Percutaneous Antegrade Removal of Encrusted Broken Double J Ureteric Stent Using a Snare

G Alshumrani

ABSTRACT

Percutaneous removal of partially encrusted broken double J ureteric stent from the renal pelvis using a snare is described. The patient is a 60-year old female, with a known case of hyperparathyroidism with double J ureteric stent placed one year earlier. Removal of the double J stent was attempted by cystoscopy but a loop of the stent was broken in the renal pelvis due to partial encrustation. Several unique aspects and technical challenges were encountered in this case including lack of pre-existing nephrostomy access in addition to a broken, partially encrusted stent which was near multiple renal stones and a newly-placed fully-functioning double J stent. The techniques to overcome those challenges are described. To the best of the author's knowledge, this is the first reported case of successful percutaneous removal of a broken encrusted double J stent by snare in the presence of such technical challenges.

Keywords: Broken double J stent, percutaneous removal, ureteral stent

Extracción Percutánea Anterógrada de un Stent Ureteral Doble J Incrustado Roto Usando un Asa

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RESUMEN

Se describe la extracción percutánea de un stent ureteral doble J parcialmente incrustado y roto de la pelvis renal usando un asa. El paciente es una mujer de 60 años, con un caso conocido de hiperparatiroidismo, a la que se le había colocado un stent ureteral doble J el año anterior. La extracción del stent doble J fue intentada por cistoscopia, pero un lazo del stent estaba roto en la pelvis renal debido a una incrustación parcial. Varios aspectos únicos y desafíos técnicos fueron encontrados en este caso, incluyendo la falta de acceso de nefrostomía preexistente, además de un stent roto, parcialmente incrustado, cerca de múltiples piedras renales. Se trataba de un stent doble J, totalmente funcional, el cual había sido colocado recientemente. Se describen las técnicas para superar esos retos. Hasta donde el autor conoce, esta es la primera vez que se reporta la extracción percutánea exitosa de un stent doble J incrustado roto, mediante un asa, frente a los desafíos técnicos existentes.

Palabras claves: Stent doble J roto, extracción percutánea, stent ureteral

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INTRODUCTION

Double J (DJ) ureteric stents are widely used for various urologic indications. The classic removal method of DJ stents is by cystoscopy. Percutaneous antegrade removal of DJ stents by snare is rarely described in the literature, particularly if there is no pre-existing nephrostomy access and the stent is broken, partially encrusted and surrounded by multiple renal stones and is a newly-placed fully-functioning DJ stent. The techniques to overcome such technical challenges are described. To the best of the author's knowledge, this is the first reported case of successful percutaneous snare removal of a broken DJ stent with such combination of technical challenges.

CASE REPORT

A 60-year old female was referred by the urologist to the interventional radiology service for removal of a broken DJ

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stent from the renal pelvis. She was known to have hyperparathyroidism with multiple bilateral renal and ureteric stones for more than five years. Bilateral DJ stents were placed and exchanged several times by cystoscopy. The patient was lost to follow-up for one year, after which removal of DJ stents was performed by cystoscopy and new DJ stents were placed. However, a loop of the left DJ stent was partially encrusted in the renal pelvis and was broken during the removal. The patient is not known to have other medical problems.

Informed consent for percutaneous removal of the broken DJ stent was obtained. The coagulation profile was within normal limits. Prophylactic antibiotic (cefazolin, 1 gram intravenously) was administered upon call of the patient to the interventional radiology suite. The patient was placed prone on the angiography table. Ultrasound showed just mild hydronephrosis as the newly placed DJ was functioning. The most inferior calyx of the lower pole showed a large stone and, therefore, was avoided during percutaneous access.

Under aseptic conditions, local anaesthesia (10 millilitres of 2% lidocaine), intravenous sedoanalgesia (1 milligram midazolam and 50 micrograms fentanyl) and ultrasound guidance, a calyx in the left lower pole was accessed using Neff percutaneous access set (Cook Medical, Bloomington, IN). Iodinated contrast (Xenetix 300, Guerbet, France) was injected in the renal pelvis. Curved 0.035 inch Amplatz Extra Stiff guide wire (Cook Medical, Bloomington, IN) was placed and an 8-Fr 25-cm introducer sheath (Terumo Co, Tokyo, Japan) was advanced into the renal pelvis. A safety guide wire to maintain the access was placed initially in the distal ureter, but was found to hinder manipulation of the snare and sheath in the upper pole where the broken stent was located, and therefore, this safety guide wire was removed and care was taken not to lose the access. An 18 mm–30 mm snare (EN Snare, Angiotech Medical Device Technologies Inc, Gainesville, FL) with 7-Fr 100 cm-long introducing sheath was placed into the renal pelvis. Presence of functioning DJ stent required frequent injections of diluted contrast into the renal pelvis to keep it distended to facilitate the snaring. A curve had to be created at the distal end of the snare to facilitate catching the broken DJ stent (Fig. 1). Due to overlapping between the broken DJ stent and the new one, the snare caught both of them which required manipulation of the snare by rotating it gently in different directions till the new DJ stent released (Fig. 2). As the broken DJ stent was partially encrusted, it was further broken into two fragments during retrieval which required further attempts to remove the remaining fragment (Fig. 3). After the complete removal of the broken DJ stent, an 8-Fr nephrostomy catheter (Navarre, Bard Inc., Murray Hill, NJ) was then placed (Fig. 4).

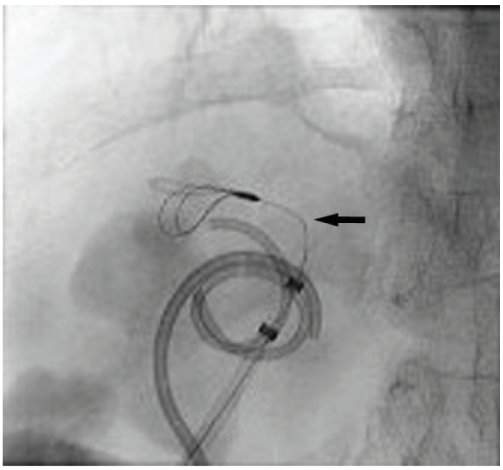

Fig. 1: A curve (arrow) was created at the distal end of the snare to facilitate catching the broken double J stent.

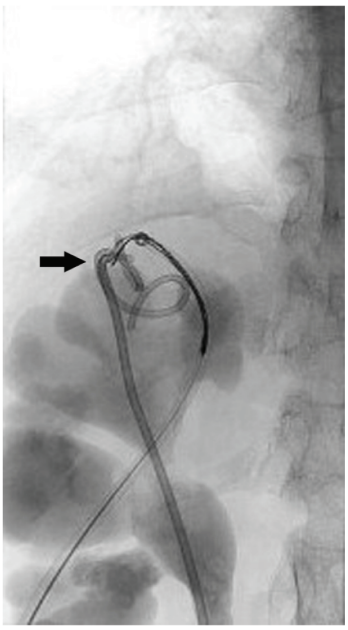

Fig. 2: Due to overlapping between the broken double J stent and the new one, the snare caught both of them initially (arrow) which required manipulation of the snare by rotating it gently in different directions till the new double J stent was released.

The patient tolerated the procedure very well and there were no complications. On the following day, the nephrostomy catheter was removed and the patient was discharged home.

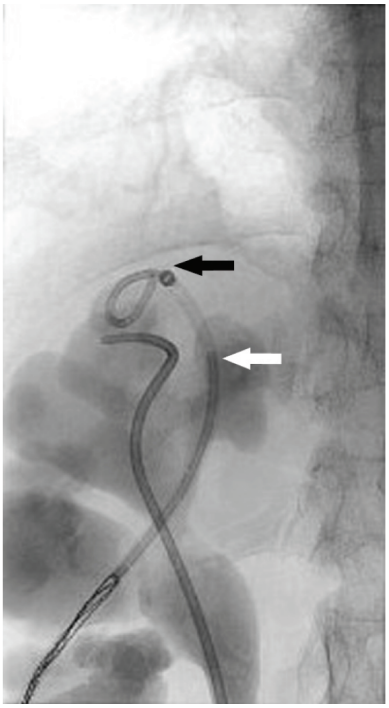

Fig. 3: During removal of the broken stent by snare, it was further broken into two fragments; one at the tip of the sheath (black arrow) and one inside the sheath (white arrow).

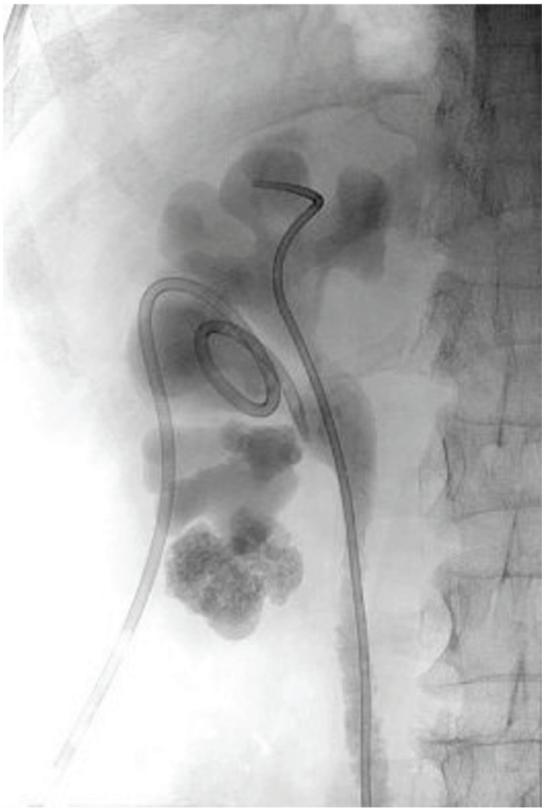

Fig. 4: Final image after removal of the broken double J stent and placement of nephrostomy catheter.

DISCUSSION

The classic urologic practice of DJ ureteric stent removal is by cystoscopy (1). However, percutaneous antegrade removal of DJ stents has been described in the literature. Some of the indications for the percutaneous antegrade approach include a pre-existing nephrostomy route, a surgical history resulting in an inaccessible retrograde route, urethral stricture, ureteric perforation, upward stent migration, inability to obtain a lithotomy position, fragmentation of the proximal stent, cystoscopic failure, physician request or patient refusal of cystoscopy (2, 3).

The case presented here is an example of fragmentation of the proximal stent. Presence of partial encrustation of the broken DJ stent, multiple renal stones, and a functioning new DJ stent beside the broken one represent technical challenges as described above. Those challenges required modifications of the retrieval technique by snare. One of the technical modifications was to access a different calyx to the one that contained the stone, which resulted in angulation of the trajectory between the long axis of the snare and the broken DJ stent. This was solved by creating a curve of the distal end of the snare shaft to direct it toward the broken stent (Fig. 1). The new functioning DJ stent represented another challenge due to continuous emptying and persistent collapse of the renal pelvis and calyces. A calyx of the lower pole was accessed successfully despite its non-significant dilatation. The renal pelvis collapse was solved by frequent injection of diluted contrast through the working sheath to keep the renal pelvis distended and to facilitate the snaring of the broken DJ stent. The new DJ stent was caught by the snare during attempts to snare the broken stent, and this was overcome by manipulation and rotation of the snare to catch only the broken stent (Fig. 2). Partial encrustation of the broken stent resulted in its fragmentation during retrieval by snare which required further snaring attempts to remove the remaining broken piece (Fig. 3). Such combination of technical difficulties is very rare; hence the uniqueness of this case.

Approximately 11% of the inserted DJ ureteric stents can get complicated by encrustation and different surgical and non-surgical procedures could be adopted to remove them, including cystolitholapaxy, retrograde ureteroscopic manipulation, intracorporeal or extracorporeal lithotripsy, percutaneous nephrolithotomy, and open surgical removal (4). Removal of encrusted DJ stent may fail (5). The encrustation of the broken stent reported here resulted in technical difficulty in the form of fragmentation of the broken stent during retrieval which required additional snaring attempts; however, it did not preclude complete removal.

The largest series of percutaneous antegrade removal or exchange of DJ stents was reported by Shin *et al* using snare or basket catheter and included 27 patients (39 stents) with a technical success rate of 95% (2). Inflated 6 mm angioplasty balloon or 9-Fr sheath were used for manipulation during stents retrieval which may result in injury of the urothelial mucosa. In the index case, there was no need

to use angioplasty balloon and the manipulation with the snare and sheath did not result in obvious injuries or blood clot formation.

Another series was reported by Liang *et al* and included 24 patients (26 stents) with 100% technical success rate (3). Forceps and/or snare were used and five stents were retrieved successfully with a forceps after initial failures with snare catheters. All patients without a pre-existing percutaneous nephrostomy (8 patients, 33%) had undergone retrieval of their DJ stents by forceps. In the case reported here, although there was no pre-existing nephrostomy tube, retrieval of the broken stent by snare was successful in the first attempt.

Yeung *et al* reported 20 patients who had fluoroscopically guided percutaneous removal of dysfunctioning ureteral stents with a success rate of 85% (6). Out of the successful 17 procedures, only two (12%) were performed by snare. The case presented here represents an example of successful retrieval by snare.

CONCLUSION

Percutaneous removal of partially encrusted broken double J ureteric stent from the renal pelvis using snare in patients without pre-existing percutaneous nephrostomy access is safe and technically feasible. Encrustation of the broken stent, presence of multiple renal stones and presence of adjacent new functioning DJ stent represent technical challenges which can be overcome. Large studies are lacking, and would be required to evaluate the overall outcome of this procedure.

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