A double-J stent misguided by zebra guidewire into ileum: A case report and literature review

Liangcheng Liu *, Guihua Cao, Guimin Huang, Jianping Du, Wei Li, Qiang Li

Department of Urology, People’s Hospital of Leshan, 238 Baita Street, Leshan, 614000, Sichuan Province, PR China

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ABSTRACT
The case is a 70-year-old man who underwent a left nephroureterectomy and cutaneous ureterostomy on the contralateral side for invasive bladder cancer had to be accepted replacement of the double-J stent because of stomal stenosis. When replacing the double-J stent, a severe complication that the double-J stent misguided into the ileum occurred. The patient underwent gastrointestinal motility drugs, and the double-J stent was excreted with the feces after 12 hours. Unfortunately, patient suffered a uretero-ileal fistula and died of septic shock finally. The diagnosis and management of Uretero-ileal fistula as an iatrogenic complication of zebra guidewire use is discussed.

1. Introduction

Double-J stents are widely used in urologic procedures. The place of the double-J stent is one of the basic techniques used by urologists and is usually successful and safe. However, rare complications, including stent knotting and vascular migration, have been reported. Here, we present a case of the double-J stent misguided by zebra guidewire into ileum and unsuccessful treatment to cause a severe medical complication. Although no appropriate clinical treatment was given for this severe complication, this case resulted in a significant warning effect for further clinical practice.

2. Case presentation

A 70-year-old man had presented with painless macroscopic hematuria accompanied by lower abdominal distension for six months history. Physical examination of the patient showed no positive signs. Abdominal enhanced computed tomography (CT) demonstrated a left bladder wall mass, and it was considered likely to invade the left ureter, thereby causing left hydronephrosis. Blood test showed hemoglobin 107 g/L, blood urea nitrogen (BUN) 5.39 mmol/L, serum creatinine (SCr) 129.5 μmol/L, and albumin 31.2 g/L. Urinalysis identified occult blood (+++). Cystoscopy findings revealed multiple bladder tumors which had extended through the bladder trigone, the left lateral wall, and the left urinary orifice and transurethral resection of bladder tumor was performed. Histopathological findings revealed urothelial carcinoma (G3, pT4b). Laparoscopic radical cystectomy was attempted but it is unresectable because of the tumor had invaded the left ureter, pelvic adipose tissue and vessel. Finally, laparoscopic left nephro-ureterectomy and contralateral end cutaneous ureterostomy was performed. For one month after the operation, the patient meet stomal stenosis, so he was followed up regularly every 3 months to replace of the double-J stent.

Three months after surgery, the patient unintentionally pulled out the double-J stent and presented to our outpatient clinic with back pain in the right side. A double-J stent was inserted into the right cutaneous ureterostomy by Boston Scientific Zebra™ (REF: M0066701100) without blatant obstruction, and the patient had no discomfort. But there was no drainage fluid in the ostomy bag while the patients stayed in the hospital for 12 hours, and the double-J stent disappeared in the abdominal wall. The abdominal pelvic CT showed that the right kidney exhibited grade 1 hydronephrosis and a strip of tube migrated into the ileum (Fig. 1). White blood cells and procalcitonin were normal, BUN 16.73 mmol/L, SCr 219.2 μmol/L, but the patient abdominal had no obvious positive signs. Following consultation and discussion with the Department of Gastrointestinal Surgery, treatment with 20 mg oral domperidone was initiated to promote gastrointestinal motility. Fortunately, the double-J stent has excreted with the feces after 12 hours.

Three days later, the SCr rose to 432.7 μmol/L, and the ureteroscopy was unsuccessful because the normal ureteral lumen could not be seen. A percutaneous nephrostomy had to be performed under ultrasound.
guidance. Over time, the patient developed abdominal pain, and abdomen examination revealed a fixed, tender mass with ill-defined borders. Even worse, we found pale yellow mucilage outflow with a bit of chyme when replacing the ostomy bags. Maybe our patient suffered a uretero-ileal fistula and intra-abdominal infection. Antegrade pyelogram through the right nephrostomy tubes showed the passage of contrast media beyond the ureteropelvic tract to the ileum (Fig. 2 A). The abdomen and pelvis CT scan revealed that the bowel tract was a structural disorder and the proximal intestinal expansion (Fig. 2 B). Relevant therapeutic processes, including anti-infection, fasting, and nutritional support, were adopted one month, but the patient still died of septic shock.

3. Discussion

Cutaneous ureterostomy is applicable to all urinary diversions following radical cystectomy and is particularly suitable for older patients and patients with advanced cancer combined with renal inadequacy. The double-J stent is a catheter placed into the ureter to maintain its permeability and needs to be replaced to prevent pipe blockages. The guidewire plays an essential role in replacing the double-J stent. In our patient, the surgeon might have difficulty placing the zebra guidewire due to ureteral twisting and fragile ureteral mucosa. In our case, the zebra guidewire possibly penetrated directly out of the upper part of the ureter and then into the adjacent ileum, eventually leading to the double-J stent misguided into the ileum. Therefore, we believe that when the ureter is twisted, narrow, and injured, it is easier to be penetrated by the zebra guidewire. It has been reported in the literature that zebra guidewire can damage surrounding organs, especially during percutaneous nephrolithotomy, such as penetrating blood vessels into the renal vein, vena cava, and even reaching the right atrium. However, the case reported here has not been reported elsewhere.

We analyzed that this case may be related to the following factors: ① Intraperitoneal adhesion is considered an inevitable result of transabdominal surgery. The ureter becomes more vulnerable because of the adhesion of the ureter to the ileum and the invasion of the ureter by metastatic lesions. ② The softer urinary guidewire has not been chosen. ③ Improper treatment: First, X-ray or CT monitoring was not performed when there was a high degree of suspicion of the double-J stent displacement. In addition, when the double-J stent misguided into the ileum has been confirmed, we are still being used for ureteroscopy, which may aggravate the injury of the ureter. ④ With relatively few cases described in the literature, experience in management is limited. We had acquiesced in the patient’s decision to choose medication. Maybe we should choose to open repair of the ureter and ileum defect along with anti-infection, fasting, and nutritional support. Our clinical experience might have misled our decision at the time.

4. Conclusion

The displacement of the double-J stent into the ileum is a rare complication in urology. The key to prevention includes guidance with X-ray monitoring, standardized diagnosis and treatment, and the correct selection of guidewires that can reduce the risk of ureteral perforation.

Ethics approval and consent to participate

The study was approved by the Ethics Committees of Leshan People’s Hospital, and patient’s family provided written informed consents.

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Authors’ contributions

Study design and significant involvement in the case: GC, LL, and GH. Major contribution to manuscript writing: LL and LD. Substantial revision of manuscript: GC, LD, and GH. All authors were involved in drafting the manuscript or revising it critically for important intellectual content and all authors have read and given final approval of the version to be published. Each author has participated sufficiently in the work to take public responsibility for appropriate portions of the content; and each author agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Availability of data and materials

All data related to this case report are available from the corresponding author on reasonable request.

Fig. 1. Computed tomography (CT) scan of the abdomen and pelvis shows the double-J stent’s misguided.
A: Coronal reformat shows the end of the double-J stent (white arrowheads) located into the terminal ileum.
B: Transverse reformat show that the stent saw as an approximate 4mm, hyperechoic, linear intraluminal structure (white arrowheads).
C: 3D-CT show a continuous complete D-J stent located in the pelvic (white arrowheads).
Fig. 2. A: Antegrade pyelogram through the right nephrostomy tubes showed the passage of contrast media beyond the ureteropelvic tract to the ileum (white arrowheads). B: CT scan of the pelvis shows intra-abdominal structure disorder and indistinct (black arrowheads), including obstruction, dilation (white arrowheads), and infection.

Consent for publication

Written informed consent was obtained from the patient’s relatives for publication of this Case report and any accompanying images. A copy of the written consent is available for review by the Editor of this journal.

Declaration of competing interest

The authors declare that they have no competing interests.

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Not applicable.

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