

Ileal Ureteral Replacement in Total Ureteric Avulsion Following Retrograde Intrarenal Surgery (RIRS) : A Novel Case Report and Review of Literature

Ajit Khadga^{1*}, Mahesh Bahadur Adhikari², Bipin Maharjan³, Ravi Kiran Gautam⁴, Prashant Mishra⁵, Pramesh Prasad Shrestha⁶, Deepak Kumar Yadav⁷, and Birodh Basnet⁸

¹Department of Urology and Kidney Transplant, Nepal Mediciti hospital, Nepal

²Department of Urology and kidney Transplant Nepal Mediciti Hospital, Nepal

³Department of Urology and kidney Transplant, Nepal Mediciti Hospital, Nepal

⁴Department of Urology and Kidney Transplant, Nepal Mediciti Hospital, Nepal

⁵Department Urology and kidney Transplant, Nepal Mediciti Hospital, Nepal

⁶Department of Urology and Kidney Transplant, Nepal

⁷Department Urology and kidney Transplant, Nepal Mediciti Hospital, Nepal

⁸Department of Urology and Kidney Transplant, Nepal

*Corresponding author:

Ajit Khadga,
Department of Urology and Kidney Transplant,
Nepal Mediciti hospital Nakhkhu Ukalo Road,
Nakhkhu Patan, Karyabinayak

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1. Abstract

1.1. Introduction

Ureteral avulsion represents a rare and fearsome complication of ureteroscopy, reported incidence of 0-0.3%. In literature there are few reports and different management options are presented for its treatment. We present a case of a ureteral avulsion managed with ileal ureter replacement.

1.2. Case Presentation

A 37-year-old man with a left proximal ureteric and lower calyxal stone was treated at our department with flexible ureterorenoscopy. During retrieval of the instrument a total ureteral avulsion was discovered. Immediate exploration and primary end to end anastomosis over double J stent was done. Later we performed a laparoscopic assisted ileal ureter replacement.

1.3. Conclusion

Ureteral avulsion is a rare complication. There is no standard definition regarding its treatment, thus management is a surgical challenge. The use of an extremely careful technique of ureteral insertion, the mandatory placement of a safety guidewire, avoidance of forceful maneuvers and staging the procedure, all minimize the risk of untoward events.

2. Introduction

Iatrogenic injury to the ureter is a potentially devastating complication of modern surgery. It vary from minor mucosal petechiae to erosion, perforation, false routes, and rarely, complete ureteral avulsion [1]. The term ureteral avulsion refers to the discontinuation of the full thickness of the ureter and has been firstly introduced to describe an upper urinary tract injury after blunt trauma or due to stone basketing procedures.[2]

3. Case Presentation

A 37-year-old man presented to our department for a left proximal stone of 10.4mm Figure 1(a) and lower calyx stone of 8mm with mild hydronephrosis on computed tomography with tender left renal angle and negative urine culture. After discussion of the therapeutic options we decided to perform a left ureterorenoscopy and retrograde intrarenal surgery to treat the stone. After a retrograde pyelography that showed a stop of contrast progression at the level of the stone, guidewire was positioned in the proximal ureter just below the stone. A 8 Fr semi-rigid ureteroscope was inserted into the left ureter and we noticed impacted stone at left proximal ureter. Stone was fragmented with laser by dusting technique. Then we proceeded with left RIRS, 7.7 / 9.5Fr disposable renoscope inserted sheathless but could only negotiate upto 1-2 cm beyond

impacted site and could not reach pelvis. Thus decision was made for staged procedure. RIRS scope could not be retrieved, even with cork screw maneuver. When gentle traction was applied there was sudden loss of resistance and retrieval of scope but guide wire was dislodged. Attempt was made to pass guide wire but could not pass beyond mid ureter. On ureterorenoscopy kinking was noted and could not pass beyond mid ureter. On RPG there was multiple kinks in mid ureter. So PCN tube was placed under USG guidance and antegrade pyelogram was done which revealed minimal contrast extravasation from site of impacted stone. Keeping in mind above finding immediate exploration was done with findings of intact serosa of ureter with mucosal intussuseption of ureter from proximal upto mid ureter. Thus intussusepted ureter realigned and was anastomosed to proximal ureter over DJ stent. Post operative period was uneventful. Patient was discharged with PCN on free drainage. Patient was asked to clamp PCN tube but had pain after clamping. Therefore, decided for definite reconstructive surgery and underwent laparoscopic assisted Ileal ureteral replacement. Started with laparoscopy but due to dense adhesion near pelvis area; was converted to open with 3cm left flank incision. Renal pelvis and proximal ureter was identified. Around 20cm Ileum was mobilized and prepared. DJ stent was fixed at proximal and distal end of ileum. Proximal ileum was tapered and anastomosed to proximal ureter after spatulation. Figure 2(a, b) Nipple was created in distal ileum and was anastomosed to bladder laparoscopically Figure 3. Post operative period was uneventful and patient discharged on 7th POD. Foley's catheter was removed on 10th POD and PCN was clamped on 12th POD and removed on 15th POD. After 6 weeks DJ stent was removed. And on follow up till 1 year he has no any complaints with normal renal function.



Figure 1: Shows left upper ureteric stone.

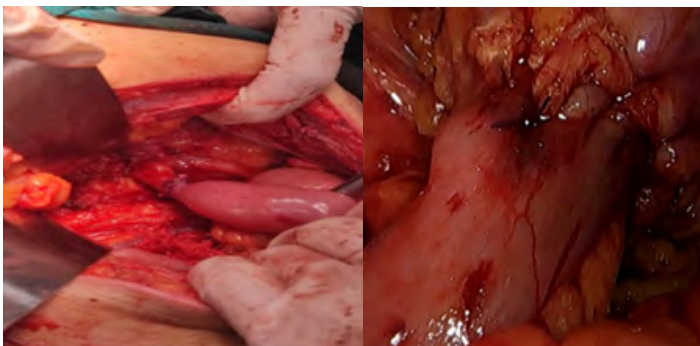


Figure 2(a): Showing proximal anastomosis of ureter with illeal loop. (b) And distal anastomosis of ileal loop with bladder.

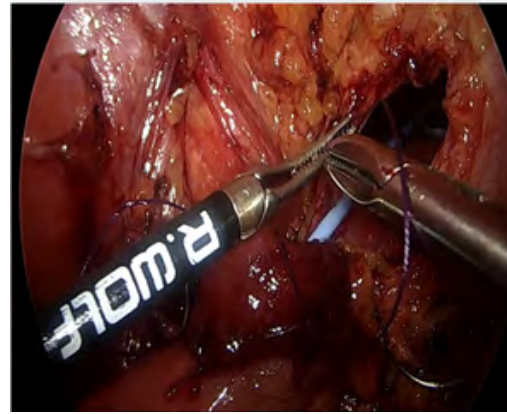


Figure 3: Anastomosing ileum with bladder laparoscopically with DJ stent insitue.

4. Discussion

Traditionally, the term ureteral avulsion has been described as an upper urinary tract injury related to the action of blunt trauma, especially from traffic accidents, being the mechanism of injury the result of an acute deceleration/acceleration movement [3]. There are few case reports and case series reports, largest series contained 7 patients. Incidence of avulsion were more common among male and proximal and scabbard avulsion were common. Among the potential factors involved in the pathogenesis of ureteral avulsion, the presence of an anomalous ureter, either due to a diseased area or to previous endourologic manipulations, is an important antecedent in the majority of cases. Furthermore, the use of multiple-wire baskets for ureteral stones retrieval have also been implicated, and particularly with regard to the size of the stone (larger than 1 cm) and history of prior ureteral surgeries or procedures which could have resulted in ureteral fibrosis or loss of ureteral elasticity [4]. Various definitive management options have been described based upon the type of injury whether one-point or two-point injury, site of injury, and the extent of ureteral loss as well as the condition of the renal unit and that of the patient. Repair preferably done immediately, delaying it may lead to loss of ureteral length due to ensuing fibrosis. In unfavourable conditions the initial management will consist of only percutaneous nephrostomy. Suggested time frame for delayed repair is about 4 to 8 weeks [5]. Even in situations where adequate expertise is available, we believe that nephrostomy placement is an ideal initial step before reconstruction, especially in proximal avulsions. Apart from preventing urinoma formation, nephrostomy placement has the added advantage of allowing the surgeon to know the exact level of avulsion by an antegrade study and also it allows the surgeon to wait safely while proper preoperative assessment (bladder capacity, in cases for Boari flap) and preparation (bowel preparation for ileal reconstruction) are done in the patient planned for major reconstruction. Further the patient is given enough time to get over the initial shock of an avulsion and understand the pros and cons of each surgical option before giving the consent for the definitive

reconstructive procedure [6]. Ileal ureteral replacement is very reliable salvage option for complete ureteral avulsion especially in the situation of immediate repair. Preoperative renal function evaluation, patient selection and preparation are indispensable for this procedure. Renal insufficiency before ileal interposition is generally understood to increase the risk of metabolic acidosis. Chung et al. indicated that 50% of patients with serum creatinine > 2.0 mg/dL developed worsening azotemia after ureteral replacement. [7] Wolff et al. showed a success rate > 90% when focused on patients with preoperative serum creatinine < 1.7 mg/dL [8]. Despite its high success rate, ileal ureter has its own intrinsic risks in the form of mucus secretion and mucus plug formation, associated bowel complications (ileus, bowel obstruction) and anastomotic narrowing and obstructive uropathy, recurrent pyelonephritis, renal calculi, and dyselectrolytemia. Reflux appears to have no detrimental effect on renal function in adults with ileal ureters and, therefore, an antireflux procedure is unnecessary. Intestinal peristalsis in an ileal segment longer than 15 cm appears to safeguard the renal pelvis [9]. Anti-refluxive implantation is recommended for intestinal reservoirs, whereas reflux prevention seems to be of minor importance when the native bladder is chosen as the site of implantation. Long-term follow-up confirms that this approach is a safe and reliable option to preserve long-term renal function [10].

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