



## Clinical images

## Laparoscopic and microscopic images of thermal injury to the ureter

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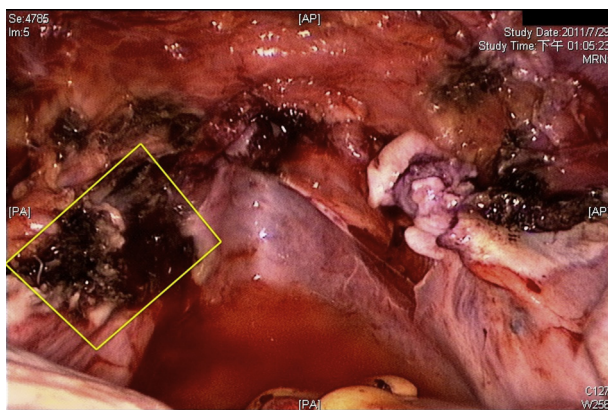
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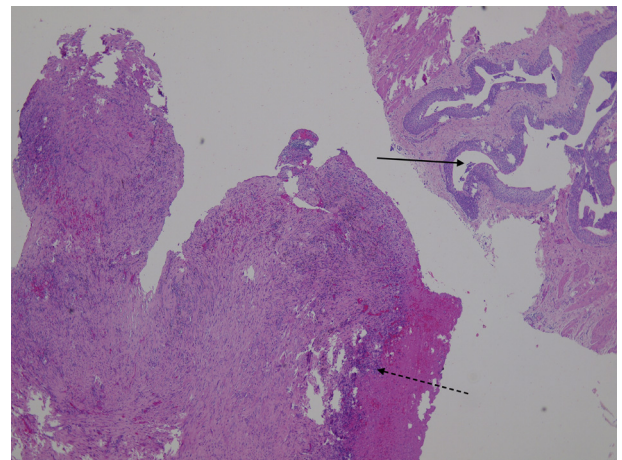
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A 38-year-old multigravida underwent laparoscopic-assisted vaginal hysterectomy for a posterior fundal myoma with cystic degeneration and left salpingectomy for hydrosalpinx by an experienced surgeon. Bleeding was encountered at the left angle of the

vaginal vault during cervicovaginal amputation, which was controlled with coagulation using PKS™ Cutting Forceps (Gyrus ACMI Inc. USA) (Figure 1). The uterine weight was 473 g. The patient was discharged with an uneventful hospital stay. One week after the surgery, she experienced urine leakage per vagina. The ultrasound examination showed mild left hydronephrosis. A Foley catheter was inserted, and the patient was given phenazopyridine orally. Yellow-orange urine was noted in the urine bag and vagina. Computed tomography urogram showed contrast leakage into the



**Figure 1.** Intraoperative picture of the vaginal vault after hemostasis during LAVH shows charring of the periurethral tissues (rectangle), in an effort to control bleeding. LAVH = Laparoscopic-assisted Vaginal Hysterectomy.



**Figure 2.** Microscopic section of the grossly necrotic part of the distal ureter resected during uretero-ureteral reanastomosis. Cross section of the ureter (solid arrow pointing to the ureteral lumen) with periureteral chronic inflammation, fat necrosis, hemorrhage, and fibrosis (broken arrow) (hematoxylin and eosin stain, ×20).

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vagina, mostly from the left superior aspect of the left distal ureter. Laparoscopy showed necrosis (2 cm) of the distal left ureter near the bladder entry. The necrotic lesion was excised, and uretero-ureteric reanastomosis was performed laparoscopically with 6 × 26 D-J urethral stent insertion. [Figure 2](#) depicts the microscopic section of the thermal injury of the distal ureter.

The incidence of ureteral injury in laparoscopic surgery ranges from <1% to 2%.<sup>1</sup> A retrospective review by Soong et al showed that ureteral injuries in Laparoscopic-assisted Vaginal Hysterectomy (LAVH) occurred most often at the level of the uterine artery and at insertion into the urinary bladder.<sup>2</sup> They attributed this to injudicious electrocoagulation of the uterine vessels and cardinal ligament in close proximity to the ureter. In our case, retraction of unsealed uterine vessels resulted in bleeding at the vaginal vault, which coagulation. Wu et al reported a case of distal ureteral injury repaired by uretero-ureteric anastomosis.

They reported that the favored procedure for distal ureteral injury by urologists is ureteral reimplantation to the bladder owing to the uncertainty of vital tissues in the distal ureter.<sup>3</sup> This case and that of Wu et al were successfully repaired by uretero-ureter anastomosis.

This case serves as a reminder for laparoscopists to dissect and isolate bleeders prior to cauterization given the close relationship of the ureter the uterine artery.

## References

1. Ostrzenshki A, Radolinski B, Ostrzenska KM. A review of laparoscopic ureteral injury in pelvic surgery. *Obstet Gynecol Surv.* 2003;58):794–799.
2. Soong YK, Yu HT, Wang CJ, et al. Urinary tract injury in laparoscopic-assisted vaginal hysterectomy. *J Minim Invasive Gyn.* 2007;14:600–605.
3. Wu TP, Sa L, Lee CL. Laparoscopic repair of delayed-onset ureter injury. *J Minim Invasive Gyn.* 2007;14:253–255.