Case Report

Complete Ureteral Avulsion during Ureteroscopy: A Case Report

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ABSTRACT

Ureteroscopy is a worldwide diagnostic and therapeutic procedure. This technique has some known complications, but proper ureteroscope handling is the cornerstone to prevent the catastrophic events such as ureteral avulsion. In this case report, we aim to review the cause and management of ureteral avulsion during ureteroscopy and presents recommendations to minimize the incidence of such serious consequence in the current practice.

KEYWORDS: injury, ureteral avulsion, ureteroscopy

INTRODUCTION

The urologists had considered uretero-renoscopy as a device to inspect and treat upper urinary tract pathology since the first attempt in 1912 by Hugh Hampton Young, and its clinical introduction in 1980 by Pérez-Castro and Martínez-Piñeiro[1,2]. However, improper use of this excellent surgical tool is prone to result in complications including false passage, bleeding, ureteral perforation, stricture and ureteral avulsion which is the most serious one[3].

CASE REPORT

A 48-year-old, married, Asian male presented to us with recurrent attacks of left flank pain since three months. Pain was colicky in nature and radiating to genitalia. There was no history of hematuria or change in bowel habits. There was no history suggestive of any other system involvement. Examination was unremarkable. On investigation, he was found to have an impacted left upper ureteric stone 1.2 cm in size causing moderate hydronephrosis and renal function impairment (serum creatinine 181 mmol/l).

An ureteroscopic removal of the impacted stone was planned. The ureteroscopy was performed under general anesthesia. On preliminary left retrograde study there were multiple ureteral kinks below the impacted upper ureteric stone. After balloon dilatation of the intra-mural part of the ureter and then with gentle manipulation by ureteroscope, the stone was fragmented by Holmium: YAG laser with extraction of multiple fragments using Nitinol Dormia basket. At the end of the procedure, an attempt was made to bypass the site of stone impaction to inspect the renal pelvis. However, the progress of the uretreoscope was arrested at this site. Another safety guide wire was introduced, but an attempt at extraction of ureteroscope produced ureteral avulsion, whereby about 20 cm of the ureter was brought out over the ureteroscope (Fig. 1, 2). As the injury was recognized immediately and the patient was stable, a repair was done based on standard open surgical techniques. The bladder was found to be of adequate capacity (400 ml). Therefore, an extended spiral bladder flap was fashioned (length: 12 cm, width: 4 cm) accompanied by a psoas hitch and an end to end anastomosis with remaining upper ureteral stump (length: 4 cm) was performed over a double J stent (8 Fr/26 cm, Fig. 3). The stent was removed eight weeks later. Convalescence was uneventful and renal function tests returned to normal. An intravenous urogram one year after the procedure showed an almost normal collecting system with excellent renal function (Fig. 4).

DISCUSSION

One of the complications of ureteroscopy is damage to the ureter in varying degrees, complete avulsion being the more serious one, but fortunately rare[4]. Although an infrequent event in the endoscopic management of ureteral calculi (0.2 - 1%)[5], with only few cases reported in the literature, ureteral

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Fig. 1: Long ureteral defect: (↑) proximal ureteral end, (↓↓) distal ureteral end

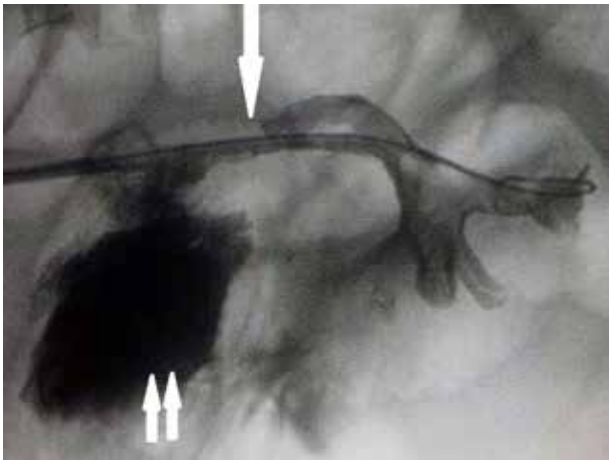

Fig. 2: Left retrograde ureteropyelography: (↓) complete ureteral avulsion, (↑↑) retroperitoneal extravasation of contrast medium

Fig. 3: (←) Extended Boari flap, raised from the mobilized left bladder dome and tubularized with continuous suturing. (⇇) Psoas hitch

Fig. 4: Late intravenous pyelography: patency of the ureter without evidence of dilatation, 12 months postoperatively

avulsion should always be taken into account when performing such procedures. The incidence in the series by Alapont *et al* was only 0.11%[6].

Among the potential factors involved in the pathogenesis of ureteral avulsion, the presence of an anomalous ureter, either due to a diseased area (as in our case) or due to previous endourologic manipulations, is an important antecedent in the majority of cases[7]. 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 the distance the stone has to cross before exiting through the ureteral meatus[8].

Proper ureteroscopic handling is the key to prevent this catastrophic complication and extreme gentleness is required during the procedure. Adherence to some basic rules such as dilatation of intramural part of

ureter, if not able to accommodate the ureteroscope freely, doing retrograde study during the procedure, the mandatory placement of a safety guide wire, use of small ureteroscope or flexible one, extreme care during basket usage and during insertion of ureteroscope into diseased ureter, especially, if there are multiple severe kinks, and limiting ureteroscopy times are some ground rules to prevent major complications of ureteroscopy[9]. For an upper third ureteric calculus treatment options include *in situ* ESWL, pushing the stone into renal pelvis followed by ESWL or in case the calculus is really big, consider ureterolithotomy (open or laparoscopic).

Repair of complete ureteral avulsion following endoscopic surgery is a challenging task and treatment should be individualized. It varies according to the compromised ureteral segment (length and location) and functional status of the renal unit[10]. In cases of largely devitalized tissue or compromise of a large ureteric segment, extreme measures are necessary, such as renal auto-transplantation or ileal interposition, the latter replacing a segment or the entire ureter[11-13]. Both procedures are highly complex and have their own inherent risks. The patient must be counseled appropriately. Boari flap is a versatile technique in the repair of severe ureteral defects, and may eliminate the need for a possible ileal ureteric replacement[14,15].

In the present case, the avulsion occurred because of continued force applied to introduce the ureteroscope into the non-healthy upper ureteral segment due to stone impaction. We did repair with extended spiral bladder flap combined with psoas hitch as the patient was of short stature and capacious urinary bladder. Using the above mentioned technique, we could bridge the long ureteral defect without any major consequence.

CONCLUSION

While performing ureteroscopy, we should always keep in mind the possibility of serious complications, including ureteral avulsion. The use of an utmost careful technique and cautious handling of the instrument is the cornerstone to minimize the risk of untoward events. Repair of such complications is a challenging task which should be tailored according to the individual situation. An extended spiral bladder flap technique is still a valuable solution in the repair of long ureteral defects.

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