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Case Report

Antegrade Flexible Ureteroscopy for Bilateral Ureteral Stones in a Patient with Severe Hip Joint Ankylosis

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In the past several decades there has been a remarkable development of small-caliber, flexible ureteroscopes and various ancillary instruments for stone manipulation and retrieval. Percutaneous antegrade ureteroscopy can be substituted in select cases for retrograde ureteroscopy. We report a case of a 60-year-old man with severe ankylosis in both hip joints who was diagnosed with bilateral ureteral stones. The patient underwent antegrade flexible ureteroscopy and laser lithotripsy. This case illustrates the role of antegrade flexible ureteroscopy combined with the holmium:YAG laser as a minimally invasive, safe, and effective technique for the management of stones in a patient who cannot undergo a retrograde approach.

Key Words: *Lasers; Ureteroscopy; Urinary calculi*

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Currently, there are various treatment modalities such as medical expulsive therapy, shock wave lithotripsy (SWL), retrograde ureteroscopy, and laparoscopic and open ureterolithotomy for the treatment of ureteral calculi. To determine the most appropriate modality, factors such as stone characteristics, anatomical details, the patient's condition, and the surgeon's preference are carefully considered. With the development of smaller caliber semirigid and flexible ureteroscopes and the introduction of improved instrumentation, including the holmium:YAG laser, and increasing experience worldwide, ureteroscopy has evolved into a safer and more efficacious modality for the treatment of stones in all locations in the ureter [1].

Percutaneous antegrade removal of ureteral stones can be performed in selected cases when SWL is not indicated or has failed and retrograde ureteroscopy is unsuitable, especially in those with urinary diversion or renal transplants [2-4]. We present a case of bilateral ureteral stones in a patient with severe ankylosis in both hip joints that was successfully managed with antegrade flexible ureteroscopy and laser lithotripsy.

CASE REPORT

A 60-year-old man was referred to the emergency department with a 2-day history of febrile sensation, nausea, and emesis. He also complained of occasional, tolerable, left-lower quadrant abdominal pain in the past three months. He had suffered from bacterial coxitis about 10 years ago and it was aggravated to severe ankylosis in both hip joints

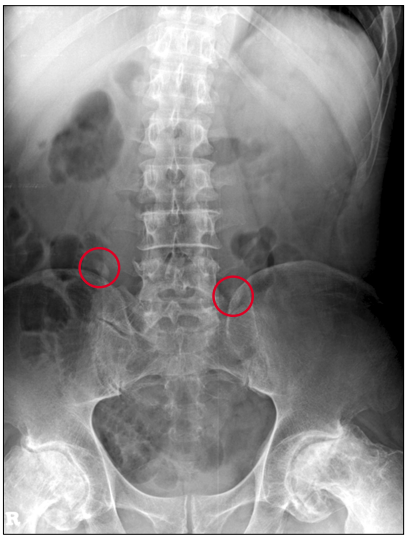

FIG. 1. Plain abdominal radiograph showing an 18.1 mm stone in the right ureter, an 18.5 mm stone in the left ureter, and ankylosis of the bilateral hip joints (see each stone inside the circles).

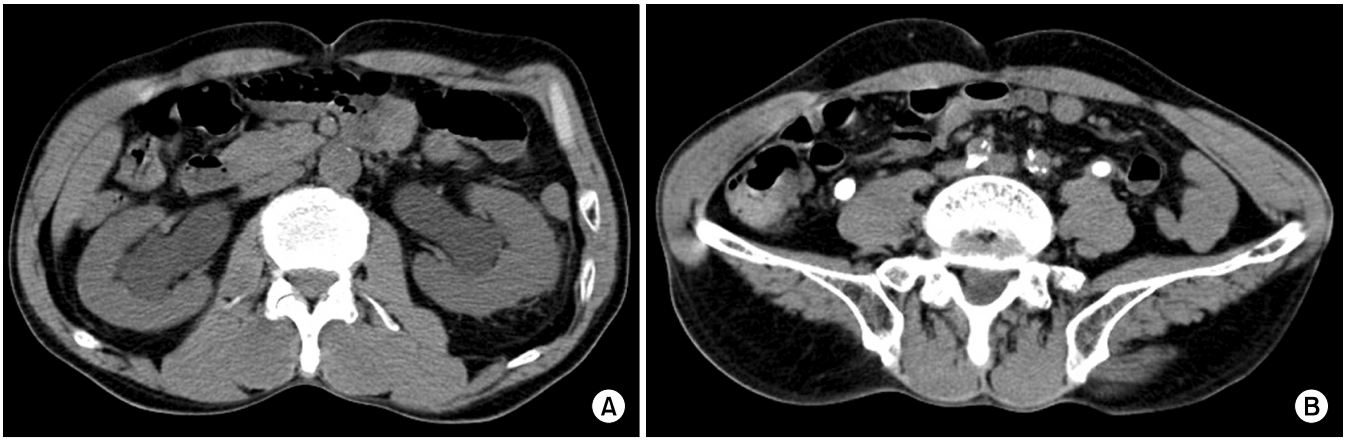

FIG. 2. Computed axial tomography scan of the abdomen showing severe hydronephrosis and bilateral ureteral stones.

that had not been treated. His range of motion was only 20-30 degrees. He had no previous history of urinary tract stones. Plain film radiography showed an 18.1 mm calcification in the right ureteral course, an 18.5 mm calcification in the left ureteral course, and bilateral hip joint ankylosis (Fig. 1). The patient's initial serum creatinine level was 5.1 mg/dl and a nonenhanced computed tomography scan was checked to rule out other causes of obstructive nephropathy. The computed tomography scan revealed both ureteral stones to be in the area of both upper ureters with significant hydronephrosis (Fig. 2). Percutaneous nephrostomy tubes were inserted into the dilated pelvocaliceal system of both kidneys for the immediate relief of the obstructive nephropathy. After this intervention and adequate intravenous antibiotics, the patient's symptoms subsided and his serum creatinine level was normalized.

When the patient's condition became stable, we decided to perform elective surgical management to remove the bilateral ureteral stones rather than SWL because of the relatively large size of the stones. However, the patient could not be placed in the dorsal lithotomy or low lithotomy position to perform a retrograde ureteroscopy because of the severe hip joint ankylosis. In this situation, we decided to perform antegrade flexible ureteroscopy through a percutaneous trans-renal route to approach the ureteral stones. Before the start of the procedure, while the patient was under general anesthesia, the patient was placed in the prone position with appropriate padding and prepared and draped in a sterile fashion. A 0.035 inch guidewire was placed under fluoroscopic guidance through the nephrostomy tube. The tract was dilated by using coaxial telescopic dilators to 14 F and a second 0.035 inch safety guidewire was placed. A 12/14 F ureteral access sheath (Applied Medical, Rancho Santa Margarita, CA, USA) was placed to allow for optimal visualization and safe introduction of the flexible ureteroscope (Fig. 3). A 7.2 F flexible ureteroscope and a 200 μ laser fiber were used for lithotripsy. We used a holmium laser machine set at an energy of 1 J and a rate of 15 Hz. The fragmented stones were passed down to the bladder by irrigation and a flexible ureteroscope was advanced to the ureteral orifice to confirm that all stone fragments were removed from the ureter. Following lithotripsy, a double-J stent was placed through an antegrade route and the same procedure was performed on the contralateral side simultaneously. Stone fragments in the bladder were evacuated by manual bladder irrigation through a 20 F Foley catheter. The stones were composed of mixtures of calcium oxalate and calcium carbonate apatite. Both double-J stents were removed through the retrograde approach by using a flexible cystoscope 2 weeks after the procedure. No residual fragments were found in the postoperative study (Fig. 4).

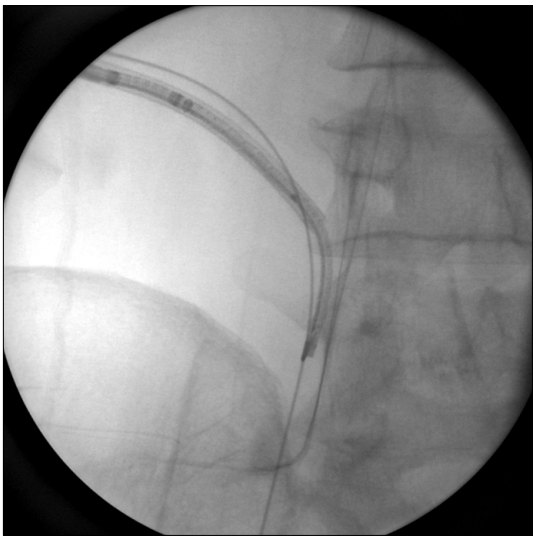

FIG. 3. Fluoroscopic image during antegrade flexible ureteroscopy and laser lithotripsy.

DISCUSSION

Over the past 15 years, rigid ureteroscopy has been established as a minimally invasive modality for the treatment of ureteral calculi, and it has proven to be equivalent to SWL for proximal ureteral stones and superior to SWL for

FIG. 4. Postoperative plain film checked 2 weeks after the operation when both double-J stents were removed.

distal ureteral stones [1]. Recently, advances in endoscopic instruments, especially the new generation flexible ureteroscope and holmium laser lithotripter, have enabled retrograde ureteroscopy to become a first-line option for most ureteral stones and even small intrarenal stones. The combination of these instruments allows for an excellent stone-free rate with a low postoperative complication rate in the treatment of urinary calculi [5]. However, there are some limitations of the retrograde ureteroscope in certain situations. It is hard to approach to the upper urinary tract in cases of a transplanted kidney, urinary diversion, and urethral or ureteral stenosis. In these cases, antegrade flexible ureteroscopy can be effectively performed for lithotripsy of upper urinary tract calculi.

Antegrade flexible ureteroscopy has several advantages over retrograde ureteroscopy. This modality enables a reliable access to the kidney and an opportunity to flush fragments down into the bladder rather than having to remove bits of stone ureteroscopically or wait for them to pass spontaneously [6]. For these reasons, the percutaneous antegrade approach has been used in the treatment of ureteral calculi in selected cases. Several studies have reported that the antegrade approach in the treatment of large impacted stones in the upper ureter is an alternative instead of retrograde ureteroscopy [7,8]. Antegrade removal of ureteral stones is also used when SWL has failed and the retrograde approach is not suitable, especially in urinary diversions or renal transplants [2-4]. In previous studies, the conventional instruments such as a nephroscope or rigid or semirigid ureteroscope with tract dilation have mostly been used through the antegrade approach. In our case, flexible ureteroscopy allowed us to easily approach the stone through a 12/14 F ureteral access sheath with minimal tract dilation.

Former studies have demonstrated that the antegrade approach is a safe and effective treatment option for ureteral calculi in selected patients. However, for large or impacted stones, the ureteral injury rate and ureteral stricture rate of the antegrade approach exceed those of retrograde ureteroscopy [6]. To prevent these complications, we need to use a smaller caliber ureteroscope and avoid ureteral mucosal injury during lithotripsy. A flexible ureteroscope, which usually has a smaller caliber than a rigid or semirigid ureteroscope, and a ureteral access sheath can reduce friction between the ureteral mucosa and ureteroscope. A laser lithotriptor, if direct thermal injury is avoided, can also reduce the risk of mechanical mucosal damage by stone fragments compared with other lithotripters. No perioperative complications were observed in our case, which was treated with a flexible ureteroscope and laser lithotripter through a ureteral access sheath.

Antegrade flexible ureteroscopy with laser lithotripsy is an attractive treatment option for patients who are unsuitable for retrograde ureteroscopy. The most important evolutions in our case were the use of an antegrade flexible ureteroscope with a ureteral access sheath percutaneously.

Conflicts of Interest

The authors have nothing to disclose.

REFERENCES

1. Preminger GM, Tiselius HG, Assimos DG, Alken P, Buck AC, Gallucci M, et al. 2007 Guideline for the management of ureteral calculi. Eur Urol 2007;52:1610-31.
2. El-Assmy A, El-Nahas AR, Mohsen T, Eraky I, El-Kenawy MR, Shaban AA, et al. Extracorporeal shock wave lithotripsy of upper urinary tract calculi in patients with cystectomy and urinary diversion. Urology 2005;66:510-3.
3. el-Nahas AR, Eraky I, el-Assmy AM, Shoma AM, el-Kenawy MR, Abdel-Latif M, et al. Percutaneous treatment of large upper tract stones after urinary diversion. Urology 2006;68:500-4.
4. Rhee BK, Bretan PN Jr, Stoller ML. Urolithiasis in renal and combined pancreas/renal transplant recipients. J Urol 1999;161: 1458-62.
5. Gupta PK. Is the holmium:YAG laser the best intracorporeal lithotripter for the ureter? A 3-year retrospective study. J Endourol 2007;21:305-9.
6. Wolf JS Jr. Treatment selection and outcomes: ureteral calculi. Urol Clin North Am 2007;34:421-30.
7. Kumar V, Ahlawat R, Banjeree GK, Bhaduria RP, Elhence A, Bhandari M. Percutaneous ureterolitholapaxy: the best bet to clear large bulk impacted upper ureteral calculi. Arch Esp Urol 1996;49:86-91.
8. Goel R, Aron M, Kesarwani PK, Dogra PN, Hemal AK, Gupta NP. Percutaneous antegrade removal of impacted upper-ureteral calculi: still the treatment of choice in developing countries. J Endourol 2005;19:54-7.