



ROBOTIC ILEAL URETERIC INTERPOSITION AS A LIFESAVING SALVAGE PROCEDURE FOLLOWING CATASTROPHIC URETERIC INJURY AFTER URETEROSCOPY: A SINGLE-CASE REPORT

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ABSTRACT

Ureteroscopy with laser lithotripsy (URSL) is a routinely performed endourological procedure with a favorable safety profile. Rarely, devastating ureteric injuries may occur, resulting in extensive ureteral loss and immediate threat to renal function. We present a single case of catastrophic ureteric injury following an apparently uncomplicated URSL, successfully managed with robotic ileal ureteric interposition. This report highlights clinical decision-making, surgical technique, and outcomes, emphasizing the role of robotic reconstruction as a renal-preserving, lifesaving option in acute post-ureteroscopy disasters.

KEYWORDS : Robotic Surgery; Ileal Ureter; Ureteroscopy Complications; Ureteric Avulsion; Reconstructive Urology, Tight Upper Ureter

INTRODUCTION

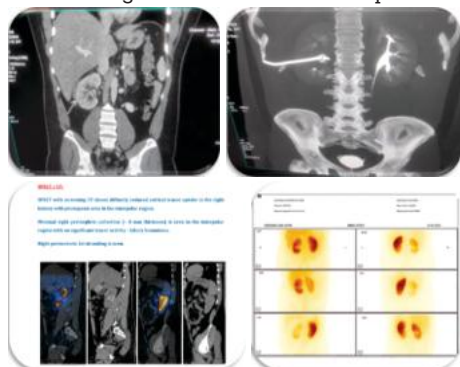
Ureteroscopy has become the standard of care for ureteric calculi due to advances in optics, laser technology, and instrumentation. Despite this, major ureteric injuries such as avulsion, ischemic necrosis, and long-segment devascularization continue to be reported, albeit infrequently. When such injuries occur, especially after a seemingly simple URSL, management becomes challenging and time-sensitive. Ileal ureteric interposition remains a definitive reconstructive option for extensive ureteric loss, and robotic assistance has significantly reduced the morbidity traditionally associated with this complex procedure.

Case Presentation

A 24 year old male patient underwent URSL for a right proximal ureteric calculus at an external center. The operative note described an uncomplicated procedure with stone clearance. Within 48 hours, the patient developed severe ipsilateral flank pain, fever, and progressive oliguria. Laboratory evaluation showed rising serum creatinine and inflammatory markers.

Contrast-enhanced computed tomography demonstrated extensive urinary extravasation with a retroperitoneal urinoma and near-complete loss of a long segment of the ureter, consistent with a catastrophic ureteric injury. Emergency percutaneous nephrostomy was performed to control sepsis and preserve renal function.

Following clinical stabilization, a detailed evaluation confirmed non-viability of the affected ureter over a long segment, rendering primary repair or short-segment reconstruction infeasible. After multidisciplinary discussion and informed consent, the patient was planned for definitive reconstruction using robotic ileal ureteric interposition.



Images 1- 4 Representing Reduced Cortical Tracer Uptake

in Right Kidney with Photopenic Area in the Interpolar Region and Perinephric Collection

Surgical Technique

The procedure was performed using a transperitoneal robotic approach. After port placement, the colon was mobilized to expose the retroperitoneum. A healthy, well-vascularized ileal segment measuring approximately 15 cm was isolated, ensuring preservation of the mesenteric blood supply. Bowel continuity was restored using intracorporeal stapled anastomosis.

The proximal end of the ileal segment was anastomosed to the renal pelvis in a tension-free, watertight fashion. The distal end was implanted into the urinary bladder using a reflux-minimizing technique. A double-J stent was placed across the reconstruction. Robotic articulation enabled precise suturing and meticulous tissue handling.

Postoperative Course and Follow-Up

The postoperative period was uneventful. Oral intake was resumed on postoperative day three, and bowel function returned promptly. Renal function showed progressive improvement, and the nephrostomy tube was removed after imaging confirmed unobstructed drainage.

At three- and six-month follow-up, the patient remained asymptomatic. Imaging demonstrated a patent ileal ureter with preserved renal function and no evidence of obstruction, infection, or metabolic derangement.

DISCUSSION

Catastrophic ureteric injury following URSL represents a true urological emergency and may rapidly culminate in renal loss if not appropriately managed. As ureteroscopic technology has advanced, ureteroscopic lithotripsy has become a common minimally invasive treatment for renal or ureteral stones. Most complications respond well to simple urine drainage with double-J (D-J) or ureteral stents. However, iatrogenic ureteral avulsion (UA) though rare remains a disastrous complication during ureteroscopy

UA can arise from

- (1) Ureteral inflammatory edema, hyperplasia, or scar formation, which distorts and thins the ureter;
- (2) Use of an oversized rigid ureteroscope, causing ureteral ballooning upon withdrawal;
- (3) Inherent vulnerability in the proximal third of the ureter due to minimal muscular support and low tensile strength

Initial urinary diversion and sepsis control are paramount,

followed by definitive reconstruction once the patient is stabilized.

In cases of long-segment ureteric loss, ileal ureteric interposition is often the only viable reconstructive option short of nephrectomy. The robotic platform offers significant advantages, including superior visualization, enhanced dexterity, reduced blood loss, and faster recovery. This single-case experience reinforces the role of robotic ileal ureteric replacement as a lifesaving salvage procedure in acute post-ureteroscopy doomsday scenarios.

CONCLUSION

Robotic ileal ureteric interposition provides a durable, minimally invasive, and renal-preserving solution for catastrophic ureteric injuries following URSL. Early recognition, timely diversion, and referral to a reconstructive center are critical to achieving optimal outcomes.

Patient Consent

Informed consent was obtained from the patient for publication of this case report and accompanying images. Patient identity has been protected.

REFERENCES

1. Brandes S, Coburn M, Armenakas N, McAninch J. Diagnosis and management of ureteric injury: an evidence-based analysis. *J Urol.* 2004;171:899-906.
2. Traxer O, Thomas A. Complications of ureteroscopy and prevention. *Eur Urol.* 2013;64:45-54.
3. Hemal AK, Nayyar R. Robotic ileal ureter replacement: technique and outcomes. *World J Urol.* 2013;31:141-147.
4. Subramaniam R, et al. Long-term outcomes of ileal ureter substitution. *BJU Int.* 2014;113:771-777.
5. Buffi N, et al. Robot-assisted ureteral reconstruction for complex ureteric strictures. *Eur Urol.* 2017;71:945-951.
6. Goodwin WE, Winter CC, Turner RD. Replacement of the ureter by small intestine: clinical application and results of the ileal ureter. *J Urol.* 1959;81(3):406-418. doi:10.1016/S0022-5347(17)66035-
7. Gao P, Zhu J, Zhou Y, Shan Y. Full-length ureteral avulsion caused by ureteroscopy: report of one case cured by pyeloureterostomy, greater omentum investment, and ureterovesical anastomosis. *Urolithiasis.* 2013;41(2):183-186. doi:10.1007/s00240-012-0541-8.