

A Case Report: Delayed Onset Urinary Tract Injury after Laparoscopic Hysterectomy

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Abstract

Objective: Lower urinary tract injury in hysterectomy is rare, but once it occurs, the consequence can be deteriorating. We experienced late onset urinary tract injury that developed as late as 15 days after laparoscopic hysterectomy. The objective of this case report is to alert all gynecological laparoscopists that such late onset complication may happen to any of patients.

Case report: A 46-year-old G2P2 woman with submucosal uterine fibroma underwent laparoscopic hysterectomy. Both the operation and postoperative course unremarkable. Intravenous pyelography (IVP) done on POD2 was normal. On POD15, the patient suddenly started complaining left lower back pain. IVP was repeated which showed apparent left hydronephrosis. On the next day (POD16), the patient developed ureteral-vaginal fistula. The patient was referred to urologist and underwent bladder-ureter new anastomosis.

Conclusion: We should keep it in mind that such late onset urinary tract injury is very uncommon but may happen to any patients. High level of suspicion during operation and a low threshold for intervention after operation is required.

Keywords: Laparoscopy; Urinary Tract Injury

Introduction

Iatrogenic ureteral injury (UI) in laparoscopic hysterectomy (LH) represents an uncommon but potentially morbid surgical complication [1]. The incidence of UI has been reported as 0.3 to 1.3% [1-4]. The rate per se is very low but the sequelae can be devastating.

A number of new methods has been developed in purpose of preventing UI and avoiding concomitant trouble afterwards. Since 2008, we have introduced intraoperative ureteral catheter (UC) placement in LH as a routine procedure [5]. Placement of UC makes it much easier for operators to determine anatomical relationship between ureter and uterine artery. Easier detection of ureters has made each step of LH easier, and consequently contributed to shorten operative time [5]. It also has given great relief to surgeon because they can always be aware where the ureter is [5].

In addition to UC placement, we routinely take intravenous pyelography (IVP) twice; before surgery and two to three days after surgery to compare before-and-after. With mandatory UC and double IVP, we have experienced only one UI in last three years (one out of 357 cases; incidence is 0.28%).

However, we recently experienced a case of delay onset UI after LH. IVP on POD2 was unremarkable. The patient had been asymptomatic until the UI developed on POD15. Here, we present the case in detail and hope that this case would be an alert to all gynecological laparoscopists those who are engaged in hysterectomy that such late onset UI may possibly occur no matter how one carefully performs surgeries.

Case Presentation

A 46-year-old G2P2 woman presented to our facility with chief complain of worsening hypermenorrhea and dysmenorrhea. Her past medical history was unremarkable. Transvaginal ultrasound and pelvic MRI revealed submucosal uterine fibroma, the size was 4.5cm in a diameter. Initial serum hemoglobin level was 8.5 mg/dL. She desired removal of uterus and was placed on iron supplementation and two course of GnRH agonist. When her serum hemoglobin was improved up to 12.1 mg/dL, LH was scheduled. Detailed surgical procedure is described elsewhere [5]: Prior to the surgery, bilateral UC (Tigertail flexible-tip UC system (diameter, 6 F; length 70 cm) (C. R. Bard, New Jersey, USA) was placed under cystoscope guide. Four ports were applied in a diamond position. Retroperitoneal space was opened until uterine artery was isolated, which was then ligated with 0-Polysorb (Medtronic, Minnesota, USA). Ureter was also isolated from surrounded connective tissue and separated from retroperitoneum. To obtain clear visualization of ureter, we always keep ureter uncovered retroperitoneal connective tissue at length of approximately 3 cm for its afterward. Then, bilateral fallopian tubes and ovarian suspensory ligaments were ligated. Cardiac ligaments were cut down from uterine body with bipolar scissor. Uterine cervix was then cut circularly and the uterus was removed transvaginally *en bloc*. There was no need to morcellate the uterus. Vaginal stump and retroperitoneum were closed laparoscopically by simple stitches with 0-Polysorb, by sequential stitches with 2-0 Polysorb, respectively. During these procedures, UC was repeatedly moved back and forth to identify ureteral running and to confirm the ureters were distant from stitches. Before removing all the ports, indigo carmine dye was injected intravenously at this time. After the dye came out through each catheter to confirm that there was no leak from ureter, pneumoperitoneum was stopped and all ports was closed. Total operating time was 1h9m. Loss of blood was 50 ml. Uterine weight was 125 g. The postoperative course was totally unremarkable. There was no remarkable change regarding perioperative hemodynamic condition; blood pressure and pulse rate had been normal and there was no remarkable drop in hemoglobin level (11.4 mg/dL on POD1). As a routine checkup, IVP was done on POD2. There was no remarkable change when compared with the preoperative IVP (Figure 1). She was discharged on POD4. Throughout the whole admission period, there were no symptoms observed to suspect any kind of postoperative complications. On POD7, she visited our facility for routine postoperative follow up. Besides subtle pain on the abdominal scar, she did not complain any symptoms relating UI at all at that time. Transvaginal ultrasound was unremarkable. However, on POD15, she visited our facility again with complaint of rather onset left lower back

pain. Ultrasound of left kidney revealed dilatation of left renal pelvis. IVP was done for the third time, which showed apparent left hydroureter and hydronephrosis (Figure 2). Urology was consulted and placement of W-J stent catheter into left ureter was scheduled the next day. On POD16, the patient started complaining watery discharge from vagina. Intravenous indigo carmine dye was injected. Shortly after the shot, the vaginal discharge turned into blue. Ureteral-vaginal fistula was highly suspected. The retrograde recanalization and placement W-J catheter were attempted but it ended up with failure; it was unable to proceed the catheter more than 4-5 cm from ureteral orifice, assumed to be the point where the obstruction and leakage occurred. On POD25, she underwent bladder-ureter new anastomosis. As for intraperitoneal findings, firm adhesion surrounding lower part of left ureter, especially around crossing point of uterine artery and ureter was found. Thus, it was difficult to follow all of the left ureteral running and left ureter was cut about 4-5 cm distal from the firm adhesion and newly anastomosed to bladder. W-J catheter was placed during the operation. The postoperative course was unremarkable and she was discharged on POD7 (i.e., POD23, from the first surgery). The W-J catheter was removed three months later. Retrograde pyelography was done at that time, in which left hydroureter and hydronephrosis was subsided completely.

A written consent form was obtained from this patient. Case reports are considered exempt by our institutional review board.

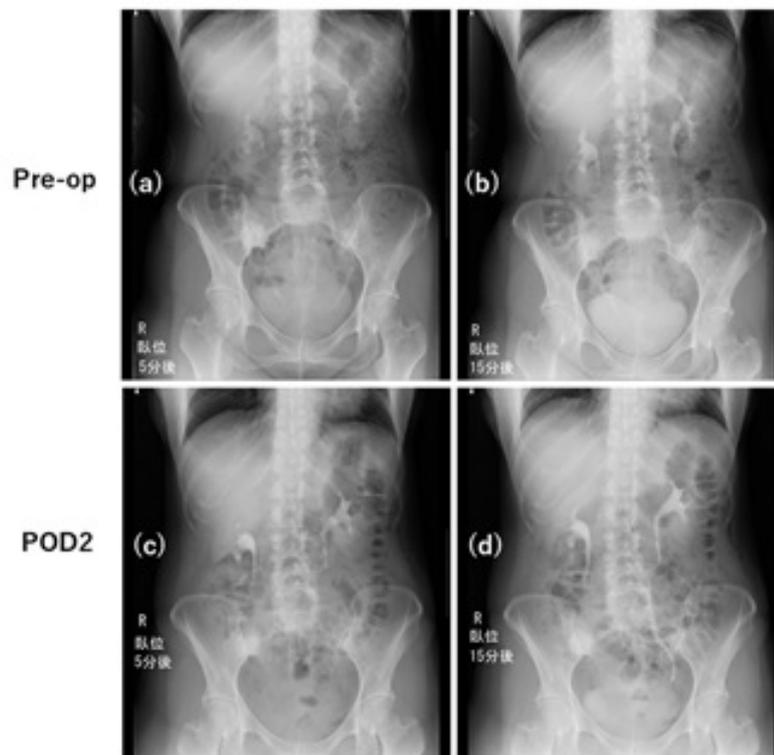


Figure 1: IVP done before operation (a), (b), and on POD2 (c), (d). (a), (c) and (b), (d) indicates five minutes and 15 minutes after iodine injection, respectively



Figure 2: IVP done on POD15. (a), (b), (c) indicate five, 15, and 20 minutes after iodine injection, respectively. Note that iodine excretion is apparently delayed on left renal pelvis when compared with right pelvis, and left ureter is not visualized (a). Note that left renal calyx was apparently dull and left ureter is dilated (b), (c)

Discussion

Hysterectomy is world-widely the most frequent gynecologic surgery for benign uterine disease [7,8]. Because of the close proximity of the ureter to the cervix and uterine artery, any gynecologist needs to be aware of that ureter is always in jeopardy to be injured unintentionally during hysterectomy [5,8]. Varying mechanisms contribute to UI, which are divided into two group; direct and indirect injury [6,8]. Direct UI may occur by suture, clip, or staple ligation, while indirect UI usually involves the spread of thermal energy. Indirect UI often leads to delayed injuries, which can lead to the development of hydronephrosis, loss of renal function, fistula formation, and possible sepsis if not treated promptly [1,2,8]. While intraoperative identification is the best chance for prompt management, studies have shown that 62-87% of injuries go unnoticed and are recognized in the postoperative period [1,4,6]. Once UI remains unrecognized, the sequelae of it include the development of genitourinary fistulae, ureteral obstruction, and even renal failure, all of which can lead to significant morbidity and, sometimes, mortality [9]. Of them, ureteral fistula after hysterectomy is 0.07% [6].

This is a rare case that UI developed on as late as 15 days after LH, although postoperative IVP was normal and operative course was totally unremarkable until then. There may arise criticism that the injury is simply due to immature laparoscopic skill. However, the operator (Y.T., the first author) have experienced laparoscopic hysterectomy more than 500 cases and authorized as a laparoscopic specialist from Japan Society of Gynecologic and Obstetric Endoscopy and Minimally Invasive Therapy.

The mechanism how UI occurred in this case remains unclear. The video record of the whole operation was reviewed by all co-authors repeatedly but we could hardly find any procedure that suggested possible direct injury toward lower urinary tract.

The energy devices we used in LH is monopolar scissors and bipolar forceps. One of possible causes is indirect thermal injury of these devices. As described above, the very first step in hysterectomy is always to find out ureter and to separate it from retroperitoneum and uterine artery. Added to that, UC, inserted into ureter, allowed us clear visualization of ureteral running. Energy devices were utilized in the following three steps; firstly, cutting of retroperitoneum, secondly, ligation of ovarian suspensory ligament and cardiac ligaments, and thirdly, cutting of vaginal cuff. Although these all three steps were performed under clear visualization of ureter, and always certain distance had been kept between ureter and where thermal device applied (Figure 3), it is possible that thermal energy had spread laterally and caused delayed injury: Any small break in the insulation allows leakage of energy and can cause thermal injury. As we did not check insulation of energy device preoperatively, such breach or microbreak of insulation could cause thermal injury toward ureter.

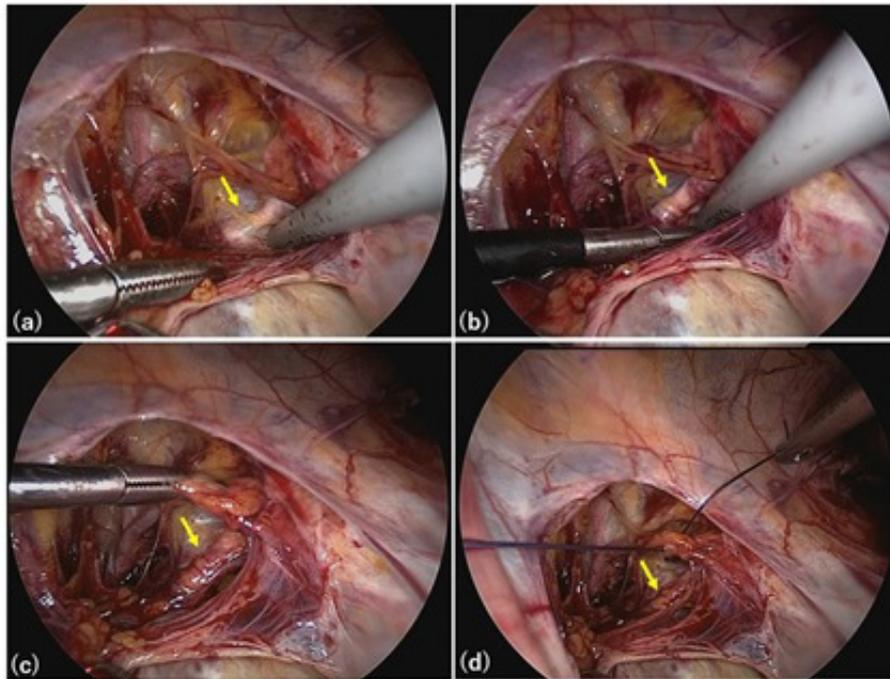


Figure 3: Identification of left ureter during the operation (arrow). Note that borderline of Tigertail flexible-tip catheter inside ureter can be identified transparently. (c), (d): left uterine artery was grabbed by forceps and 0-Vicryl thread was placed for ligation

The other possibility is ureteral devascularization. It is possible that monopolar dissection, which tends to be used frequently while skeletonizing ureteral running, may have caused devascularization and subsequent delayed UI.

Generally speaking, it is not quite rare to experience mild hydroureter after any mode of hysterectomy. However, in most cases it is temporary and resolved spontaneously. Accordingly, we expected spontaneous resolution in this case and decided to treat conservatively. As a result, there was one day delay between the onset of hydroureter and trial of W-J catheter insertion. However, Occlusion seemed to develop rather quickly. Had we decided to place the W-J stent catheter promptly after the patient presented to the hospital on POD14, the situation would have changed; the W-J stent would have been successfully inserted and bladder-ureter new anastomosis would have been avoided.

Conclusion

In conclusion, we experienced post hysterectomy hydroureter and hydronephrosis on POD14. Ureteral-vaginal fistula developed on POD15, which required bladder-ureter new anastomosis. IVP on POD2 was unremarkable. Possible cause include indirect thermal spread and devascularization of ureter. This case alert us that no matter how we try, it is inevitable to avoid UI completely and that high level of suspicion during operation and a low threshold for intervention after operation is very important.

Conflict of interest

The authors have no conflicts of interest relevant to this article.

Disclosure statement

All authors declare that they have no conflicts of interest and nothing to disclose.

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