

CASE REPORT

Pediatric bilateral ureteral stone successfully removed using single-use flexible ureteroscopy with a holmium: YAG laser

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Abstract

A 12-year-old boy received steroid for his minimal change nephrotic syndrome for 10 years, and bilateral renal and ureteral stones and hydronephrosis were observed. Single-use flexible ureteroscopy is usable for pediatric lithotripsy with Ho: YAG laser.

KEYWORDS

Ho:YAG laser, single-use flexible ureteroscopy, ureteroscopic lithotripsy

1 | INTRODUCTION

With the recent development of ureteroscopy and laser devices, pediatric cases have been reported with treatment of renal or ureteral stones using ureteroscopic lithotripsy.^{1,2} Recently, single-use flexible ureteroscopy came into clinical use and showed efficacy without inferiority to flexible reusable ureteroscopy.³ However, due to the costs associated with flexible ureteroscopy, not all cases have been treated with ureteroscopic lithotripsy.^{3,4}

We herein report a pediatric case of bilateral ureteral stones successfully removed using single-use flexible ureteroscopy with holmium YAG (Ho: YAG) laser lithotripsy.

2 | CASE PRESENTATION

A 12-year-old boy received steroid for his minimal change nephrotic syndrome for 10 years. During the follow-up observation of his renal function, bilateral renal and ureteral stones and hydronephrosis were observed (Figure 1A and B). Because of his fever UTI without pain, bilateral ureteral stent insertion was performed. Because this was a bilateral case

requiring one-time invasive treatment in a pediatric patient, bilateral ureteroscopic lithotripsy was planned.

One month after initial ureteral stent insertion, trans-ureteral lithotripsy was planned. Under general anesthesia, we first tried to remove the ureteral stents, but due to heavy encrustation, the stents could not be removed. We then performed rigid ureteroscopy beside the encrusted ureteral stents to confirm the encrusted area and successfully removed them. An 11/13-Fr ureteral access sheath (UAS) was then inserted under fluoroscopic guidance just in front of the target stone, and the target stone was observed using single-use flexible ureteroscopy. Ho: YAG laser lithotripsy was performed at the settings of 1.0J 5 Hz, and then, the target stones were removed using a basket device. A double-J ureteral stent was inserted at the conclusion of lithotripsy. As the ureteral stent on the other side was also encrusted, we managed to remove it with the same approach. The renal and target ureteral stent were then also removed. A single-J stent was inserted at the conclusion of lithotripsy.

After confirming he had no fever on the next day after surgery, the single-J stent was removed. After confirming he had no hydronephrosis by ultrasonography, the double-J stent

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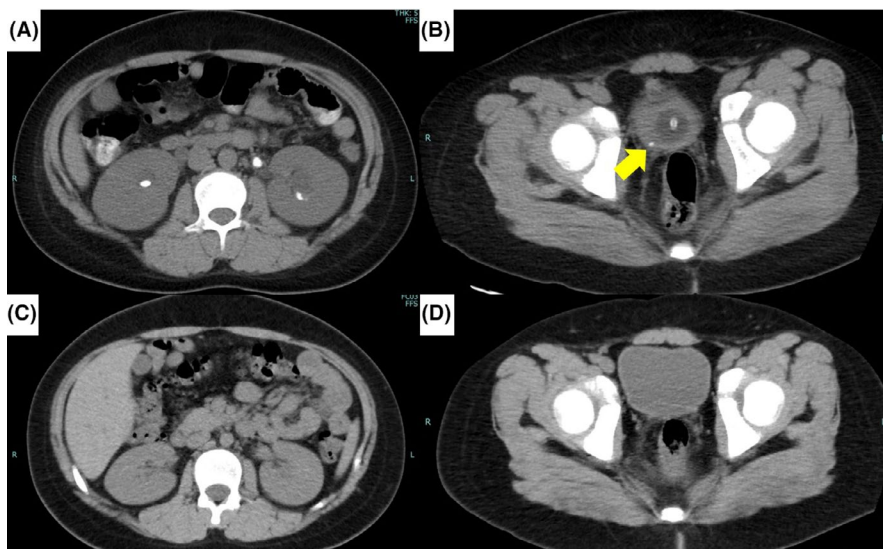


FIGURE 1 Initial CT image: A, bilateral ureteral stone and left hydronephrosis and B, right ureteral stone at ureterovesical junction. C, D, postoperative CT and no residual stone, and hydronephrosis was observed

was also removed under general anesthesia (Figure 1C and D). Postoperative urinary analysis showed pH 5.5, and serum creatinine level was 1.07. Stone chemical analysis was uric acid. He administered potassium citrate and following up X-ray examination every 6 months.

3 | DISCUSSION

Bilateral ureteroscopic laser lithotripsy was achieved for bilateral renal and ureter stones in a pediatric case. Our case used steroidal therapy for his minimal change nephrotic disease. Continuous steroid therapy is a risk for making ureteral stone; thus, our bilateral simultaneous ureteral stones might be come from this steroidal therapy. Also, our case showed heavily ureteral stent encrustation within a month, and at the time of removing ureteral stent after URS laser lithotripsy, also ureteral stent encrustation was observed. Thus, continuous steroidal therapy might be a risk of ureteral stent encrustation. Stone analysis revealed uric acid. Hiraishi et al reported that calcium oxalate was a major stone for childhood ureteral stone.⁵ We speculated that uric acid also a risk for rapid ureteral stent encrustation.

Previous cases of pediatric renal and ureteral stone lithotripsy have usually been performed using a percutaneous approach.⁶ Therefore, there has been no consensus concerning which size of UAS is most appropriate for a ureteroscopic approach in young patients. In our institute, all cases were able to be managed using an 11/13-Fr UAS. The detailed definition whether or not a 11/13-Fr UAS could be inserted; therefore, preoperative stenting might be a useful procedure, particularly in pediatric cases.⁷ We previously reported the efficacy of preoperative stenting for dilating the ureter, successfully achieving the insertion of a large-diameter UAS.⁷ In pediatric cases, preoperative stenting may also be useful for inserting a UAS.

Our institute is a tertiary referral highly advanced medical treatment center, and general stone surgery cannot be performed at our facility. Pediatric cases of stone disease require a high degree of surgical anesthesia. Our institute has no laser equipment and only one digital flexible ureteroscope, so we borrow the laser device when needed. Single-use flexible ureteroscopy allows our hospital to perform ureteroscopic laser lithotripsy two or more in the same day. Notably, single-use devices do not require sterilization or any degree of maintenance.

Single-use flexible ureteroscopy with a reduced diameter of ureteroscope has entered clinical use and is now available for treating pediatric cases with ureteroscopic lithotripsy using a Ho: YAG laser. In the present case, pediatric ureteroscopic lithotripsy was performed using single-use flexible ureteroscopy. We encountered a pediatric case of bilateral renal and ureteral stones successfully removed using single-use ureteroscopy with Ho: YAG laser lithotripsy.

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Published with written consent of the patient.

CONFLICT OF INTEREST

None declared.

AUTHOR CONTRIBUTIONS

TK, KK, TH, SK, and J-T: involved in data acquisition; TK: wrote the manuscript; HU: supervised the study.

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