Case report: Development of vesicouterine and vesicovaginal fistulas after uterine rupture

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ABSTRACT

Vesicouterine fistulas are an extremely rare fistula occurring between the bladder and uterus and most commonly occur after lower segment cesarean sections. There are fewer than 100 case reports documenting vesicouterine fistulas, with most managed with open or laparoscopic surgical techniques. We present a novel case, including diagnostic evaluation and robotic-assisted repair, of a simultaneous vesicovaginal and vesicouterine fistula that developed after a uterine rupture that was complicated by multiple cystotomies. A robotic approach affords good visibility of the deep pelvis while still allowing for mobilization of the omentum as an interposition graft, with the benefit of a minimally-invasive approach.

1. Introduction

Fistulous connections between the bladder and other structures can occur as a result of numerous pathologies, including inflammatory and infectious diseases, cancers and cancer-related treatments, and traumatic injury. 1 Vesicouterine fistulas (VUFs) are an extremely rare fistula occurring between the bladder and the uterus with a reported incidence of 1 in 100. 2 In this case report, we detail the evaluation and management of a simultaneous vesicouterine and a vesicovaginal fistula (VVF) that occurred after a uterine rupture complicated by multiple cystotomies.

VUFs most commonly occur after lower segment Cesarean sections and have been reported to occur after operative vaginal delivery, vaginal birth after C-section, uterine rupture, and IUD placement. 3 While VVFs frequently present with urinary incontinence, the presentation of VUFs is more variable and often without incontinence. Occasionally, patients with VUFs present with Youssef’s syndrome: a triad of cyclic hematuria, amenorrhea, and absence of urinary incontinence. 4 Radiologic evaluation of VUFs mirrors that of VVFs, and includes CT, MRI, and VCGU. 1

Treatment for vesicouterine fistulas include both surgical and non-operative options. Key principles for managing any fistulous connection to the bladder include ensuring adequate nutrition to promote wound healing, eliminating infection, maximal urinary diversion, and ruling out cancer as a primary etiology. 1 Conservative management of VUFs can be utilized for poor surgical candidates or patients who desire uterus preservation for fertility. Case reports have documented the successful use of hormonal treatment to induce involution of the VUF while the bladder is maximally drained. 6, 7 Surgical treatment of VUFs historically involves a hysterectomy with primary closure of the bladder. Limited case series have reported uterus-sparing techniques for VUF repair in patients desiring fertility. A 1996 review of 16 patients who underwent uterus-sparing VUF repair documented 5 pregnancies, 4 of which were full-term. 5

We present a novel case of a robotic-assisted laparoscopic repair of both a vesicovaginal and vesicouterine fistula that occurred after a uterine rupture complicated by multiple cystotomies.

2. Case presentation

Our patient is a 35-year-old G3P2 female with no significant medical history who had previously undergone a C-section 10 years prior to presentation. She underwent an emergency Cesarean section for uterine rupture after trial of labor after C-section. The bladder was densely adhered to the uterus and a 10cm cystotomy at the dome of the bladder and multiple additional smaller lacerations to the lateral bladder were identified. These were repaired primarily and the uterus left in place. X-ray cystogram two weeks after surgery via indwelling urethral catheter demonstrated extravasation of contrast into the vagina and uterus. CT cystogram confirmed presence of both a vesicovaginal fistula and a vesicouterine fistula at the dome of the bladder (Fig. 1). Her...
A urethral catheter was maintained for an additional two weeks, however, repeat cystogram demonstrated continued extravasation. Cystoscopy demonstrated a large VVF with an associated mucosal bridge and erythematous changes at the bladder dome consistent with known VUF (Fig. 2). Her VVF was less than 2cm from her left ureteral orifice. Given persistence of her fistulas despite maximal urinary diversion, she elected to proceed with operative repair.

Approximately 5 months after injury, she underwent a robotic-assisted laparoscopic total hysterectomy with repair of both her vesicovaginal and vesicouterine fistula with omental interposition flap (Fig. 3). Bilateral ureteral identification stents were placed. During hysterectomy the vesicouterine fistula was identified and the bladder entered. A supracervical hysterectomy was then performed; the cervix was left in place as a handle to manipulate the vaginal apex to aid in dissection. The fistula was large, extending from the vaginal apex to the superior portion of the trigone. A left ureterolysis was performed to protect the left ureter, although ultimately a left ureteral reimplant was not necessary.

Dissection of the lateral portions of the bladder and vagina were continued to ensure a tension-free repair. After completing the dissection, the cervix was then excised. The bladder and vagina were each closed with 2-0 V-Loc suture (Medtronic, Minneapolis, MN). The vagina was closed longitudinally to preserve vaginal length and caliber. The cystotomy, which connected the VUF and the VVF, was closed in two layers. The bladder was leak-tested to 180mL to ensure a watertight closure. An omental flap was created, and secured distal to the vaginal repair with 2 interrupted polydioxanone (PDS) sutures (Ethicon, Bridgewater, NJ). A surgical drain and a 20F urethral catheter were left in place.

She was discharged to home on post-operative day two. CT cystogram two weeks after surgery did not reveal a leak or fistula. Foley catheter was subsequently removed. She was seen in clinic three months later and was doing well without voiding symptoms or urinary incontinence.

3. Discussion

Given the association of these fistulas with prior surgeries, infection and inflammation, surgical intervention repair of vesicouterine fistulas and complex vesicovaginal fistulas can be challenging. In cases where cystotomy repairs are adjacent to repairs of nearby structures, e.g., bowel injuries, uterine closures, vaginal cuff closures or injuries, etc., an interposition flap should be utilized to reduce the risk of fistula formation to the bladder.

In our institution, a robotic-assisted approach is used for management of vesicovaginal fistulas that cannot be repaired transvaginally. Applying a similar technique, we demonstrate the feasibility of a robotic VUF repair. This patient’s fistula failed conservative management with the techniques detailed above, and given its size and extent, required surgical management. Similar to an open approach, a robotic technique affords good visibility of the deep pelvis while still allowing for mobilization of the omentum as an interposition graft. A robotic approach offers patients the benefits of a minimally invasive approach including a more rapid recovery compared to traditional open surgery.

Regardless of technique used for vesicouterine fistula repairs, it is imperative to ensure adequate nutrition to promote wound healing and

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Fig. 1. X-ray cystogram (A) and CT cystogram (B) demonstrating vesicovaginal and vesicouterine fistulae. The urethral catheter is seen with the tip traversing the vesicouterine fistula.

Fig. 2. Cystoscopic evaluation of vesicouterine fistula at the dome of the bladder (A), large vesicovaginal fistula at the base of the bladder (B), and close proximity of left ureteral orifice to the vesicovaginal fistula (C).

Fig. 3. Dissection of vesicouterine fistula with entrance into bladder (A). Spongestick in the vagina seen through large vesicovaginal fistula (B). Complete removal of vesicouterine and vesicovaginal fistula with left ureter dissected (C). Omental interposition flap (D).
4. Conclusion

Vesicouterine fistulas are a rare pathologic communication between the bladder and the uterus. While conservative management can be successful, most cases are treated with surgical intervention requiring hysterectomy. To our knowledge, we report the first robotic-assisted laparoscopic repair of a simultaneous vesicovaginal and vesicouterine fistula.

Declaration of competing interest

The authors do not report any financial relationships with any entity discussed in this paper. This article does not contain any studies with human or animal subjects performed by any of the authors.

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