

Ureterovaginal Fistula and Laparoscopic Repair: A Case Report and Literature Review

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ABSTRACT

Iatrogenic ureteral injuries are mainly associated with gynecologic procedures and other abdominopelvic interventions. They may go unrecognized during surgery and subsequently present with pain, fever, urinoma, obstruction, deterioration of renal function on serum biochemical testing, or vaginal urinary leakage after a fistulous tract forms between the ureter and vagina.

In ureterovaginal fistulas, ureteral stenting is an initial option in selected patients; when it fails or when a complex distal injury is present, ureteral reimplantation is the definitive treatment, either through an open or laparoscopic approach. A psoas hitch brings the bladder closer to the viable ureter and facilitates a tension-free anastomosis. We present a case of a delayed right ureterovaginal fistula after myomectomy, treated with laparoscopic Lich-Gregoir ureteral reimplantation plus psoas hitch, resulting in resolution of the leakage and recovery of biochemical renal function.

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BACKGROUND

Iatrogenic ureteral injury is an uncommon but potentially serious complication of abdominopelvic surgery. Gynecologic procedures are among its main causes because of the close anatomical relationship of the distal ureter with the uterine artery, cervix, ovarian vessels, and vaginal cuff.¹⁻⁴ The risk increases in the presence of large uterine leiomyomas, endometriosis, neoplasms, intraoperative bleeding, previous surgery, and pelvic adhesions, all of which may distort the anatomy and hinder ureteral identification.^{1,2,5} Mechanisms of injury include ligation, partial or complete transection, crushing, angulation, devascularization, and thermal damage. Some injuries are not recognized during the initial procedure and later present with abdominopelvic pain, fever, urinoma, hydronephrosis, impaired renal function, or vaginal urinary leakage. Likewise, the absence of hematuria does not exclude ureteral injury.^{1,6,11}

A ureterovaginal fistula is an abnormal communication between the ureter and vagina, generally caused by an unrecognized ureteral injury during pelvic surgery.⁷⁻¹⁰ Its characteristic manifestation is continuous urinary leakage

through the vagina, frequently accompanied by preserved voluntary voiding; this clinical presentation should raise suspicion of a ureterovaginal fistula and helps distinguish it clinically from other fistulas, such as a vesicovaginal fistula. CT urography with an excretory phase can identify urinary tract dilation, delayed excretion, urinoma, and contrast extravasation from the ureter into the vagina.^{7,8,11} Cystography allows assessment of bladder integrity and exclusion of a vesicovaginal fistula. When findings are inconclusive, retrograde or antegrade pyelography can define the location and extent of the injury.^{1,6,8}

The goals of treatment are to control extravasation, preserve renal function, and restore urinary continuity. In selected patients, initial urinary diversion with a double-J ureteral stent or percutaneous nephrostomy may be attempted.^{1,6-9} Resolution rates with ureteral stenting vary and depend on the duration of the condition, ureteral viability, defect length, and the ability to traverse the injured segment.^{7,8}

When endourologic treatment fails, the fistula persists, a complex distal injury is present, or renal function deteriorates, surgical reconstruction is indicated.^{6-9,11} For distal ureteral

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injuries, ureteroneocystostomy using the extravesical Lich-Gregoir technique is a reconstructive option. When ureteral length is insufficient, a psoas hitch enables bladder mobilization toward the proximal ureter and creation of a tension-free anastomosis.^{13,14}

Laparoscopic and robotic approaches allow the principles of open surgery to be applied with less bleeding, less postoperative pain, and a shorter recovery time in appropriately selected patients.¹⁵⁻²⁰

CASE PRESENTATION

A 38-year-old woman from the Yucatán Peninsula, a homemaker, had no relevant family history and denied chronic degenerative diseases. Her surgical history included exploratory laparotomy in 2009 for an ectopic pregnancy. Her present illness began on April 23, 2025, when she was scheduled at a medical unit in her home state for exploratory laparotomy because of abnormal uterine bleeding secondary to large uterine leiomyomas. During myomectomy, however, she sustained an unrecognized complete disruption of the distal right ureter, classified as AAST grade IV. An end-to-end ureteral anastomosis was performed by the general surgery service. Seven days after the operation, she developed febrile episodes and abdominopelvic pain. CT urography demonstrated a urinoma and urine extravasation at the distal ureter. She was referred to the emergency department and received without evidence of hemodynamic compromise; laboratory testing showed neither leukocytosis nor anemia, and renal function was preserved. Because of the AAST grade IV ureteral disruption, cystoscopy and bilateral ureteroscopy with placement of a right double-J ureteral stent were performed on May 20, 2025. The ureteral stent was removed three months later. In January 2026, the patient again presented to the emergency department because of urinary leakage through the vagina. CT urography and CT cystography were obtained during the same admission. The right kidney was enlarged with loss of its usual morphology;

the right ureter was dilated, and excretory-phase contrast passed from its distal segment into the vagina. CT cystography showed no contrast leakage into the vagina, and the bladder wall was intact without filling defects. Normal saline with methylene blue was also instilled, and cystography was performed in anteroposterior and lateral projections to exclude a bladder-to-vagina fistula. Based on these findings, a transurethral Foley catheter was placed, yielding urine with sediment, and intravenous treatment with a third-generation cephalosporin was administered. Elective surgery was scheduled and performed on May 20, 2026: laparoscopic Lich-Gregoir ureteral reimplantation with psoas hitch. Findings included multiple bowel-to-abdominal-wall adhesions along the midline, dilation of the proximal right ureter, and extensive mesentery-to-distal-ureter adhesions. There were no intraoperative or postoperative complications and no blood-product transfusion was required. After surgery, the patient remained hospitalized for strict monitoring of output from the Penrose drain placed toward the space of Retzius and of urinary output, surgical wound care, pharmacologic and mechanical thromboprophylaxis for 48 hours during absolute bed rest to prevent suture dehiscence, and biochemical monitoring. Her leukocyte count improved compared with the value before admission, although nitrogenous waste levels remained mildly elevated. After seven days in the hospital and with a favorable clinical course, she was discharged with the transurethral Foley catheter. At the one-month outpatient follow-up, laboratory tests showed improvement in renal function and nitrogenous waste levels. The transurethral catheter was removed, removal of the double-J stent was scheduled, and follow-up CT urography performed three weeks later confirmed adequate passage of contrast throughout the entire right ureter during the excretory phase.



Figure 1. Sagittal computed tomography image obtained during the excretory phase. Contrast medium is seen passing from the distal right ureter into the vaginal cavity.



Figure 2. Coronal and axial computed tomography images obtained during the excretory phase, showing marked dilation of the renal pelvis and proximal ureter.

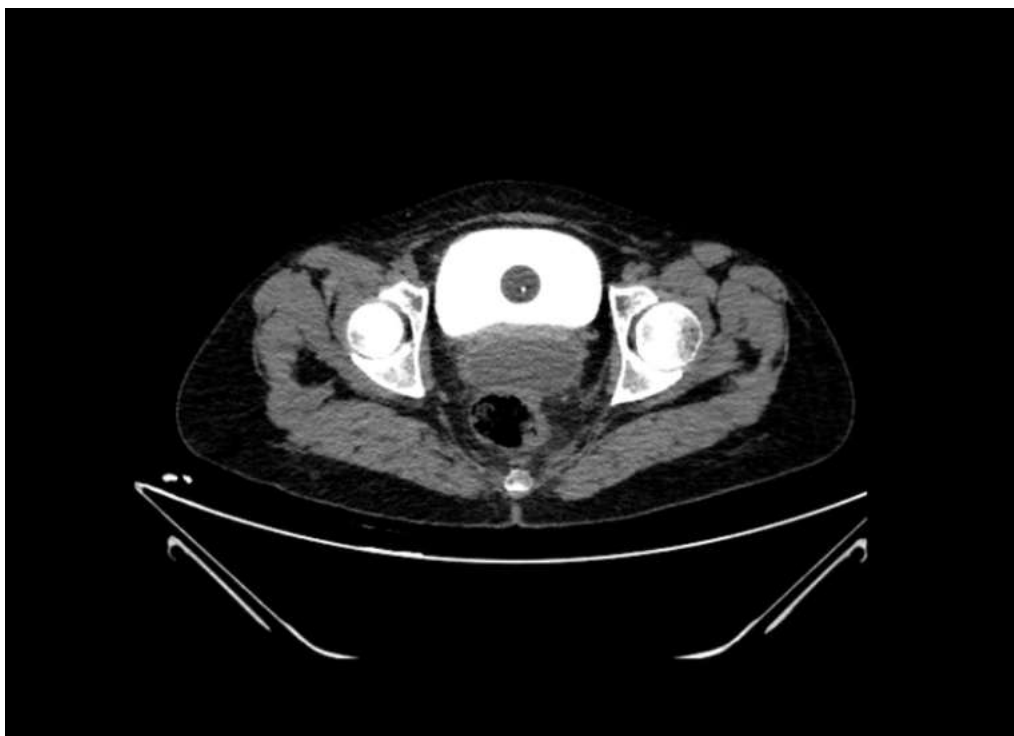


Figure 3. Axial CT cystography image showing formation of a urinoma in the pelvis.

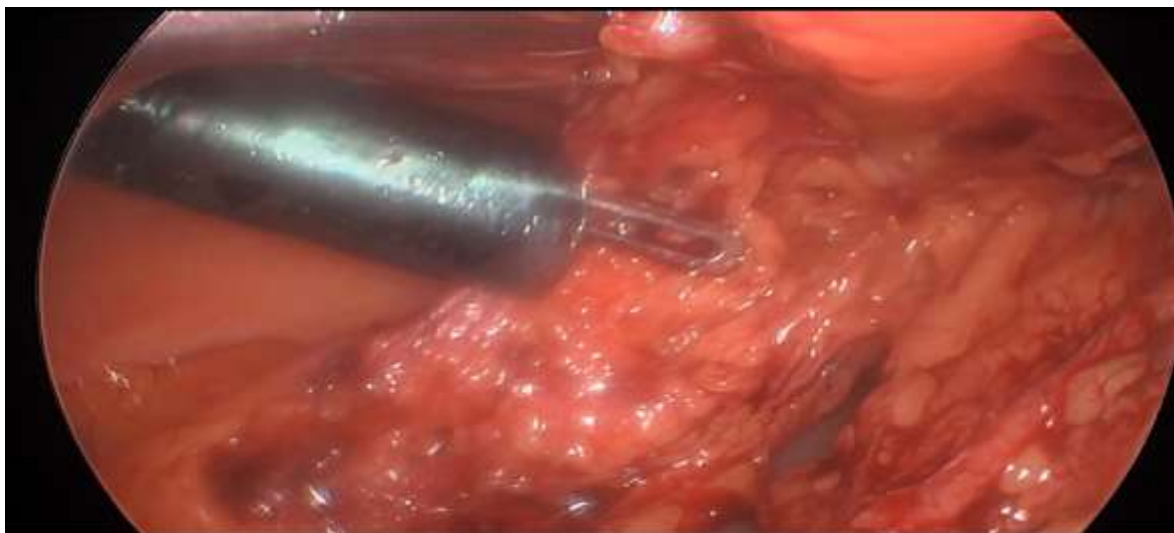


Figure 4. Multiple bowel-to-abdominal-wall adhesions are observed; adhesiolysis was performed.

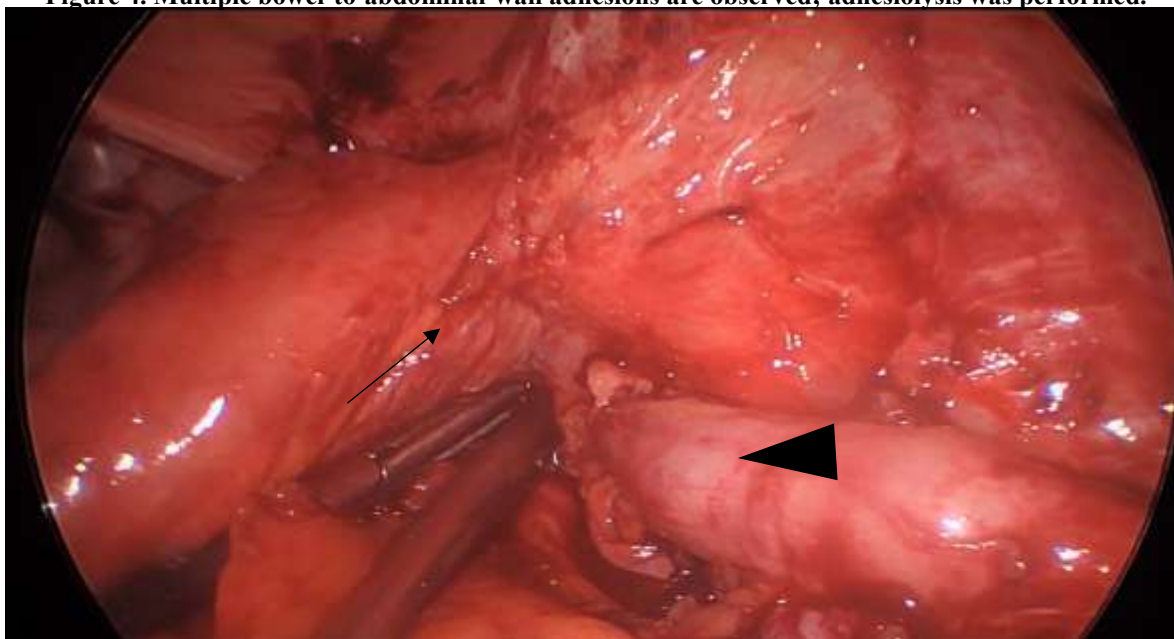


Figure 5. Distal segment of the right ureter (thick arrow), which was densely adherent to the ileal serosa, peritoneum, and abdominal wall (thin arrow), where the proximal portion of the ureterovaginal fistula was located.

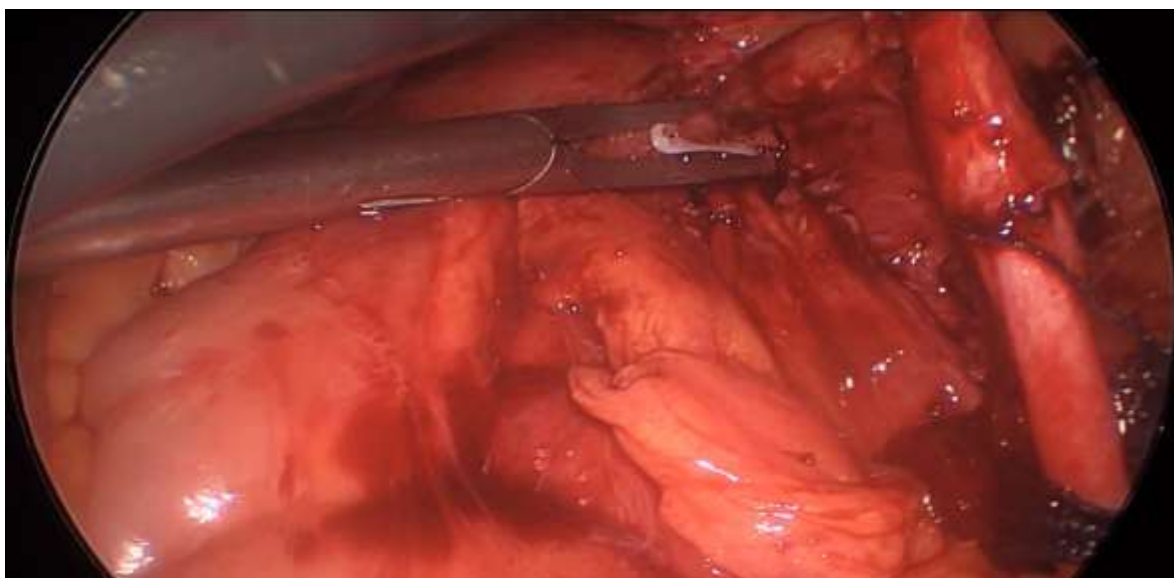


Figure 6. Placement of a Hem-o-lok clip on the distal ureter before transection. The proximal ureteral end was also released to reduce traction during reimplantation.

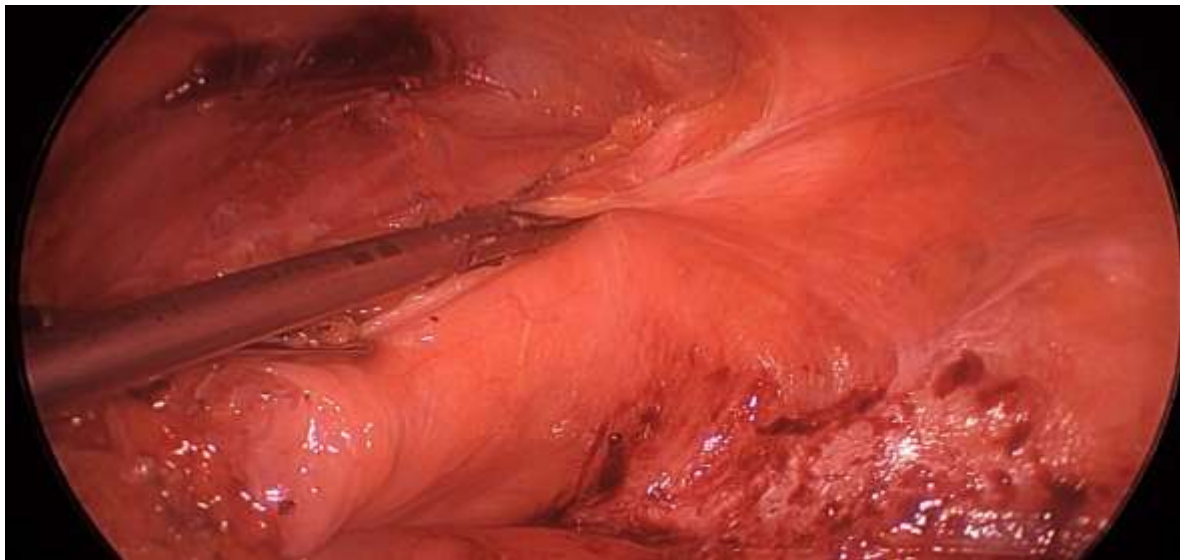


Figure 7. Release and mobilization of the bladder from the anterior wall.

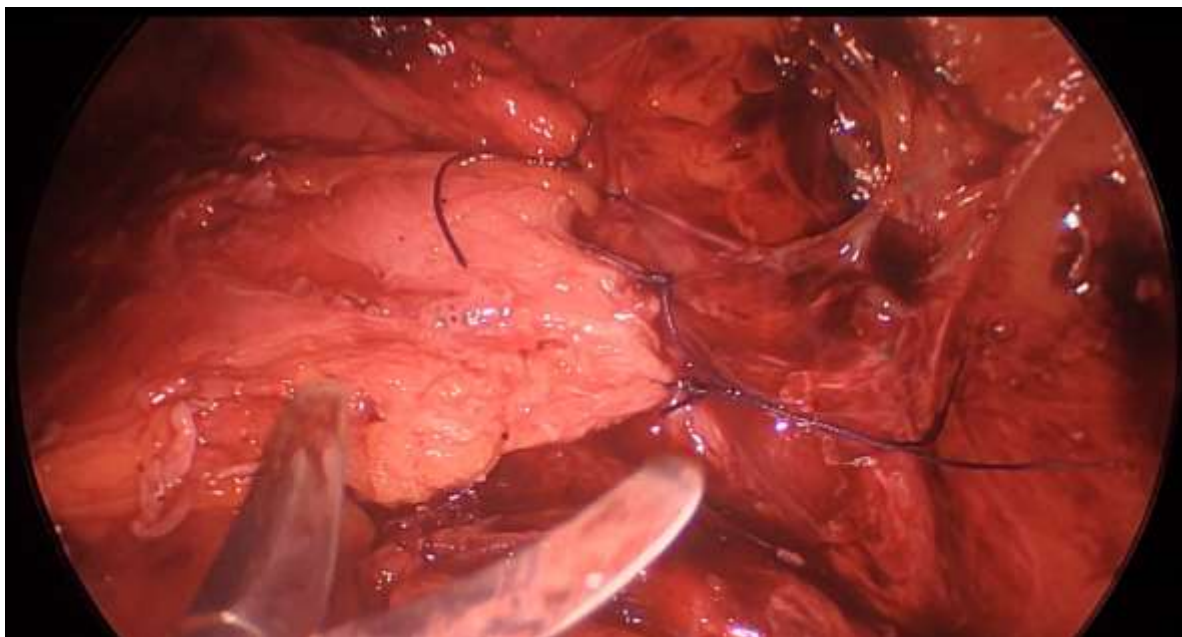


Figure 8. Three Vicryl sutures were placed to perform a Psoas hitch of the right bladder wall.

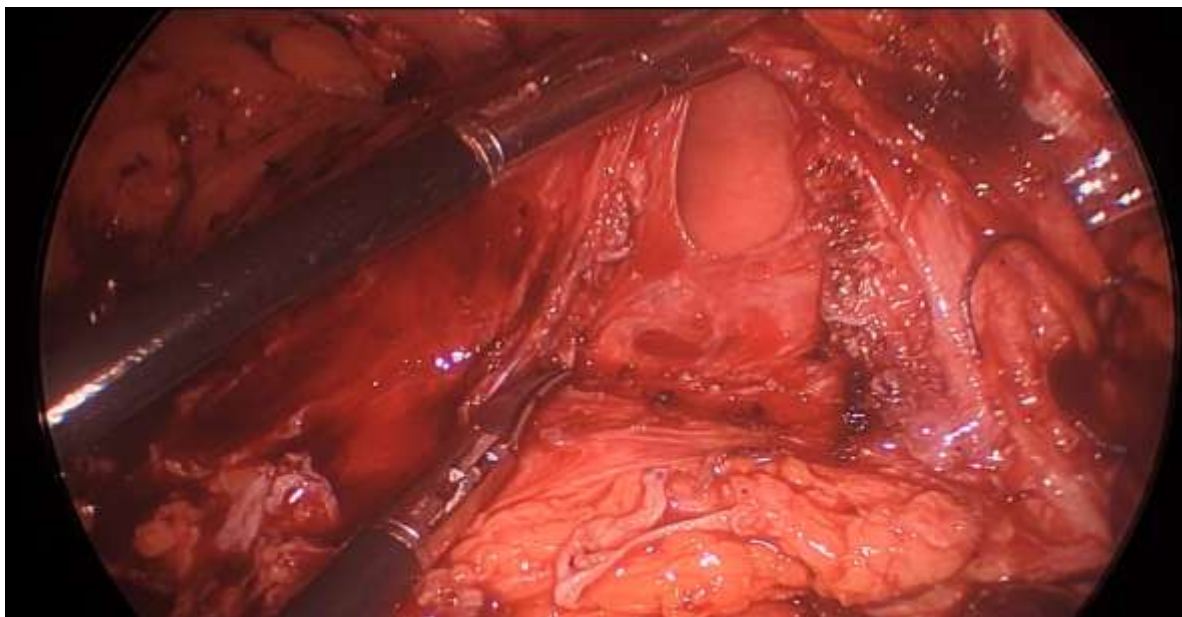


Figure 9. The bladder wall was opened at the dome and its edges were remodeled to perform right ureteral reimplantation.

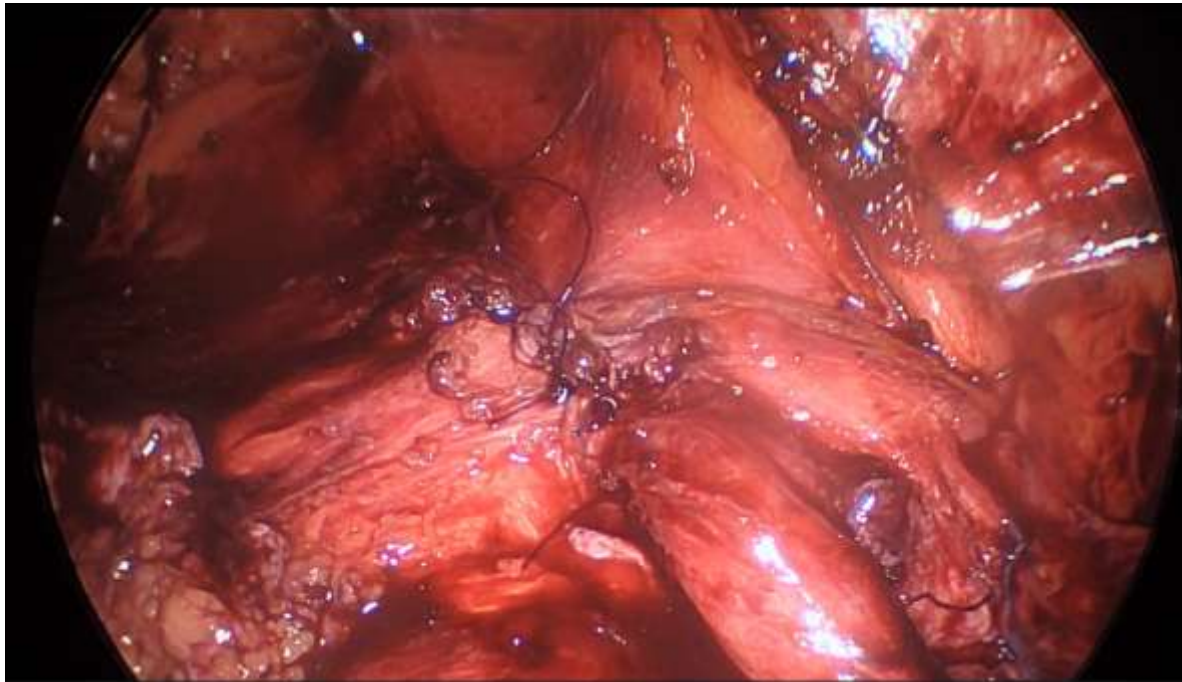


Figure 10. Final appearance of the right ureteral reimplantation performed with Monocryl after placement of a double-J stent. A hydraulic test with 200 mL of saline solution showed no leakage and confirmed a watertight closure.

INFORMED CONSENT

Before data collection and preparation of this manuscript, the purpose of the report was explained to the patient in person, and follow-up was conducted by telephone and text message. She currently reports a good quality of life after the intervention. She was informed that the literature providing guidance on ideal management and outcomes is limited; nevertheless, the data and follow-up collected in this case may guide future work related to this condition, its timing, and the type of intervention. The patient agreed to publication and reported no conflict of interest.

The General Health Law of Mexico and its secondary regulations, including NOM-004-SSA3-2012 on medical records and the Regulations of the General Health Law Regarding Health Research, establish the mandatory requirement for informed consent for any medical procedure and research involving human participants, including publication of case reports. The patient must be informed of the purpose of the study, and the principles of autonomy, confidentiality, and privacy, as well as the right to withdraw participation from the project, must be respected.

DISCUSSION

Ureterovaginal fistula is an uncommon complication of gynecologic surgery and is related to the close anatomical proximity of the distal ureter to the uterine artery, cervix, and vaginal cuff. Thus, as in this case, the patient's leiomyomatosis may make identification and dissection of the ureter difficult.

Although the injury was recognized and repaired during the gynecologic procedure, the subsequent appearance of fever, pain, urinoma, and extravasation suggested failure of the

initial repair. Possible causes include ischemia, anastomotic tension, devascularization, obstruction, or unrecognized thermal injury.^{6,11}

Placement of a double-J stent was an appropriate initial measure to promote drainage and healing. The success of this treatment varies: Shaw et al. reported resolution in 71% of selected cases, whereas Chen et al. reported higher rates.^{7,8} In this patient, the onset of transvaginal urinary leakage after stent removal indicated failure of endourologic management. CT urography demonstrated passage of contrast from the distal ureter into the vagina, whereas cystography and intravesical methylene blue instillation showed no bladder extravasation. These findings confirmed the ureterovaginal fistula and excluded a vesicovaginal fistula.^{7,8,11}

Persistence of the fistula, urinary tract dilation, and renal impairment justified definitive reconstruction. In distal injuries, ureteroneocystostomy allows resection of the affected segment and restoration of urinary continuity.^{6,12-14} A psoas hitch facilitates a tension-free anastomosis when the length of viable ureter is insufficient to reach the bladder.^{13,14}

The laparoscopic approach allowed completion of Lich-Gregoir reimplantation with 100 mL of blood loss and no complications, despite the patient's multiple adhesions. Contemporary series show favorable results with laparoscopic and robotic techniques, although the evidence comes mainly from retrospective studies with small samples.^{9,15-20}

The decrease in serum creatinine from 5.3 to 1.2 mg/dL and in BUN from 66 to 18 mg/dL, together with disappearance of the leakage and adequate contrast transit, support clinical, functional, and radiological success. Nevertheless, long-term

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follow-up is required to detect stricture, recurrent hydronephrosis, infection, or late renal impairment.^{6,8,13}

CONCLUSION

Ureterovaginal fistula should be considered in patients with vaginal urinary leakage after pelvic surgery, particularly when cystography does not demonstrate bladder communication. Excretory-phase CT urography was decisive in locating the injury in this patient and enabled better planning of the subsequent intervention. After less invasive management with a double-J stent failed, laparoscopic ureteral reimplantation achieved a successful anastomosis, resolution of leakage, and substantial patient recovery. We therefore consider that this intervention is a successful definitive treatment option, in agreement with the published literature.

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