

Simultaneous percutaneous nephrolithotomy and early endoscopic ureteric realignment for iatrogenic ureteropelvic junction avulsion during ureteroscopy

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Abstract

We present a case report of successful management of ureteropelvic junction avulsion during ureteroscopy successfully managed with simultaneous percutaneous nephrolithotomy and early endoscopic ureteral realignment.

Introduction

The incidence of ureteral injury and overall complications during ureteroscopy ranges from 0 to 28%.¹⁻⁵ Iatrogenic ureteral injury varies from minor mucosal petechiae to erosion, perforation, and rarely complete ureteral avulsion.⁶ Factors associated with higher complication rates during ureteroscopy are longer surgery times, treatment of renal calculi, surgeon inexperience, and previous irradiation.^{1,3,7} Ureteral stents are the cornerstone in the management of ureteral injury. If stent placement is not possible following ureteral injury, placement of a percutaneous nephrostomy tube is required for renal drainage until elective repair can be accomplished.^{1,8-10} Several authors have reported reasonable rates of success with ureteroscopic ureteral realignment for iatrogenic ureteral injury during gynecologic and general surgical procedures.⁹⁻¹³ However, to our knowledge, there has not been a previous report of successful endoscopic ureteral realignment following avulsion of the ureter at the level of the ureteropelvic junction.

Case report

A 59-year-old female with a long history of nephrolithiasis had a 7-mm right renal pelvic calculus. Ureteroscopic treatment was performed at an outside institution. There was some difficulty with ureteral dilatation and UPJ avulsion of

the ureter was suspected associated with insertion of the ureteral access sheath. A safety guide wire was not used during the procedure. Subsequently, a guide wire was not able to be passed beyond the injury into the renal collecting system and, therefore, a stent could not be placed. A 5F ureteral catheter was placed through the avulsed proximal ureter projecting into the retroperitoneum. The patient was transferred to Indiana University Health Methodist Hospital for subsequent management.

The patient has a history of cirrhosis, splenomegaly, and thrombocytopenia with a platelet count of 52,000 and an INR of 1.5. Ureteroscopy was performed confirming complete avulsion of the ureter (Fig. 1). A stent could not be placed and a ureteral catheter was replaced into the retroperitoneum near the kidney. The following day a percutaneous nephrostomy was inserted by Interventional Radiology (Fig. 2). The patient was then returned to the operating room and placed in a prone split-leg position to allow for simultaneous antegrade and retrograde access to the ureter. The percutaneous access was dilated to 30F and an Amplatz sheath was positioned into the kidney (Fig. 3). Nephroscopy identified the stone in the renal pelvis which was removed. The UPJ was identified and noted to be very small in caliber. A flexible ureteroscope was passed antegradely through the UPJ confirming that the avulsion occurred at this level. A sensor guide wire (Boston Scientific, Natick, MA) was passed through the ureteral catheter which had been previously placed but, unfortunately, could not be identified with the flexible ureteroscope. The UPJ was dilated with a 6 mm Uromax balloon (Boston Scientific Corp., Natick, MA) so that a larger instrument could be used to identify the guide wire (Fig. 4). The sensor guide wire was exchanged for a glide wire which provided for more coiling of the wire in the retroperitoneum. Using the flexible nephroscope, the glide wire was immediately located and pulled through and through. The glide wire was exchanged for an Amplatz super stiff wire. An 8F, 24cm JJ stent was then placed in antegrade fashion. A 16F Foley catheter was placed in the bladder and a 10F Cope loop was placed in the kidney.



Fig. 1. Avulsed ureteropelvic junction.

An antegrade nephrostogram was done two weeks following stent placement. No extravasation was evident so the nephrostomy tube was removed (Fig. 5). Eight weeks postoperatively, the ureteral stent was removed and a retrograde pyelogram was performed showing no extravasation, apparent healing of the UPJ, and mild hydronephrosis (Fig. 6). A CT urogram done two weeks following stent removal showed continuity of the UPJ and ureter with mild hydronephrosis and no extravasation. An IVP done 10 weeks later showed resolution of hydronephrosis with no extravasation (Fig. 7). The patient remained asymptomatic. An MRI was done one year following the endoscopic realignment as part of an evaluation of the patient's cirrhosis, which revealed no hydronephrosis and a normal appearing kidney.

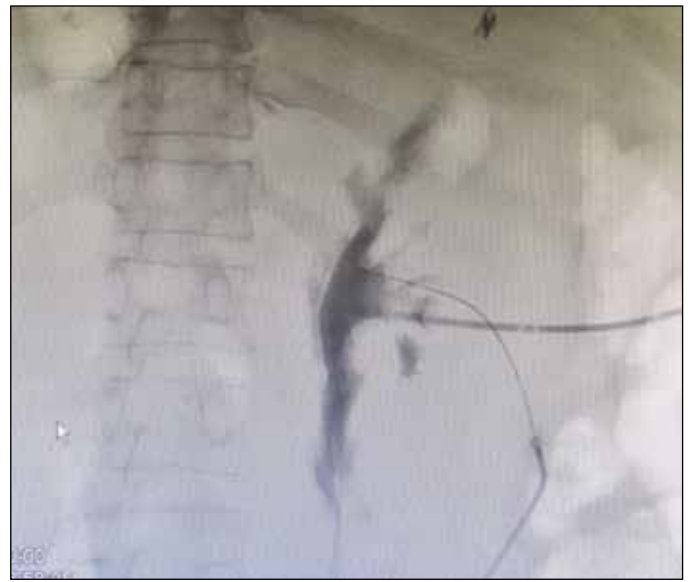


Fig. 2. Extravasation of contrast with complete disruption of the UPJ.

Discussion

The incidence of ureteral perforation during ureteroscopy ranges from 1% to 15.4 %, while the feared complication of ureteral avulsion is rare in contemporary reports.^{3-5,7,9,14,15} Complication rates during ureteroscopy correlate with prolonged operative duration, as well as surgeon experience.³ The treatment of impacted ureteral calculi are also associated with a greater rate of complications, as well as unsuccessful interventions.¹⁶ In this case, use of a ureteral access sheath was thought to be associated with avulsion of the ureter from the UPJ. Interestingly, Traxer and colleagues reported that ureteral injury is common with ureteral access sheath placement, although they reported no avulsions in the series. They also noted that pre-ureteroscopic stenting decreased the incidence of higher grades of ureteral trauma.⁶

Endourologic management of complete avulsion of the UPJ has not been previously reported to our knowledge. Early diagnosis and treatment are important and, in this case, realignment was performed within 48 hours of the injury. The referring urologist was suspicious of avulsion leading to prompt referral of the patient. A satisfactory outcome in this case was likely enhanced by the minimal displacement of the proximal ureter (about 2–3 cm).

For these complex procedures, patients should be placed in the prone split-leg position allowing simultaneous antegrade and retrograde access to the avulsed ureter. Following removal of the offending stone, coiling of a hydrophilic wire in the retroperitoneum either antegradely or retrogradely increases the chances of visualization of the wire from either side and subsequent pull through of the wire.

In our case, nephrostomy drainage was maintained for two weeks and ureteral stenting for a total of eight weeks.

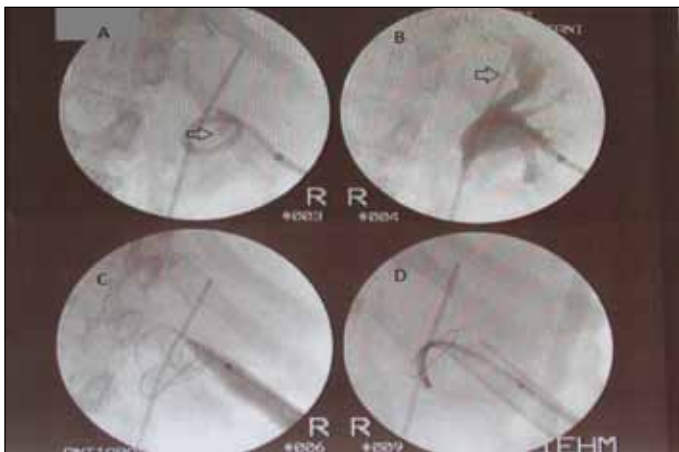


Fig. 3. A: 9-mm stone in the renal pelvis; B: ureteral catheter in the retroperitoneum outside the renal pelvis; C: hydrophilic wire coiled in the retroperitoneum; D: flexible ureteroscope inserted antegradely.

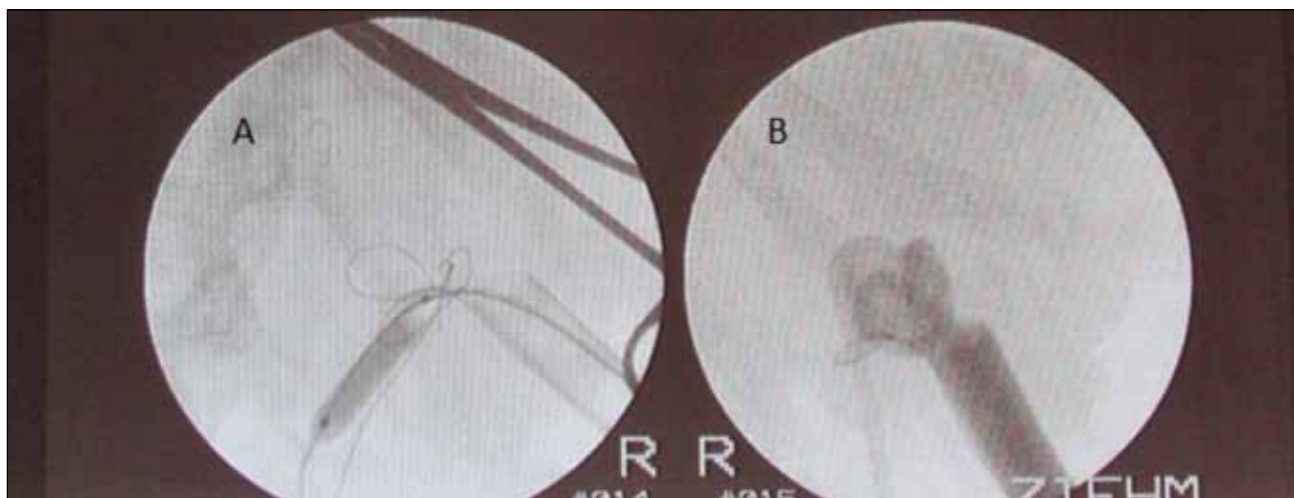


Fig. 4. A: Uromax balloon dilating the tight avulsed UPJ. B: JJ stent and Cope loop nephrostomy tube in place.

Although some patients may develop secondary ureteral strictures, the approach presented herein should not prevent subsequent open or laparoscopic surgical repair if ultimately required.

Conclusion

Early endoscopic ureteric realignment is a safe and feasible method to manage iatrogenic ureteric avulsion obviating the need for open surgical repair.

Competing interests: Dr. El Tayeb and Dr. Mellon declare no competing financial or personal interests. Dr. Lingeman is or has been an Advisory Board member for and has received honoraria from from Boston Scientific.

This paper has been peer-reviewed.

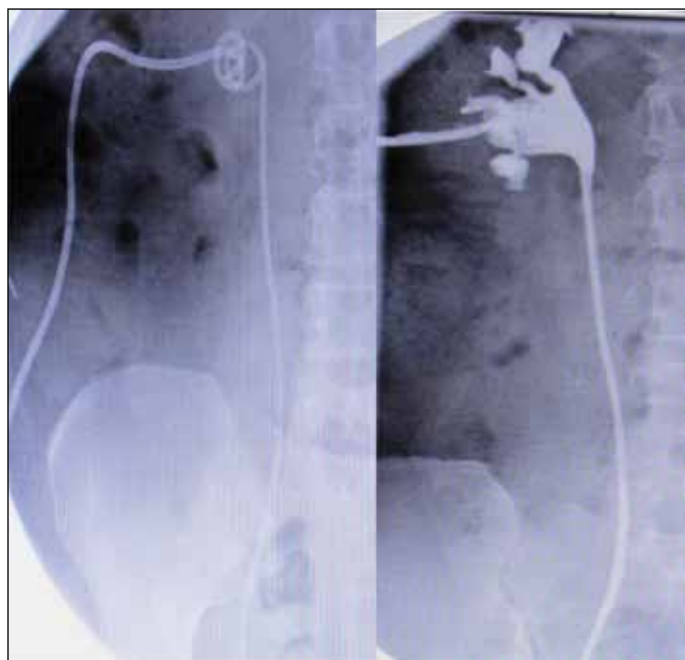


Fig. 5. Antegrade nephrostogram showing intact UPJ with no extravasation.



Fig. 6. Retrograde pyelogram at time of ureteral stent removal showing intact UPJ.



Fig. 7. 18 weeks postoperative IVP.

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