

CASE REPORT

Endovascular removal of a misplaced ureteral stent in the vena cava: a complication of ultrasound-guided percutaneous nephrolithotomy

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Abstract

Intravascular migration of a double J stent into the inferior vena cava is an uncommon complication. Active prevention, timely diagnosis, and early intervention are crucial for this complication. Intravascular interventional therapy is relatively easy, less traumatic, and has a high success rate. It can be used to select patients for intravascular ectopic DJS treatment.

KEYWORDS

Complications, Double J stent, Intravascular intervention, Inferior vena cava

1 | INTRODUCTION and BACKGROUND

Percutaneous nephrolithotomy (PCNL) performed only under ultrasound guidance has its inherent limitations, one of which is incorrect ureteral stent placement. We report the misplacement of the inferior vena cava DJS after PCNL under ultrasound guidance. We will also describe our minimally invasive method, which helps to solve this situation.

2 | CASE

A 53-year-old man appeared in our emergency department due to the migration of the double J stent to the IVC after the right ultrasound-guided percutaneous nephrostomy. Physical examination revealed that he had impingement pain in the right kidney area. His creatinine level is 117 $\mu\text{mol/L}$ and his white blood cell count is 15×10^9 cells/ml. Urinalysis showed that the urine white blood cell count was

2+. The CTV scan showed that the residual DJS entered the IVC, and there was a 0.6×0.8 cm stone at the ureteral pelvic junction, resulting in hydronephrosis (Figure 1). After considering a multidisciplinary approach, the 28 cm F6 DJS was completely removed through the femoral vein using the GN2000 gooseneck snare in the interventional department (Figure 2), and then place a new double J bracket, and confirm its position under the guidance of fluoroscopy. After the operation, the patient was given subcutaneous injection of 3075AU of Naperine calcium for anticoagulation treatment for 4 days, and intravenous injection of cetoheazine sodium/sulbactam sodium 2g every 12 hours for 5 days. Two weeks later, the patient underwent a successful right flexible ureteroscopic lithotripsy and successfully indwelled 28 cm F6 DJS under X-ray monitoring. The procedure went smoothly and no obvious incidents occurred. One month later, the double J stent was removed from the bladder. No other specific complications were observed. After 1 year follow-up period, CT and ultrasound examination found no sequelae (Figure 3).

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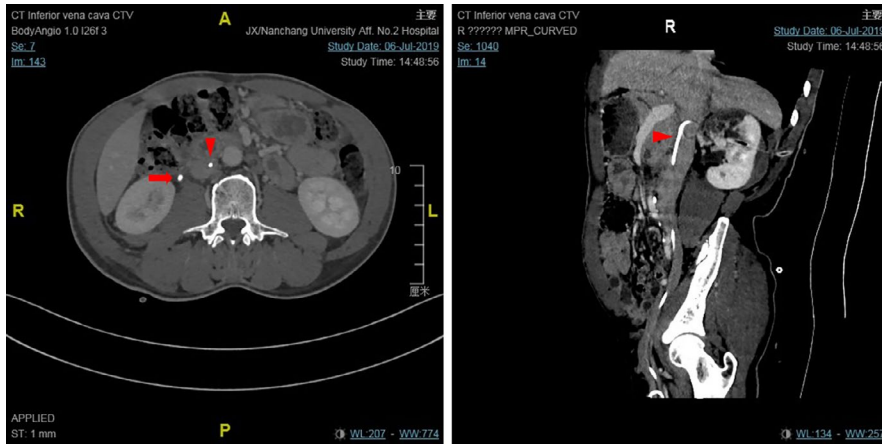


FIGURE 1 The CTV scan showed residual stones (0.6×0.8 cm) in the ureter (red arrow), and there was a migrating double J stent (red triangle) in the IVC. CTV = computed tomography venography

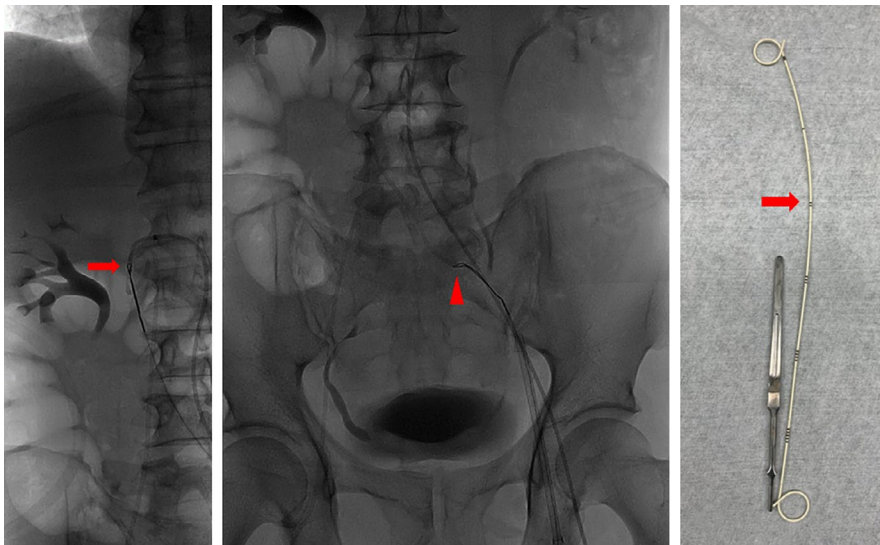


FIGURE 2 X-ray monitor shows that the double J stent has been successfully retracted through the gooseneck snare (red triangle), and the double J stent is intact (red arrow)

3 | DISCUSSION

We introduced the discovery of a case of DJS misplacement in IVC, which was successfully treated by using a gooseneck snare to remove the stent from the blood vessel. A review of the diagnosis and treatment of similar cases shows that the following are the most likely reasons for this serious complication: First, urinary tract infection causes renal pelvic mucosal edema, and the renal pelvic mucosa and tissue structure relax and increase. Organization is fragile. As a result, only a small external force is required to penetrate the edema mucosa. Secondly, there are limitations in using ultrasound to check the location of DJS (especially the location of the distal end of DJS) during surgery. Nephroscopy considers that proper winding of the proximal end of DJS is the criterion for correct placement of the stent.¹Third, increasing the pressure and flow of the perfusion pump may cause a small amount of bleeding, which can lead to blurred vision. According to our experience and related literature, active anti-infection treatment for patients with urinary tract infection can relieve renal pelvic mucosal edema. In addition, for patients with high risk of infection, it is recommended to use a negative pressure

suction device in lithotripsy, because this device can shorten the operation time and effectively reduce the possibility of infection. In addition, fluoroscopy can be used to guide the real-time location of DJS.

According to reports, four operations can be used to remove ectopic DJS in blood vessels, including urological endoscopic surgery,^{2,3}Intravascular intervention^{4,5} Laparoscopic surgery⁶ And open surgery.⁷The treatment plan depends on the location of the stent, the patient's condition, bleeding, thrombosis, and the surgeon's expertise. In this example, we used intravascular intervention to remove the migrated DJS (Figure 2). The main reasons are as follows: First of all, endoscopic urological surgery is beneficial to patients whose DJS distal end is coiled in the renal pelvis, but in our case, the stent is completely located in the blood vessel. Therefore, endoscopic urology is not suitable for this situation. Secondly, although laparoscopic treatment of total intravascular ectopic has been successfully reported, the author also proposed that if the stent is directly penetrated into the adjacent cardiac vein, the feasibility and safety of laparoscopic surgery will be greatly reduced.³This is because laparoscopic surgery is usually aimed at patients

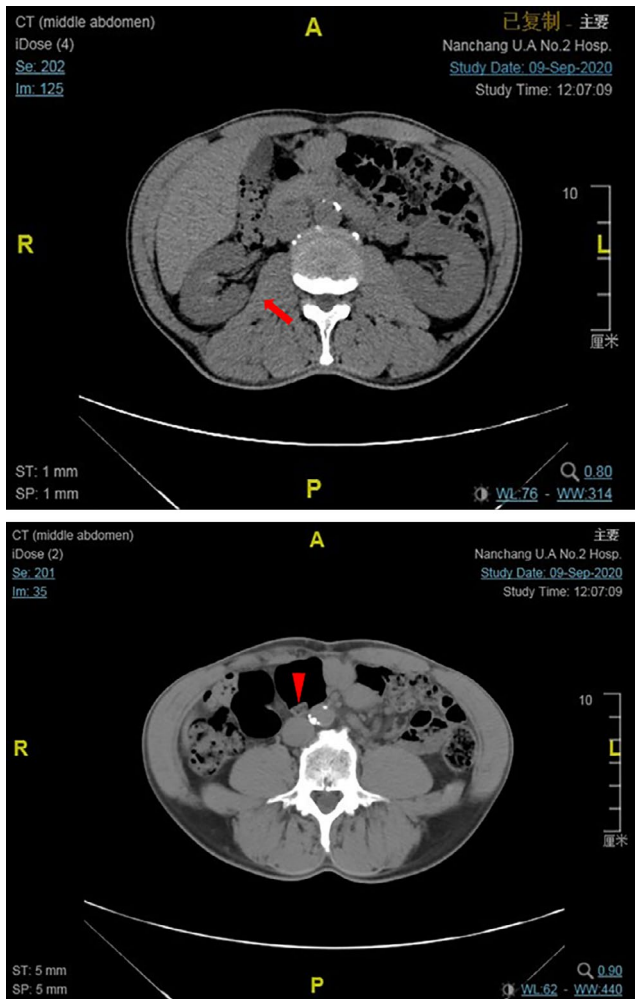


FIGURE 3 CT results confirmed that there were no delayed adverse events in the kidney (red arrow) and IVC (red triangle) one year after surgery. IVC = inferior vena cava

with the DJS proximal coil in the venule. Third, we conducted a preoperative evaluation through inferior vena cava imaging and found that the snare drum device can reach the foreign body smoothly, and there is no thrombosis in the site. DJS. Vascular surgeons experienced in interventional removal of foreign bodies in blood vessels have successfully treated several similar cases. Usually, before, during, and after the removal of foreign bodies, symptomatic and supportive treatments need to be provided in the form of anti-infection and anticoagulation therapy. In addition, it will be useful to closely monitor and observe changes in vital signs during surgery. In addition to perioperative anticoagulation therapy, hours. Therefore, generally speaking, the removal of vascular interventional heterotopic stents through the femoral vein is a safe and effective method.

Intravascular dislocation is a serious complication of DJS implantation. Therefore, when identifying abnormal symptoms and signs after surgery, the possibility of stent displacement should be considered. Active prevention, timely diagnosis and early intervention are particularly important. Intravascular

interventional therapy can be used as the first choice for clinical treatment of this serious complication, because it is a simple, fast and relatively non-invasive operation with a high success rate.

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Published with the written consent of the patient.

CONFLICT OF INTEREST

No statement.

AUTHOR CONTRIBUTION

HC and ZA: contributed equally to this study. HC: conceived and designed the study, and wrote the manuscript. ZA: coauthored and revised the manuscript and did proofreading. ZX and LT: coauthored the manuscript and performed the literature search. LX: reviewed and proofread the final manuscript.

ETHICAL APPROVAL STATEMENT

Informed written consent was obtained from the patient for publication of this case report and accompanying images.

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