Robotic assisted laparoscopic repair of vesico-vaginal fistula: the extravesical approach

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The optimal method of vesico-vaginal fistula (VVF) repair remains undetermined. Almost all previous descriptions of laparoscopic/robotic fistula repair involve utilizing a vertical cystotomy to identify the fisula. Avoidance of an intravesical approach to vesico-vaginal fistula repair may decrease patient morbidity. Patient selection, patient positioning, fistula recognition, port placement, intra-operative dissection techniques, flap formation, and repair are outlined in this video of robotic repair of vesico-vaginal fistula utilizing an extravesical approach. The extravesical robotic repair has been successfully utilized in two patients with VVF following hysterectomy. This manuscript and video demonstrates that vesico-vaginal fistulae can be repaired with a robotic assisted extravesical approach avoiding the morbidity of a large cystotomy.

Key Words: robotics, laparoscopy, vesico-vaginal fistula, vagina

Introduction

Repair of vescio-vaginal fistula (VVF) represents a surgical challenge with regards to timing of repair, surgical approach, and postoperative patient management.[1] VVF below the trigone are usually repaired vaginally. Supratrigonal fistulas have been repaired utilizing open and laparoscopic approaches. The first robotic assisted vesico-vaginal fistula repair was performed at the University of California, Irvine.[2] Since that time robotic surgery has continued to be increasingly utilized for urogynecologic surgery.[3] Most robotic repairs of VVF to date have utilized an intravesical approach.[4,5] We describe our technique of robotic assisted laparoscopic repair of a VVF utilizing the extravesical approach.

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*This video is available online at www.canjurol.com

Video description*

The video demonstrates a 42-year-old female who complained of persistent urinary leakage following an abdominal hysterectomy via Pfannenstiel incision. Physical exam and cystography confirmed VVF fistula. CT scan/excretory urogram ruled out a uretero-vesical fistula. Cystoscopy confirmed appearance of the fistula in the supratrigonal midline. The VVF failed a 2 week trial of catheterization. Due to the supratrigonal location of the fistula in the bladder, the patient elected for robotic assisted laparoscopic repair of the VVF.

After induction of anesthesia, the patient is placed in the dorsal lithotomy position using Allen stir ups. Bilateral ureteral identification catheters are placed cystoscopically. The fisula is cannulated cystoscopically with a wire and a 5 Fr open-ended catheter, Figure 1. In this video we were able to pass the catheter into the vagina to achieve through and through access. Although this through and through access is extremely helpful, it may not be feasible in most cases.

Figure 2 demonstrates port placement for robotic VVF repair. Pneumoperitoneum is achieved with the veress needle technique and a 12 mm port placed in the supra-umbilical midline, 8 mm robotic ports are placed 15 cm from the mid portion of the pubic bone

Figure 1. Cystoscopic placement of ureteral catheters and fistula access.
Bilateral ureteral catheters are cystoscopically placed to aid in intraoperative ureter identification. The supratrigonal fistula is cannulated with a 5 Fr open-ended catheter.

and 8 cm from the midline. A 12 mm assistant port is placed 7 cm superior lateral to the right side 8 mm robotic port. A 5 mm assistant port is placed 7 cm superior lateral to the 12 mm camera port.

Once intraperitoneal exposure is achieved, adhesions near the fistula are taken down. It is not uncommon to visualize numerous bowel adhesions in the region of the fistula and careful sharp dissection must proceed in this area. The omental flap is created, and care should

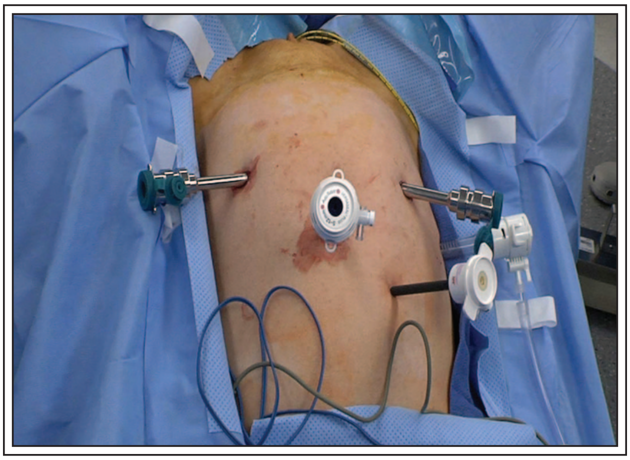

Figure 2. Port placement.
A 12 mm camera port is placed in the supra-umbilical midline. 8 mm robotic ports are placed 15 cm from the pubic bone and 8 cm from the midline bilaterally. A 12 mm assistant port is placed 7 cm superior-lateral to the right side 8 mm robotic port. A 5 mm assistant port is placed 7 cm superior-lateral to the 12 mm camera port.

be taken to insure that the flap length is sufficient to reach the repair area. If an omental flap is not freely available, a peritoneal flap or free bladder mucosal graft may be used. The peritoneum overlying the bladder and vagina is incised. The through and through yellow catheter is used as a guide in this case as a plane is created between the bladder and vagina. A metal vaginal probe aids in exposure during this dissection. Sufficient exposure of the fistula allows for a two layer closure in addition to placement of an omental flap. The vagina is typically closed with interrupted 2-0 monocryl sutures. The omental flap is anchored over the vaginal repair with 2-0 vicryl sutures. Anchoring the omental flap before bladder closure allows for confident full suture line coverage before bladder closure. The bladder is closed in two layers with 2-0 monocryl sutures. Opposing suture lines are created by closing the vagina horizontally and the bladder vertically.

A urethral catheter is placed in the bladder and a pelvic drain is placed. The drain is typically removed on postoperative day number 1 if there is confirmation of no urine leakage and the patient is typically discharged to home on postoperative day 2. The urethral catheter is removed following normal cystography on postoperative day 10-14.

Discussion

Despite a century passing since the first described vesico-vaginal fistula repair (VVF), controversy exists regarding the surgical approach, timing of VVF repair, and postoperative management of patients.[1] In developed countries, VVF occurs most commonly following hysterectomy. Presentation is usually 1 to 6 weeks following the procedure. The diagnosis of VVF is typically made by symptomatic assessment, physical exam, blue dye test and cystoscopy. Cystography will usually demonstrate contrast flowing from the bladder to the vagina. Fistulas below the trigone are usually repaired vaginally. Supratrigonal fistulas have been repaired utilizing open and laparoscopic approaches. The first robotic assisted vesico-vaginal fistula repair was performed by the University of California, Irvine.[2] Since that time robotic surgery has continued to be increasingly utilized for urogynecologic surgery.[3]

Most robotic repairs of VVF to date have utilized an intravesical approach.[4-6] This manuscript and video describe the robotic repair of a VVF with an extravesical approach. This approach allows for the basic principles of fistula repair to be followed while eliminating the morbidity of a large cystotomy. An initial large cystotomy may also pose a problem during robotic surgery with loss of pneumoperitoneum.

Clamping the catheter may aid in preventing loss of pneumoperitoneum if a large cystotomy is required.[6] This technique may demonstrate progress considering that prior robotic series utilizing a cystotomy for fistula recognition required average hospital stays of 3.1 to 5 days.[4,6] Avoiding a large cystotomy may aid in postoperative recovery and make the robotic approach technically easier.

We have successfully performed this procedure on two female patients (ages 42 and 51) for VVF following hysterectomy. Both patients were noted to have supratrigonal fistulae following hysterectomy that were accessible via intraperitoneal approach. Both patients were discharged to home on postoperative day number 2 without complications and neither have had VVF recurrence after 1 year follow up. Patient selection is key for success of the extravesical VVF repair. The fistula must be in a supratrigone location with easy intraperitoneal access. The intrinsic properties of the bladder wall and vagina (distensability, color of tissue, etc) may aid in determining how mobile the bladder and vagina will be intraoperatively. The more amendable the vagina and bladder are to be mobilized, the more facile the extravesical robotic approach will be. Failure to identify the fistula will require a midline cystotomy for VVF identification. Hemal et al[7] have noted another advantage of robotics in VVF repair is the ease at which ureteral reimplantation can be performed in cases where simultaneous ureter-vaginal fistula is noted.

As with all pelvic laparoscopic surgery, it is widely accepted that a pure laparoscopic approach to VVF repair carries with it a considerable learning curve.[8] We believe the robotic platform aids in magnified dissection of VVF and improves suturing compared to pure laparoscopic techniques secondary to the wristed movements allowed with the technology. Yet, it is also felt that adoption of a robotic approach should be cautiously performed until proven to be reproducible and more effective than other traditional approaches.[9] This technique has resulted in minimal morbidity, a short hospital stay and a quick recovery. This technique should be considered for supratrigonal fistulae where a transvaginal approach would be difficult to perform.

Conclusion

This manuscript and video demonstrates that VVF can be repaired with a robotic assisted extravesical approach avoiding the morbidity of a large cystotomy. This technique may prove most beneficial in properly selected patients with supratrigonal fistulae. □

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