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LAPAROSCOPIC REPAIR OF URETER RESECTED DURING OPERATIVE LAPAROSCOPY

Camran Nezhat, MD, and Farr Nezhat, MD

Ureteral injury is a recognized complication of gynecologic surgery. During operative laparoscopy performed to treat extensive endometriosis of the pelvic sidewall, a 1.5-cm portion of the right ureter was resected and was repaired successfully. Repair of a resected ureter may be effectively accomplished endoscopically by experienced operative laparoscopists. *(Obstet Gynecol 1992;80:543–4)*

Dowling et al[1] reported that up to 75% of ureteral injuries occur during gynecologic procedures. Gomel and James[2] reported a laparoscopic ureteral injury that did not involve ureteral resection. We describe laparoscopic anastomosis for the repair of a ureter resected during operative laparoscopy. To our knowledge, this report is the first to detail the repair of a completely resected ureter.

From the Department of Obstetrics and Gynecology, Mercer University, Macon; and the Center for Special Pelvic Surgery, Endometriosis Clinic, Atlanta, Georgia.

Case Report

A 31-year-old woman with a long history of incapacitating pain caused by severe endometriosis underwent operative laparoscopy after hormone therapy failed to relieve her pain. Although we were aware of the degree of her endometriosis, we have had excellent results using laparoscopic treatment for this disease.[3,4] In addition, we have frequently treated endometriosis near the ureters, bladder, and bowel.[3–5] Thus, after consulting extensively with the patient and obtaining the appropriate consent forms, we performed diagnostic and operative laparoscopy. The findings included severe endometriosis of the rectum and both pelvic walls, and a right ovarian endometrioma. The endometriosis was more severe on the right side. Both tubes were adherent to the ovaries, and the ovaries to the ovarian fossa. Severe nodularity of the rectovaginal septum was detected during simultaneous rectal and vaginal examinations. Using an Ultrapulse carbon dioxide laser (Coherent, Palo Alto, CA) via videolaparoscopy[3] (Circon-AMCI, Stamford, CT), we lysed all adhesions and freed the pelvic structures from the pelvic wall. The endometriosis was excised or vaporized and the endometrioma removed. The rectosigmoid colon was separated from the posterior aspect of the uterus and uterosacral ligaments.

We identified the ureters at the level of the pelvic brim and gradually freed them from the surrounding endometriotic tissue. The peritoneum was severely involved with endometriosis and fibrosis. During excision of this area, we resected a 1.5-cm portion of the right ureter midway between the pelvic brim and the ureterosacral ligament. Because we had successfully performed ureteroureterostomy to treat a ureter obstructed by endometriosis, we believed that the repair could be accomplished laparoscopically.[3–5] After consulting a

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urologist and discussing the associated risks and possible complications with the patient's family, we decided to attempt the repair laparoscopically.

The edges of the laceration were identified and the remaining endometriosis removed. Intravenous injection of indigo carmine dye revealed leakage from the proximal ureter. The proximal and distal ends of the ureter were held with the grasping forceps, and the carbon dioxide laser was used to free the ureter from its periureteral attachments for approximately 2–3 cm on each side. After adequate length was obtained, the proximal and distal edges were held together with a 4-0 polydioxanone suture (Ethicon, Somerville, NJ). A stay ureteral stent, introduced cystoscopically by the urologist, was moved past the injury at the distal portion of the ureter, then fed by the grasping forceps to the proximal portion of the ureter and into the right renal pelvis. The stent was secured outside and placed on continuous drainage.

We repaired the ureter by applying four 4-0 polydioxanone sutures at the 12-, 6-, 9-, and 3-o'clock positions, using two laparoscopic needle holders and extracorporeal knotting. The lacerated edges were well approximated. A Jackson-Pratt drain was inserted and an indwelling Foley catheter was introduced into the bladder. The duration of the entire procedure was 187 minutes, and the repair took 35 minutes. One gram of cefoxitin was given preoperatively and continued postoperatively (1 g every 6 hours) until the patient was discharged from the hospital.

On the first postoperative day, there was no drainage from the Jackson-Pratt drain and it was removed. No postoperative complications were noted. The patient remained afebrile with normal renal function tests and sterile urine. Although the ureteral stent stayed in place, the Foley catheter was removed. The patient was discharged on the second postoperative day and prescribed prophylactic antibiotics (Septra DS; Burroughs Wellcome, Research Triangle Park, NC). Six weeks postoperatively, we removed the ureteral catheter and noted no evidence of ureteral dilation or stenosis. An intravenous pyelogram revealed no leakage.

Discussion

To help prevent ureteral injury, we recommend identifying the course of both ureters, from their entrance to the pelvic cavity until they reach the bladder, before working near the ureters or bladder. However, some degree of risk is associated with any surgical procedure. This increased risk of injury during operative laparoscopy is related to the complexity of the procedure and the surgeon's experience. Accordingly, the pelvic cavity must be inspected as thoroughly as possible at the end of any procedure. In cases of suspected injury, injection of indigo carmine dye may locate a laceration. When injury is noted, the surgeon should attempt repair via the technique(s) with which he or she is most familiar.

In most cases, ureteral injury during operative laparoscopy is repaired by laparotomy.[2,6] The only report of ureteral damage secondary to operative laparoscopy and repaired laparoscopically involved an injury to the left ureter 7 cm from the bladder, which was repaired with a single suture of 4-0 plain catgut.[2] Laparoscopic ureteroureterostomy has been performed to treat a ureter obstructed by endometriosis.[4,5] To our knowledge, ours is the first successful intraoperative laparoscopic repair of a ureteral resection.

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Address reprint requests to:
Camran Nezhat, MD
5555 Peachtree Dunwoody Road NE
Suite 276
Atlanta, GA 30342

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