LESS

Case Report

Laparosc Endosc Surg Sci 2019;26(2):73-77
DOI: 10.14744/less.2019.90377

Robotic repair of complicated vesico (-utero)/ cervico-vaginal fistula after caesarean section

Pengfei Wang,[1] Michael Mesbah,[1] George Lazarou,[2]
Matthew Wells,[1] Farr Nezhat

[1]Division of Minimally Invasive Gynecologic Surgery and Robotics, Obstetrics and Gynecology Department, NYU-Winthrop Hospital, Mineola, New York, United States
[2]Division of Urogynecology, Obstetrics and Gynecology Department, NYU-Winthrop Hospital, Mineola, New York, United States

ABSTRACT

In developed countries, urogenital fistula primarily occurs after gynecological surgeries, but rarely, it may be seen as a result of obstetric complications. The primary treatment of a urogenital fistula is either transvaginal or transabdominal surgical repair. Presently described is the case of a 36-year-old woman (G3P3003) who developed a complicated large vesico-(utero)/cervico-vaginal fistula after an emergent repeat caesarean section. Robotic repair was performed 2 months after the injury using a modified O'Connor method. Blood loss was minimal and the patient was only in the hospital for 1 day postoperatively. Follow-up showed complete healing of the fistula with no urine leakage, frequency or dyspareunia, and a normal menstrual period up to one year. This case demonstrates that robotic surgery can be effective in the management of complicated urogenital fistula repair.

Keywords: Cesarean section; robotic surgery; urogenital fistula.

Introduction

Urogenital fistula is a devastating and debilitating medical condition for patients. The commonly quoted prevalence is 2 million cases worldwide with 50,000–100,000 new cases each year.[1] Obstetric fistula is a complication of childbirth occurring almost exclusively in developing countries and resulting from prolonged obstructed labor. In industrial countries, iatrogenic injury to the urinary tract is the most common cause of vesico-vaginal fistula (VVF) and the majority results from consequences of benign gynecological surgery. Other causes in the developed world include malignant disease and pelvic irradiation. Emergent or multiple cesarean sections increases the risk of maternal complication significantly, including injury of bowel, bladder, and ureter. Cesarean delivery-related complications can result in fistula involving the lower segment of uterus and cervix. In fact, approximately 80-90% of utero-vaginal fistulas are caused by cesarean section.[2]

Surgery is the preferred approach of treatment, with a success rate of 75–95%. Surgical routes such as transvaginal and open transabdominal fistula repair were all well studied and reported. Nezhat et al.[3,4] first reported their experience of laparoscopic repair vesico-vaginal fistula (VVF) in 1994 and then first laparoscopic repair of rectovaginal

Received: 28.05.2019 **Accepted:** 09.06.2019
Correspondence: Farr Nezhat, M.D., 233 Broadway, Suite 2750 New York - United States
e-mail: farr@farrnezhatmd.com

fistula (RVF) in 1998. Melamud et al.[5] first reported robotic vesico-vaginal fistula (VVF) repair in 2005. However, robotic urogenital fistula repair still is uncommon due to high cost of the device, special surgical training, and rare occurrence of urogenital fistula in industrial countries. We present a case of robotic repair of a complicated vesico-[utero]/cervico-vaginal fistula after cesarean section.

Case Report

A 36-year-old female, with an obstetrical history of primary cesarean section followed by vaginal delivery after cesarean section (VBAC), was scheduled for repeat cesarean section at 39 weeks for breech presentation. She presented at another hospital in spontaneous labor at 38.6 weeks. When found to be fully dilated with breech presentation, she had an emergent cesarean section. During the cesarean section, multiple lower uterine segment and vaginal lacerations were identified and repaired. Gross hematuria was found on post-operative day #1. Urology was consulted and CT cystogram was performed. A defect measuring approximately 1.2 cm in width was identified in the posterior wall of the urinary bladder, with pooling of contrast in the vagina and lower uterine cavity (Fig. 1). Conservative treatment was attempted with continuous bladder drainage through a 16 French Foley catheter. Repeat CT cystogram on post-operative day #14 showed the contrast extending from the posterior urinary bladder to the vagina, consistent with vesicovaginal fistula. Air and contrast were also seen within the uterine cavity of the lower segment/cervical region. Despite the continuation of foley drainage, her vaginal urine leakage persisted on post-operative day #27. The patient was referred to our division of urogynecology. An attempt to perform cystoscopy failed due to the large size of fistula not being able to distend the bladder. The patient was offered an open abdominal total hysterectomy and repair of fistula as she had completed childbearing. The patient declined hysterectomy and requested repair using a minimally invasive approach. Subsequently, she was referred to our minimally invasive surgery division. On physical and pelvic examination, the orifice of the fistula was found at 12 o'clock in the anterior fornix. Urine pooled in the vagina despite the Foley catheter draining the bladder. She was counseled regarding her options of repair and decided on a robotic approach.

Surgical Technique

The procedure was performed under general anesthesia, in the dorsal lithotomy position by an experienced minimally invasive surgeon (FRN). Hysteroscopy was initially performed which showed a defect on anterior of lower uterine segment and cervix. Next, cystoscopy was attempted but the bladder could not be distended due to the large fistula. A pediatric Foley catheter was placed transvaginally to the bladder through the fistula and the balloon was distended to block the bladder fistula, allowing adequate distention of the bladder, and the ability to perform cystoscopy and place bilateral ureteral catheters. The fistula was found to be approximately 1.5x3.0 cm of the bladder trigone. The apex of the fistula was approximately 1 cm distally from urethra. Bilateral ureteral orifices were intact and about 1–1.5 cm away from the edge of fistula (Fig. 2). A HUMI uterine manipulator was placed for manipulation of the uterus and injection of methylene blue dye.

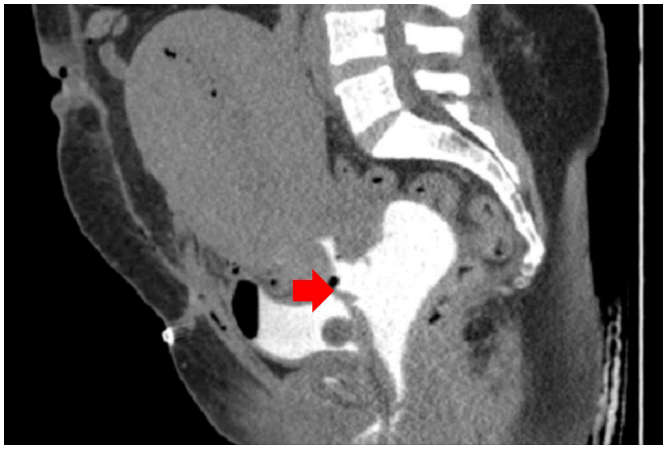

Figure 1. CT cystogram on post-operative day #1 indicated a defect measuring approximately 1.2 cm in width in the posterior wall of the urinary bladder with pooling of contrast in the vagina and lower uterine cavity.

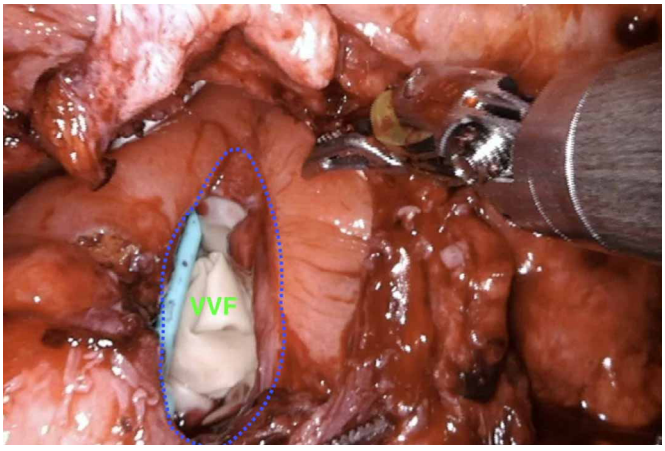

Figure 2. The exposure of fistula after cystotomy. The apex of the fistula was about 1 cm from urethra distally. Bilateral ureteral orifices were intact and about 1.0 to 1.5 cm away from the edge of fistula.

At this time, the robot was docked. Multiple puncture operative robotic surgery using da Vinci® XiTM Surgical System (Intuitive surgical, Sunnyvale, CA) was initiated by placing primary port trans-umbilical as has been described before.[6,7] Extensive lysis of adhesions was performed between the anterior abdominal wall and the uterus. During mobilization of bladder from the lower uterine segment and cervix, an opening to the uterus and cervix occurred immediately and spontaneously. Bleeding and oozing due to the inflammatory process were controlled using gentle bipolar electrodessication. We used the modified O'Connor fistula repair. An intentional 5–6 cm cystotomy was performed on the dome of the bladder allowing better assessment of fistula and vesicovaginal septum.

Using mostly robotic sharp scissors to avoid thermal injuries to the surrounding structures, the bladder was mobilized posteriorly and meticulously. Vesicovaginal septum was dissected to the level of the proximal opening of urethra, where the distal apex of the fistula was exposed and excised from both the bladder and vaginal side (Fig. 3). Hemostasis was achieved by careful application of bipolar energy and injection of diluted pitressin. The vaginal defect edges were trimmed and closed with one layer of 1–0 V-LocTM barbed suture (Covidien) transversely in running style. The bladder edge of the fistula was carefully trimmed. The bladder fistula defect and cystotomy were closed vertically with 2–0 V-LocTM barbed suture in continuous running style in one layer. Placement of the ureteral catheters was very useful to identify the ureteral orifices and to avoid including them in the repair. Bladder integrity was tested by inflating 200 cc normal saline into the bladder. A small cystotomy away from fistula was reinforced with one figure of eight 0-Vicryl suture (Ethicon). The cervix was closed vertically and the lower uterine segment was repaired transversely again using 1–0 V-LocTM barbed suture. The integrity of the closures of the cervix and lower uterine segment was tested with methylene blue injected through the HUMI uterine manipulator and found to be water tight. Finally, an omental flap was interposed between the bladder and vagina, and stabilized with interrupted 0-Vicryl sutures (Ethicon).

The entire procedure time was approximately 4 hours, and estimated blood loss was 100cc. The patient was discharged home on post-operative day #1. She was started on oral birth contraceptive on post-operative day #2 to stop menstruation, and vaginal estrogen cream twice

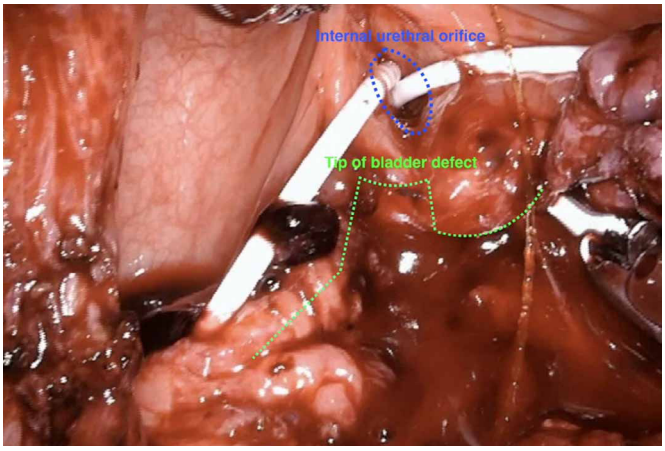

Figure 3. Adequate dissection of the fistula. The edge of fistula was trimmed and healthy tissues from bladder and vagina are prepared.

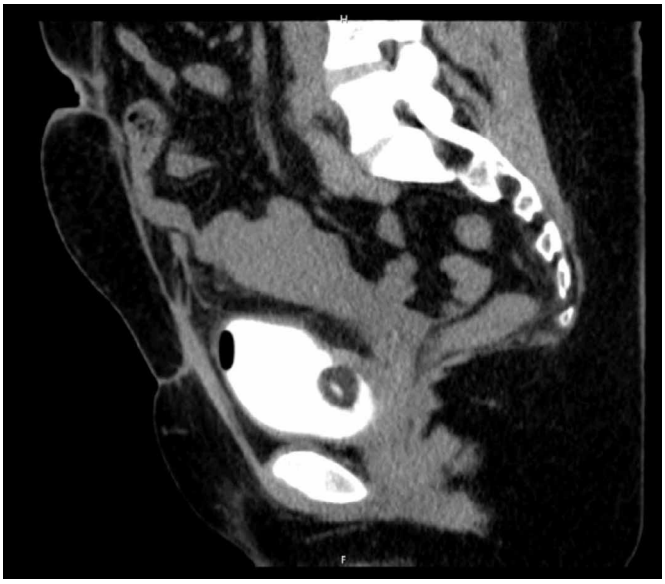

Figure 4. CT-cytogram on post-operative day#21 showed no contrast extravasation. Foley catheter was removed.

weekly for promoting local vaginal tissue health. The patient also received 2 weeks of prophylactic antibiotics. Foley catheter was removed on post-operative day #21 after repeat CT-cystogram showed no contrast extravasation (Fig. 4). Follow-up post-operative care at one year showed that the patient continues to have no urine leakage, no urgency or frequency, and no dyspareunia during intercourse. The patient also has normal menstrual period on oral contraception pills. The repair of fistula is intact.

Discussion

Urogenital fistula is a rare entity but brings overwhelming burden to patients physically, emotionally, and socio-economically. A meta-analysis study showed that less than 1 per 1000 women of reproductive age in low- and mid-

dle-income countries suffered from fistula. The number increased to 1.57 per 1000 when only data from sub-Saharan Africa and South Asia were used. More than 80–90% of obstetric fistula resulted from prolonged obstructive labor due to inability of the facility to complete a cesarean section.[8] Emergent cesarean section is one of biggest risk factors for obstetric fistula. In a large retrospective study of 805 iatrogenic genitourinary fistulas, 57.4% of cases were from cesarean section and 9.8% of cases were from cesarean hysterectomy from uterine rupture in labor. Of the 805 iatrogenic fistula, 351 cases were VCVFs (vesico-[utero]/cervico-vaginal fistula), representing 43.6% of patients.[9]

Although the conservative management of urogenital fistula may be successful in some cases, surgical correction is often necessary. While the best chance to cure urogenital fistula is surgery, the biggest risk factor for a failure of repair or fistula recurrence is previous repair surgeries. Therefore, the choice of surgical mode should depend on surgeon's experience, preference, and the facility. Surgical principle is the same as promoted by Dr. J. Marion Sims in 1852: adequate separation of bladder from uterus and vagina, meticulous hemostasis, adequate fresh tissues on the edge, tension-free and watertight closure, and continuous bladder drainage for 10–14 days. When the fistula involves the uterus and the patient has finished child bearings, concomitant hysterectomy is recommended by most of surgeons. Some literature suggests that there is no need to remove the uterus even if the fistula is large, unless otherwise indicated.[10] The patient in our case strongly insisted to keep her uterus; therefore, hysterectomy was not performed. Performing this repair with laparoscopy rather than laparotomy not only has all the advantages of minimally invasive surgery, but also provides better access and evaluation to the anatomical region, especially in obese patients. Robotic surgery has several merits that conventional laparoscopy lacks, including three-dimensional magnification, tremor elimination, motion scaling, more degrees of freedom with instrumentation, higher quality views, access to challenging anatomical regions such as deep and narrow pelvic inlets, and less surgeon fatigue in sitting position for prolonged procedures. Compared to our previous experience of laparoscopic repair of VVF and UVF,[3,4] we found that adequate exposure, delicate dissection, and flexible suturing from robotic surgery were the major factors for successful repair of this complicated VCVF.

There is also the argument of optimum timing of repair. The traditional opinion is to wait for at least 3 months for inflammation to decrease. However, this statement is arbitrary, with no scientific evidence. For example, Zimmern et al.[11] did not find increased morbidity or failure after the early repair of a VVF at 2–3 weeks after injury. There were two reasons for us to wait for eight weeks to perform the repair: (1) it normally takes 4–6 weeks for gravida uterus for completely involution, and (2) resolution of the patient's urinary tract infection. We encouraged the patient to continue breasting feeding which helps uterus involution and delays the return of menstrual period. The patient continued with OCP daily after surgery to delay menses. Meanwhile, vaginal estrogen cream was applied to facilitate the healing process.

"Closing the hole" may not suffice in restoring quality of life for patients. Empathy and counsel from providers, optimizing the medical condition pre-operatively, excellent surgical design and skills, systematic follow-up, and post-operative management are fundamental for the cure of this devastating disease. Our experience illustrated that successful outcome can be achieved even for complicated cases with sufficient knowledge, skill, facility, and systematic management.

Disclosures

Informed Consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

References

1. Cottingham J, Royston E. Obstetric stula: A review of available information. Geneva: World Health Organization; 1991.
2. Chang-Jackson SC, Acholonu UC Jr, Nezhat FR. Robotic-assisted laparoscopic repair of a vesicouterine fistula. JSLS 2011;15:339–42. [CrossRef]
3. Nezhat CH, Nezhat F, Nezhat C, Rottenberg H. Laparoscopic repair of a vesicovaginal fistula: a case report. Obstet Gynecol 1994;83:899–901.
4. Nezhat CH, Bastidas JA, Pennington E, Nezhat FR, Raga F, Nezhat CR. Laparoscopic treatment of type IV rectovaginal fistula. J Am Assoc Gynecol Laparosc 1998;5:297–9. [CrossRef]
5. Melamud O, Eichel L, Turbow B, Shanberg A. Laparoscopic vesicovaginal fistula repair with robotic reconstruction. Urology 2005;65:163–6. [CrossRef]
6. Nezhat C, Saberi NS, Shahmohamady B, Nezhat F. Robotic-

assisted laparoscopy in gynecological surgery. JSLS 2006;10:317–20.

7. Nezhat FR, Pejovic T, Finger TN, Khalil SS. Role of minimally invasive surgery in ovarian cancer. J Minim Invasive Gynecol 2013;20:754–65. [CrossRef]
8. Adler AJ, Ronsmans C, Calvert C, Filippi V. Estimating the prevalence of obstetric fistula: a systematic review and meta-analysis. BMC Pregnancy Childbirth 2013;13:246.
9. Raassen TJ, Ngongo CJ, Mahendeka MM. Iatrogenic genitourinary fistula: an 18-year retrospective review of 805 injuries. Int Urogynecol J 2014;25:1699–706. [CrossRef]
10. Ali-El-Dein B, El-Tabey N, El-Hefnawy A, Osman Y, Soliman S, Shaaban AA. Diagnosis, treatment and need for hysterectomy in management of postcaesareansection vesicouterine fistula. Scand J Urol 2014;48:460–5. [CrossRef]
11. Zimmern PE, Hadley HR, Staskin DR, Raz S. Genitourinary fistulae. Vaginal approach for repair of vesicovaginal fistulae. Urol Clin North Am 1985;12:361–7.