterine fistula repairs, surgeons often look to the world literature to seek technical advice. In this case, research is limited to case reports and case series. One of the largest case series reported a recurrence rate of 20% post surgical repair.<sup>2</sup> Therefore, innovative surgical techniques are needed to ensure complete resolution of the fistula at first repair attempt.

Principles of fistula repair include removal of the entire tract, layered tension-free closure with watertight layers in alternating directions, and the use of interposition grafts, typically autologous omental.<sup>4</sup> Essentially, the suture lines need to be separated to encourage healing and avoid recurrence of the abnormal communication tract. Hysterectomy is indicated for definitive management if no further childbearing is desired, or if other uterine pathologies are present.<sup>4</sup>

Sacrohysteropexy is a surgical technique employed for the surgical treatment of uterine prolapse when uterine preservation is desired.<sup>5,6</sup> It involves suspending the uterus to the sacral promontory with a graft of non-absorbable material also known as synthetic mesh. The arms of a T or Y-shaped graft are passed through windows made in the broad ligaments bilaterally at the level of the cervical isthmus. A bladder flap is created anteriorly to allow for attachment of the two mesh ends to the anterior cervix with delayed absorbable or synthetic sutures. The proximal end of the mesh is attached with synthetic sutures to the anterior sacral ligament at the level of the first sacral vertebra, avoiding the intervertebral disk spaces and nearby structures such as the middle sacral artery and vein, the ureter and the aortic bifurcation.<sup>5</sup> Sacrocolpopexy has been performed with biologic absorbable material and sutures.<sup>7</sup> Research showed that this technique is not as durable as its equivalent with synthetic mesh and sutures, presumably because of dissolution of the graft material followed by incomplete scar formation and prolapse recurrence.<sup>7</sup>

However, in the context of fistula surgery, temporary uterine suspension away from the healing bladder trigone with eventual dissolution of the suspensory graft are desirable.

Small intestine submucosa grafts have been shown to dissolve over 8-12 weeks, while acting as a scaffold for collagen deposition along anatomic lines.<sup>8,9</sup> Suspending the uterus close to or above the pelvic brim after fistula tract excision and uterine closure allows time for fistula healing.

### Clinical history

A primiparous patient underwent a difficult caesarean delivery for second stage arrest/cephalopelvic disproportion after uncomplicated term pregnancy and spontaneous onset of labour. Fetal head vaginal disim-

paction was needed to deliver a 3320-g male fetus. Uterine incision was noted to be quite close to the bladder and a bladder injury was suspected. A dilute 250 ml solution of methylene blue was retrograde-instilled into the bladder and no spill was noted into the abdominal cavity. Symptoms of urinary incontinence were noted in the discharge summary two days postpartum. The patient was instructed to perform Kegel's exercises. Because of the intraoperative suspected bladder injury, a computed tomography pelvic scan was ordered and revealed a minimum 3-mm diameter fistula between the posterior aspect of the bladder dome and the lower aspect of the uterus, with extravasation of contrast into the endocervical canal. Ureters were described as uninvolved with the fistula. A Foley catheter was placed for initial conservative management of the fistula. The patient was referred to Urogynecology for further management. Despite continuous bladder drainage via Foley catheter for 3 months postpartum, she experienced ongoing constant urinary leakage per vagina. Immediately postpartum, she also experienced passage of blood clots through and around the Foley catheter, with hematuria eventually stopping a few weeks later. The patient described her childbirth experience as traumatic and her constant vaginal passage of urine as unbearable. A persistent vesicouterine fistula was diagnosed via office cystoscopy and methylene blue tampon test 14 weeks postpartum. Pelvic examination confirmed the presence of normal support of pelvic organs and pelvic floor muscle hypertonicity, presumably secondary to recent traumatic events and the patient's attempts to maintain urinary continence through constant performance of pelvic floor muscle exercises. Surgery was scheduled the day after investigations confirmed fistula location and persistence.

### **Surgical technique and resolution**

The large vesicouterine fistula was visualized cystoscopically above the trigone and a ureter stent was passed into the fistula tract for later localization. Ureteric stents were also placed into the ureters bilaterally. A Pfannenstiel incision was used to access the vesicouterine fistula site. The bladder was dissected away from the lower uterine segment and the fistulous tract was fully excised. Bladder trigone and lower uterine segment were closed in alternating tension-free layers with absorbable sutures. A watertight seal was confirmed with instillation of dilute methylene blue through the Foley catheter. The fistula was in close proximity to the internal cervical os and therefore a cervical dilator was used to delineate the cervical canal and ensure the internal cervical os was not obliterated or incorporated into the uterine closure. Sacrohysteropexy was then performed using an inverted T-shaped sheath (Figure 1) of porcine small intestine submucosa autologous graft: posterior portion was attached to the back of the uterus (Figure 2); arms of the T were passed through the broad ligament windows and attached to the anterior cervix covering the uterine fistula repair site (Figure 3); bottom of the T was attached to the anterior sacral ligament at the level of the sacral promontory. Delayed absorbable PDS sutures were used at all attachment points. This achieved excellent elevation of the uterus away from the site of the fistula. A thin omental layer was placed above the biologic graft, behind the bladder, and secured to the lower uterine segment with delayed absorbable sutures, covering the graft and for purposes of further interposition. The abdomen was then closed and ureteric stents removed. A Foley catheter was placed and left in situ for 14 days postoperatively. It was then removed following a normal voiding cystourethrogram. Cystoscopy with methylene blue tampon test was performed 1 month postoperatively and revealed normal bladder anatomy with no fistula recurrence. Three months postoperatively, the patient was symptom-free and started planning her next pregnancy, with delivery via elective caesarean section. She gave written permission for publication of her clinical history and photographs.

### **Conclusion**

Sacrohysteropexy with absorbable graft can be successfully undertaken in the case of known suboptimal healing states such as in recently postpartum or immunosuppressed patients to separate repaired organ layers and hopefully prevent fistula recurrence. The use of a biologic graft with known absorption time is desirable to ensure exaggerated temporary elevation and subsequent return of the uterus to its normal anatomic position within the lower pelvis.

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