Endourology treatment of giant ureteral stone: Distal ureteral stone lithotripsy with nephroscope and shockpulse

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ABSTRACT

There has been no article that publish the utilization of nephroscope to lithotripsy in removing giant distal ureteral stone. Here we reported a case of large multiple distal ureteral stones treated using nephroscope and lithotripsy with shockpulse in a 53-year-old woman. The biggest stone measuring 40×35 mm and 5×5 mm for the smallest one. After initial cystoscopy and ureteric dilatation, nephroscope 24fr was inserted into the distal ureter. DJ stent was applied. No residual stone and complication were found. After four weeks the stent was removed and the ureteral lumen was normal in size.

1. Introduction

Ureteral stones represent a group of calculi that are particularly resistant to removal because of the typical inflammatory response of the ureteral wall when the stone becomes impacted and sometimes embedded. Before the advancement in the technology of endoscopes and lithotripters, large ureteral stones could be treated with Ureteroscope/URS, specifically with ureterorenoscopy and lithotripsy. However, as the evidence of endourology treatment effectiveness increased, the EAU guidelines acknowledge the merits of either the endoscopic procedures or the ESWL in the treatment of upper and lower ureteral stones with a size >1 cm. Herein, we present and discuss the results with using another way. We use a nephroscope and lithotripsy with shock pulse treatment to treat large ureteral stones with a size of around 40mm and performed in the urologic department of Gunung Jati Hospital.

2. Case description

A 53-year-old woman has referred to Gunung Jati Hospital due to colic flank pain 4 months ago but is worsening 1 week ago. The patient also felt that she urinated less frequently. The patient often has a high protein intake and less intake of water. The patient has a history of recurrent urinary tract infections. The patient had no other significant prior medical history. Laboratory examination showed Creatinine of 1.18 mg/dL and ureum 32 mg/dL. Other laboratory parameters were within normal limits. Urinalysis showed increased leukocyte esterase, protein, erythrocyte, and leukocyte.

Upon CT scan examination (Fig. 1), we found left hydrenephrosis grade 3 and multiple large distal left ureteral stones with the size of 40×35 mm and 20×20 mm.

The patient was prepared for lithotripsy under general anesthesia and then the patient was placed in a lithotomy position. Cystoscopy was first carried out to gain retrograde access. The urethral outlet was within normal limits. Both ureteral orifices were visualized and within normal limits. The ureter was dilated and guided using the C-arm. A nephroscope 24 fr was inserted into the bladder and then into the ureter. Multiple ureteral stones were visualized. The largest stone was 40×35 mm, followed by with 20×20 mm as the second large stone and the smallest was 5×5 mm. (Fig. 2). All stones were fragmented using a shock pulse lithotriptor.

Irrigation was achieved with normal saline mostly under gravity with pressure only increasing with pressure bag when vision became poor. C-arm was used to guide the steps of the procedure where necessary without a ureter sheet, particularly guidewire insertion, ureteric dilatation with ureter dilator up to 12 fr, some steps of nephroscope manipulations with pencil dilator and alken road 16-24 fr, and placement of DJ stents.

DJ stent was placed and a foley catheter that was inserted to rest the bladder at surgery was removed on the first day after the operation. Intravenous antibiotics were given for 24 h postoperative and subsequently oral antibiotics. Four weeks after the DJ stent was implanted, the normal diameter of the left ureteral lumen showed after the stent was

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removed (Fig. 3). The procedure, which is done under general anesthesia, takes about 1.5 hours.

3. Discussion

The advancement in the endourological armamentarium, the downsizing of the nephroscope, and increased expertise have combined to push the indications for endourology to any location in the upper urinary tract. To the best of our knowledge, this is the first report on treating large distal ureteral stones using retrograde nephroscopy.

We prefer a nephroscope over a ureteroscope due to the flexible nephroscope’s larger caliber, compared to the flexible ureteroscope, thus a better vision is provided. Additionally, a larger working channel favors the usage of alarger lithotripter, consequently, it can diminish shock time and energy and time needed for stone fragmentation, and significantly increases the stone-free rate in patients with staghorn urinary tract stone. In the case where giant stones obstruct the ureteral lumen, a larger working channel may aid in more effective and fast fragmentation. This patient also had multiple stones that required better visualization in order to manage optimal stone clearance. The main objective of stone surgery is to establish a stone-free status to diminish the risk of future stone-related events and concomitant surgery. Therefore, we optimize the effectivity of stone removal by choosing a nephroscope as the main modality. The disadvantage of using nephroscope is the higher risk for ureteric perforation and ureteric avulsion as the caliber of the nephroscope is larger than the ureteroscope. However, with the possible benefit of increased success and decreased re-operation rates, we believe that these disadvantages can be overlooked.

We did not find any studies that compare the effectiveness and safety between ureteroscopy and nephroscopy in treating ureteral stones. Thus, limiting our discussion to comparing the result of this patient with
the previous study. However, we found one study, by Miller et al., that employed a 24-French rigid nephroscope to remove a large distal ureteral stone in a patient with ureterocele. They fragmented and evacuated the large stone with the ultrasonic lithoclast within the distal ureter. A 365-μm laser fiber was also used to fragment some of the stones. Complications were not observed in their report. Upon CT scan 4 months postoperatively, stone recurrence was negative. They followed up with the patients up to 15 months post-procedure when the patient was doing well.5

We believe that this case report can be additional evidence to support the utilization of a nephroscope for giant distal ureteral stone removal. Complications such as ureteral perforation or avulsion were not found by the end of the procedure. Also, there are no residual stone fragments. This indicated that nephroscopy has a good short-term outcome. However, we did not evaluate a long-term outcome of the patient. However, with a good short-term outcome, we expect that the patient will have good long-term outcome.

4. Conclusion

Open surgery is not the first option to treat large stones in the distal ureter. Nephroscope and lithotripsy with shock pulse could be good options to treat this problem. Utilization of nephroscope 24 fr with shock pulse lithotripsy in patients with large multiple distal ureteral stones is safe and effective. This could be additional evidence to support the utilization as another option in treating distal ureteral stone.

Consent

Written informed consent was obtained from the patient for publication of this case report. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Declaration of competing interest

The authors declare that there is no conflict of interest.

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