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The use of Alken Metal Telescopic Dilator for 'X-ray-free' PCNL in neglected DJ stent patient: A case report

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ABSTRACT

Neglected DJ stent is a challenging case, due to the procedures required, using fluoroscopy, as seen in ESWL, URS, and PCNL. This study presents the case of a 54 years old woman with pyelum and ureter stones, alongside neglected DJ stent for about a year. Treatment was started with cystoscopy, URS lithotripsy, which was continued with kidney puncture, and the subsequent dilatation with Alken Metal Telescopic Dilator. All steps were performed under the guidance of ultrasonography without fluoroscopy. The result showed a successful removal of DJ stent, which was achieved percutaneously, and no remaining stone was found.

Introduction

DJ stent often causes distress when the removal is not performed in time. The removal process requires the use of X-ray procedures, including ESWL, URS, or PCNL, as neglected DJ stent tends to be covered with stones over time.[1] PCNL procedure is needed to fragment the stones covering the proximal side of the DJ stent. The introduction of US in PCNL, avoids or reduces the use of X-rays. Collectively, these techniques have frequently been adopted for puncture and dilatation, in attempts to gain access to the kidney. This involves the use of BD, which has the disadvantages of being non-reusable and poor cost effectiveness.[2] AMTD is a cheaper and reusable method, unfortunately literature research shows no reports regarding the use AMTD in US-guided PCNL. This research shows reports on the treatment of neglected DJ stent using AMTD to gain access to the kidney without an X-ray.

Case

A 54 year old female was admitted to the hospital with pain at the right flank, experienced for about a year. The patient had previously visited another hospital, and was diagnosed with right nephrolithiasis, which was remediated through DJ stent insertion and ESWL. ESWL was performed for four series, prior to a car accident, followed by the evasion of hospital visits for a year. Due to the lack of facilities, the patient was then referred to our hospital.

The CT scan showed right hydronephrosis, which was caused by stone in the pyelum and in the proximal of the ureter (22 × 20 × 13 mm and 8 × 6x6 mm respectively; HU 368–580). In addition, the stone was also covering DJ stent (Fig. 1). Therefore, the patient was scheduled for x-ray-free cystoscopy, URS and PCNL under spinal anesthesia.

During cystoscopy, the distal end of the DJ stent was covered with a thin sheath of stones. URS was performed with a semi rigid ureteroscope until distal part of the ureteral stone and then fragmented with pneumatic lithotripter. Subsequently, two Nitinol guidewires were inserted to serve as a guide for a UC to reach the kidney, followed by removing one of the nitinol guide wire inside the UC. Conversely, the UC position was checked by spooling saline and air into the UC to observe water jet in US imaging, which confirms the presence of distal part of UC inside the kidney. The patient then changed into supine position. Furthermore, the kidney was punctured with a needle and stiff guide wire was then inserted. Conversely, renal access was dilated by 8F–12F fascia dilator, followed by kidney dilation using the AMTD size 8F–28F, consecutively, and lastly, the insertion of 28F outer Amplatz sheath. The entire procedure was guided by US, while saline solution flowed through the UC during kidney puncture and access dilation. This was performed in order to create artificial hydronephrosis and indicate the maintenance of fascia dilator and AMTD inside the pelvico-calyceal system.

After establishing access to the kidney, nephroscopy was performed,

Abbreviations: AMTD, Alken Metal Telescopic Dilator; BD, Balloon Dilator; DJ, Double J; ESWL, Extracorporeal Shock Wave Lithotripsy; HU, Hounsfield Unit; PCNL, Percutaneous Nephrolithotomy; URS, Ureteroscopy; UC, ureteral catheter; US, Ultrasound.

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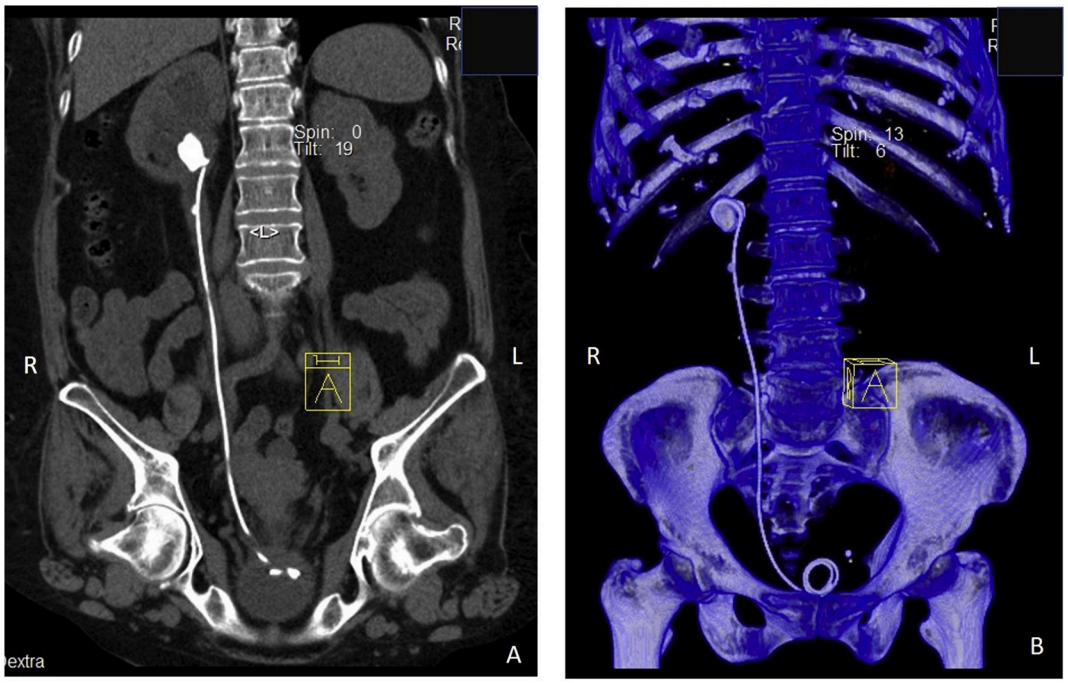

Fig. 1. CT scan before the removal of stones and DJ stent showing a right pyelum stone with dimension 22 × 20 × 13 mm, and right ureteral stone of size 8 × 6x6 mm covering the DJ Stent. (A) Plain CT scan (B) Reconstructive CT scan.

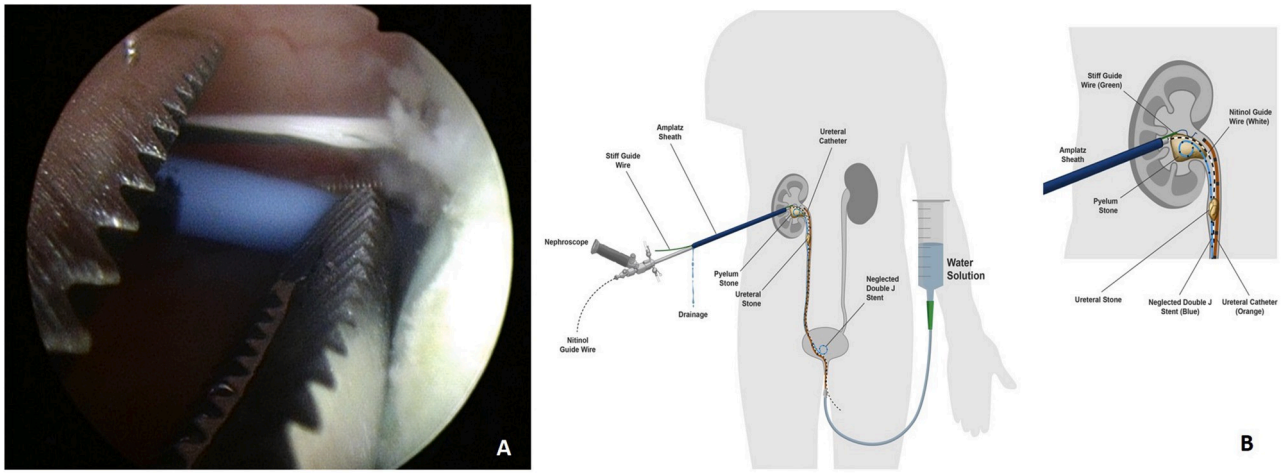

Fig. 2. (A) Nephroscopic view: stone covering the DJ stent, nitinol guide wire (Zebra wire) and ureteral catheter (bule) were observed through a nephroscope. (B) Intraoperative schematic image showing the DJ stent covered with stone, ureteral catheter, the stiff and nitinol safety guide wires, with the latter inserted into the bladder through the ureter, kidney, and out via the nephroscope.

where a stone was seen in the right pyelum, covering the proximal end of DJ stent. In addition, the other end of the nitinol guidewire was then pulled out through the Amplatz sheath to serve as safety wire (Fig. 2). The stone fragmented with a combination of US and shockwave lithotripter. After clearance from the kidney stone, the DJ stent was taken out percutaneously. This device was observed to be intact, with the presence of encrustation (Fig. 3A). Ultrasound imaging and nephroscopy were used to recheck for residual stones, and none were found. Hence, the operation was terminated after placing the UC for 24 hours, without percutaneous drainage. The x-ray obtained on the following day showed the retention of a good position with no residual stone. (Fig. 3B). Therefore, the patient was discharged day one post-surgery, and no significant decline in hemoglobin was observed (11 gr/dL to 10.2 gr/dL).

Discussion

The combination of PCNL procedure with URS and or ESWL is a common approach towards the treatment of neglected DJ stent, which is generally conducted under fluoroscopy guidance. However, several urology centres perform this operation fluoroscopy free, which is safer and cheaper for the patient and the operator.[3]

During this treatment, ESWL was not an option in the removal of stones covering neglected DJ stent, although the HU range was between 368 and 580. This is due to the uncertainty to determine how many series of ESWL are needed to eliminate the remaining stone, as those in the proximal location had not yet fragmented after prior four ESWL series. Conversely, there were also concerns regarding a definitive therapy with the ability to eliminate the stone and evacuate the neglected DJ stent.

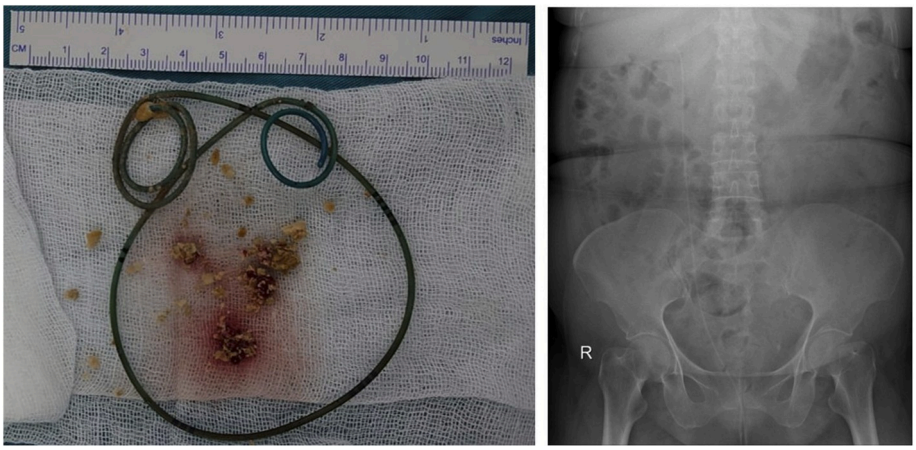

Fig. 3. (A) Removed DJ stent intact with some encrustation. (B) Abdominal X-ray taken 24 h after the operation, showing no residual stone.

The advantages of X-ray-free PCNL include the absence of radiation hazard for both the operator and the patient, as well as the relative cost effectiveness and the ability to perform the entire procedure in a urology centre without a C-arm device.[2] Advantages of using AMTD are cost-effectiveness, reusability, and the ability to conduct in patients with peri-renal fibrosis after previous procedure.[4] Using AMTD in X-ray-free PCNL, we can combine those advantages.

On a prospective randomized study, which compared the techniques used to dilate the kidney in PCNL, it was observed that perforation/overshooting had also been reported in AMTD. However, this incidence was also reported in patients undergoing dilatation with BD.[5] Operator experience is a major disadvantage of using AMTD in the X-ray-free PCNL method, as urologists are expected to at least be proficient in performing the procedure in a supine position with fluoroscopy. Moreover, the general safety and effectiveness of this technique is not yet known because this is a pilot study, hence the need for application in a large number of patients.

Despite all the disadvantages reported, the use of AMTD for X-Ray-Free PCNL in the treatment of neglected DJ stent is still promising for further application in more patients. Moreover, the use of AMTD for X-Ray-Free PCNL in patients with kidney stone alone is also promising.

Conclusions

X-ray-free PCNL using AMTD can be safely and successfully performed to manage neglected DJ stent case.

Declaration of competing interest

None.

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References

1. Polat H, Yücel MO, Utangaç MM, et al. Management of forgotten ureteral stents: relationship between indwelling time and required treatment approaches. *Balkan Med.* 2017;34(4):301–307.
2. El-Shazly M, Salem S, Allam A, et al. Balloon dilator versus telescopic metal dilators for tract dilatation during percutaneous nephrolithotomy for staghorn stones and calyceal stones. *Arab J Urol.* 2015;13(2):80–83.
3. Yang YH, Wen YC, Chen KC, et al. Ultrasound guided versus fluoroscopy guided percutaneous nephrolithotomy: a systematic review and meta-analysis. *World J Urol.* 2019;37(5):777–788.
4. Dehong C, Liangren L, Huawei L, Qiang W. A comparison among four tract dilation methods of percutaneous nephrolithotomy: a systematic review and meta-analysis. *Urolithiasis.* 2013;41:523–530.
5. Srivastava A, Singh S, Dhayal IR, Rai P. A prospective randomized study comparing the four tract dilation methods of percutaneous nephrolithotomy. *World J Urol.* 2017;35:803–807.