Bilateral complete duplication of the ureters, with calculi simultaneously obstructing the four ureters

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Abstract

Bilateral complete duplication of the ureters is a rare condition. We report a case of an adult male patient with bilateral complete duplication of the ureters, with a single stone simultaneously obstructing each of the four ureteral limbs. Multiple bilateral renal stones were also demonstrated in the imaging studies. The ureteral stones ranged from 7 to 23 mm in length and 5–11 mm in width. Ureteroscopy and holmium laser lithotripsy for the ureteral stones were done sequentially in the four ureteral limbs, in a single session. Four double-J stents were inserted after removal of all ureteric stones, one in each ureter. The patient passed an uneventful postoperative course. The patient has received extracorporeal shock wave lithotripsy sessions for the bilateral renal stones. The double-J stents were removed under local anesthesia after clearance of all stones. To the best of our knowledge, there are no data in the literature representing an identical case.

Key Words: Calculus, duplication, ureter, ureteroscopy

INTRODUCTION

Bilateral complete duplication of the ureters is a rare condition. In a study, of 5196 excretory urograms performed on both children and adults, duplex systems were present in 95 (1.8%) patients. The condition was bilateral in only 16 (0.3%) patients while complete duplication was demonstrated in <1/3 of the duplicated systems. Ureteral duplication is often asymptomatic but may be associated with urinary tract infections (UTIs), vesicoureteral reflux, ureterocele, and/or obstruction. Urinary calculi may also be formed due to relative urine stasis, or due to other factors unrelated to the duplication.

We report a case of 41-year-old male with bilateral complete duplication of the ureters, with a single stone simultaneously obstructing each of the four ureteral limbs. The ureteral stones ranged from 7 to 23 mm in length, and 5–11 mm in width. Ureteroscopy and holmium laser lithotripsy for the ureteral stones were done sequentially in the four ureteral limbs, in a single session. Four double-J stents were inserted after removal of all ureteric stones, one in each ureter. According to our knowledge, there are no data in the literature representing an identical case.

CASE REPORT

A 41-year-old male, known to have hypertension on amlodipine, has presented to our hospital with bilateral recurrent colicky flank pain several weeks. The patient had a history of the
spontaneous passage of several stones during the past years. There was no history of previous UTIs or family history of urinary stones. Physical examination was unremarkable. Urine analysis showed microscopic hematuria and urine culture showed no growth. Creatinine was 130 mmol/dl, and other blood works were within normal range. Plain X-ray of the urinary tract [Figure 1] has showed two radiopaque shadows overlying the course of abdominal part of the ureter (white arrows) in each side. Bilateral multiple renal stones (black arrows) were also seen. Excretory urography [Figure 2a and b] has demonstrated bilateral complete duplication of the ureters, with mild to moderate hydrenephrosis in the right side, and moderate to severe hydrenephrosis in the left side (black stars). Each of the four ureteral limbs was harboring a single stone at the abdominal segment (white arrows). The ureteral stones ranged from 7 to 23 mm in length and 5–11 mm in width.

Cystoscopy was performed under general anesthesia and revealed four ureteric orifices, with two ureteric orifices on each side at their normal anatomic position. Through one of the left ureteric orifices, retrograde pyelography demonstrated the ureteral limb with the obstructing stone, and a 0.038-inch Terumo guidewire was manipulated to pass above the stone. A small caliber 7 Fr semi-rigid ureteroscope was easily steered up to the stone, and holmium laser lithotripsy was done. The ureteroscope was withdrawn, keeping the guidewire in place. The same technique was repeated in the ipsilateral second ureteral limb, followed by the two contralateral ureteral limbs, keeping a guidewire in each limb. The four ureters were successfully rendered stone free in a single session. Four double-J stents, one in each ureter, were inserted after removal of all ureteric stones.

The patient passed the uneventful postoperative course. After that, the patient has received few extracorporeal shock wave lithotripsy (ESWL) sessions for the bilateral renal stones. The double-J stents were removed under local anesthesia after clearance of all stones.

**DISCUSSION**

Migliari and Usai have reported on two patients with bilateral ureteral duplicated systems— one with complete, and the other with incomplete duplication — and a solitary calculus obstructing one limb of the duplicated systems in each patient. The calculi were removed using the ureteroscope.\(^3\)

Megremis et al., have also used the ureteroscope to remove two simultaneously obstructing stones from both limbs of a bifid ureter.\(^4\) More recently, Aiken et al. reported on a patient having bilateral complete ureteral duplication with calculi obstructing both limbs of the left double ureter.\(^2\) Because of the small caliber of the ureters, it was difficult to get ureteral access, and those authors recommended passive ureteral dilation by pre-stenting as an adjunct to enhance ureteral compliance prior to ureteroscopy, and to allow easy, uncomplicated retrograde passage of the ureteroscope.\(^2\)

In the current report, our patient presented with bilateral complete duplicated ureteral systems, a calculus simultaneously obstructing each of the four ureteral limbs, and multiple bilateral renal calculi. The ureteral stones ranged from 7 to 23 mm in length, and 5–11 mm in width. The four ureteral lumens were wide enough to easily accommodate the small caliber semi-rigid ureteroscope, and to allow for laser lithotripsy without the need for ureteral dilatation or pre-stenting. All ureteral stones were removed completely and successfully from the four ureters in a sequential fashion, in a single setting. Four double-J stents, one in each ureteral limb, were left in place at

**Figure 1:** Abdominal X-ray showing multiple bilateral renal stones (black arrows) and multiple bilateral ureteral stones (white arrows)

**Figure 2:** Intravenous pyelogram – (a) After 5 min: Bilateral double renal pelvis with moderate to severe hydronephrosis (black stars) and bilateral double ureters with a stone in each ureter (white arrows). (b) After 10 min: Bilateral double renal pelvis with moderate to severe hydronephrosis (black stars), bilateral double ureters with a stone in each ureter (white arrows), and partially filled urinary bladder (back arrow)
the end of the procedure. The patient was completely cleared from the remaining renal stones after receiving few sessions of ESWL. To the best of our knowledge, we report on the first patient with bilateral complete duplication of the ureters, with four calculi simultaneously obstructing the four ureteral limbs, which were rendered free of stones using retrograde ureteroscopic laser disintegration in a single session.

**CONCLUSION**

Bilateral complete duplication of the ureters is a rare condition. We report to the best of our knowledge the first case of bilateral complete duplication of the ureters with multiple calculi simultaneously obstructing the four ureteral limbs. All ureteral limbs were safely rendered stone free in a single session using semi-rigid ureteroscopy and laser lithotripsy.

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**Conflicts of interest**

There are no conflicts of interest.

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