

Laparoscopic Management of a Misplaced Ureteral Stent in the Duodenum

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Abstract

Background: Double-J stents (DJSs) are placed in the ureter to maintain urine flow from the kidney to the bladder. Extraordinary tract displacement of the stents is very rare, those observed in the literature are vascular displacement into inferior vena cava, into rectum after anticancer treatment of the cervix and a forgotten stent into third part of duodenum. We present a unique case of displaced DJS into the second part of the duodenum and its management laparoscopically.

Case Presentation: A 59-year-old diabetic man on evaluation for right flank pain and intermittent episodes of fever with chills and rigors for 4 months was identified elsewhere on CT of kidney, ureter, and bladder (KUB) to have a retroperitoneal mass engulfing the right ureter with a small contracted kidney with mild hydronephrosis for which CT-guided retroperitoneal mass biopsy (reported as acute suppurative inflammation) and subsequent right Double-J stenting were done. He was lost to follow-up and presented to us 3 months later with similar complaints. On evaluation, CT of KUB with contrast revealed a shrunken, hydronephrotic, and poorly excreting right kidney but no mass. The right DJS was seen in the upper ureter and its proximal tip was seen to perforate the anterior wall of the right ureter, and it lay within the second part of the duodenum. The distal tip was seen in the bladder. Laparoscopic right nephrectomy was done with duodenal rent closure. During DJS retrieval, unfortunately, the smaller proximal end of the DJS slipped completely into the duodenum, but fortunately was expelled spontaneously by the patient (confirmed on postoperative day 10 with X-ray).

Conclusion: It is ideal to place a DJS under fluoroscopic guidance or obtain a check X-ray to confirm its position postprocedure. Patients should always be counseled on the importance of follow-up and the complications of forgotten stents.

Keywords: chronic pyelonephritis, duodenal rent, Double-J stent, migration, nephrectomy

Background

DOUBLE-J STENTS (DJSs) are placed in the ureter to maintain urine flow from the kidney to the bladder to overcome obstruction caused by extrinsic or intrinsic pathologies. Being a foreign body, it is associated with complications such as encrustation, hematuria, bacteriuria, sepsis, fragmentation, migration (proximal/distal), and displacement.¹ Many of the former can be managed conservatively, but displacement, blockage, and migration require surgical correction. Extraordinary tract displacements observed in the literature are vascular displacement into inferior vena cava, rarely into right ventricle, into rectum after anticancer treatment of the cervix, and a forgotten stent into third part of the duodenum.^{2–4} In this study we present a unique case of a displaced DJS into the second part of the duodenum and its successful management laparoscopically.

Case Report

A 59-year-old diabetic man came with complaints of right flank pain with intermittent episodes of fever with chills and rigors on and off for 4 months. Initially he was evaluated elsewhere. He was identified to have a retroperitoneal mass engulfing the right ureter, with a small contracted kidney and mild hydronephrosis on CT of kidney, ureter, and bladder (KUB). CT-guided retroperitoneal mass biopsy was reported as acute suppurative inflammation and subsequently right DJ stenting had been done (details of the procedure were unavailable). He was managed conservatively with antibiotics but was subsequently lost to follow-up. In view of persistent symptoms on and off, he presented to us 3 months later for further management. On evaluation he had azotemia (creatinine 1.6 mg/dL), urine for bile was negative. Repeat CT with contrast (under N-acetylcysteine cover) revealed a shrunken

right kidney (6.7×3.5 cm), parenchymal thinning with poor enhancement, hydronephrosis, and perinephric fat stranding, no mass. The right DJS was seen in the upper ureter and its proximal tip was seen to perforate the anterior wall of the ureter and lie within the second part of the duodenum. The distal tip was seen in the bladder. Diagnostic endoscopy to access the extent of duodenal damage confirmed DJS coil within the second part of the duodenum with surrounding mucosal erythema (Fig. 1). Diethylenetriamine pentaacetic acid revealed poorly excreting right kidney with split renal function of 10%.

In view of a contracted and poorly functioning right kidney, he was planned for laparoscopic/open right nephrectomy, DJS removal, and duodenal wall repair. Intraoperatively, after mobilizing the right colon, entire kidney with Gerota's fascia and duodenum was observed. They were inflamed and friable. Duodenum was gently separated from the kidney by both blunt and sharp dissection. Ureter was identified and traced proximally where it was adherent with the duodenum. Adhesions were released and right pyeloureteroduodenal fistula was identified. DJS could not be retrieved by gentle traction, hence was cut with scissors. Unfortunately, the smaller proximal end of the DJS slipped completely into the duodenum, but the larger remaining stent retained in right ureter was removed and retrieved out through one of the ports. Intraoperatively, a surgical gastroenterologist's opinion was obtained. It was decided to watch for spontaneous passage of stent fragment, and duodenal rent was closed with 2-0 Vicryl. Nephrectomy was completed

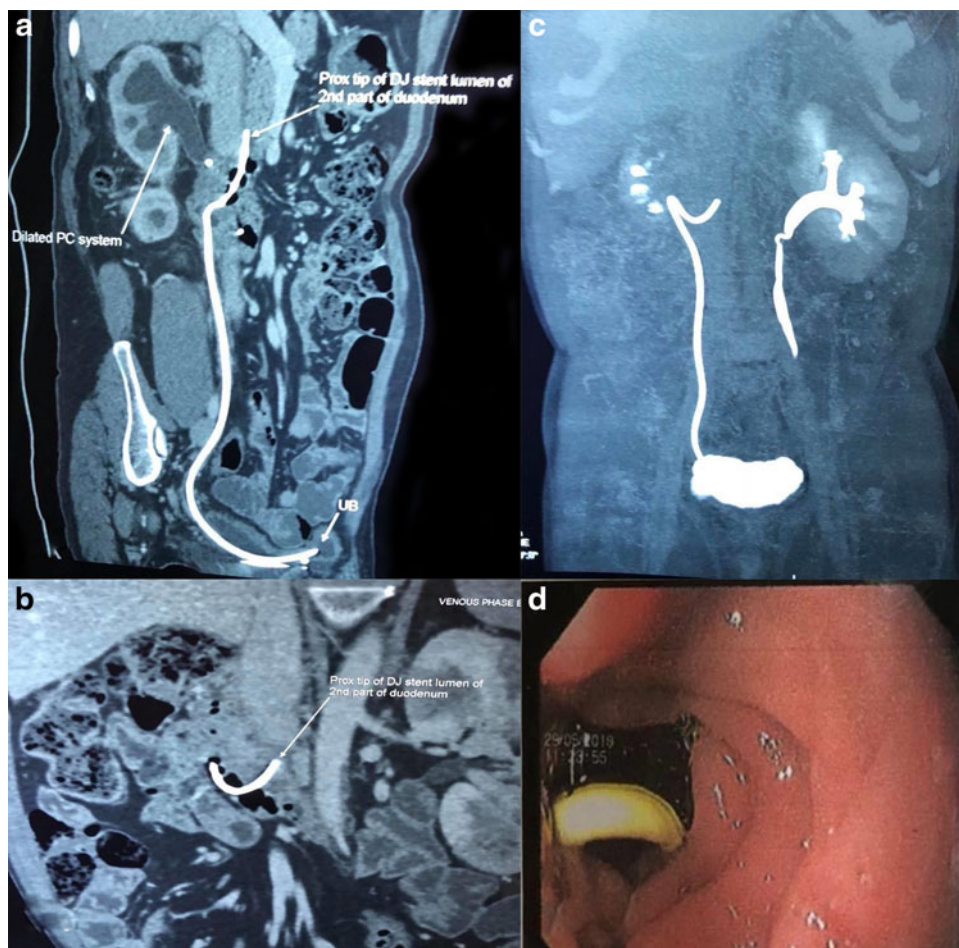
uneventfully. Postoperative period was uneventful, Ryles tube was removed on postoperative day (POD) 3 and the patient was started on liquid diet. He was discharged on POD 5, once he tolerated soft diet and moved bowels. Abdominal drain was removed. Histopathologic examination of specimen was reported as chronic pyelonephritis. KUB on POD 10 revealed effective spontaneous passage of stent fragment (Fig. 2). His azotemia started resolving and his creatinine was 1.4 and 1.3 mg/dL on follow-up.

Discussion

DJSs have been used widely for more than two decades for different indications. Its widespread use corresponds to the increase in complications, including encrustation, stent migration, occlusion, stone formation, and fragmentation.¹ Migration is an uncommon complication. It can migrate proximally toward the kidney or distally toward the bladder, which can be managed by simple endoscopic procedures.

There are very few data on the extraurinary tract displacement of DJS. As the right ureter is adjacent to the iliac vein and the vena cava, a DJS can be prone to vessel erosion or more rarely intravascular displacement, which has been reported in the literature. Chronic ureteral trauma by urolithiasis or ureteral wall inflammation causes ureteral wall fragility and it forms the predisposing factor for ureteral perforation. Intravascular DJS displacement to the heart or lung vasculature can occur from inferior vena cava leading to endocarditis, embolism, and valve

FIG. 1. (a, b) Displaced DJS with its tip in the second part of duodenum, distal end within the bladder, and shrunken right kidney with hydronephrosis. (c) Right kidney with delayed and reduced excretion and complete demonstration of the displaced DJS. (d) Endoscopy showing the tip of the DJS within the lumen of second part of the duodenum. DJS, Double-J stent.



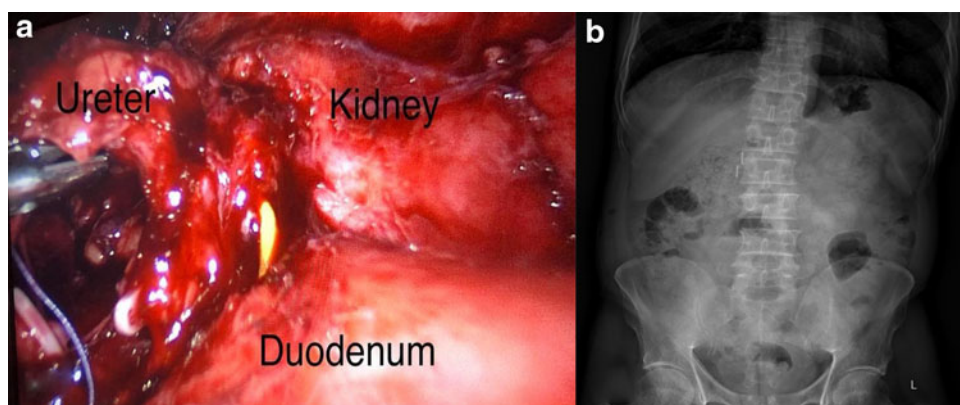


FIG. 2. (a) Intraoperative demonstration and relations of the DJS. (b) KUB on postoperative day 10 confirming spontaneous passage of the stent fragment.

insufficiency.^{2,3} There are few reports of DJS migrating into the rectum after treatment of cervical cancer.⁴

There is a single reported case of a 10-year-old patient for forgotten right-sided DJS displacement into the third part of duodenum, which was managed by open right nephrectomy and duodenal repair.² Iatrogenic retroperitoneal duodenal rents, although rare, typically occur after gastrointestinal endoluminal interventions such as endoscopic retrograde cholangiopancreatography, biliary endoprosthesis, migrated esophageal and gastroduodenal stents, and endoscopic ultrasonography.

This is the first report on displacement of DJS into the second part of the duodenum managed by laparoscopy. Anatomically posterior to the second part of the duodenum lies the right renal pelvis, right ureter, and right renal vessels. The probable reasons could be erosion of the stent through the friable mucosa of the pelvis/ureter secondary to inflammation (recurrent/chronic pyelonephritis) or an erroneously placed DJS at the outset. The procedure details were unavailable with our patient and the initial procedures were performed in a peripheral hospital. This is an ideal case for laparoscopic management because, if percutaneous nephrostomy was attempted for stent extraction, there is an increased chance of duodenal damage. The duodenal rent may or may not close spontaneously as a mature fistula tract would have formed over this period and being retroperitoneal there is no omentum to spontaneously patch the rent. Identifying the rent would also become difficult and hence he will require laparotomy with rent closure or a more complex procedure. If the kidney had better function, endoscopic retrieval and DJS replacement (retrograde/antegrade) will be a viable option. Duodenal rent can be managed by placing a Ryles tube and keeping the patient nil by mouth for 3–5 days. A gastrografin study will be done at 5 days to check for leakage, and if leakage is present, the perforation will be repaired by laparoscopy/open surgery. There are also many reports of duodenal perforations effectively managed endoscopically by hemoclips, fibrin glue, and cap-assisted endoscopy in stable patients.³ Our patient was fortunate enough to have an uneventful course.

Conclusion

The best treatment for complications of indwelling DJSs lies in its prevention. It is ideal to place a DJS under fluoroscopic guidance or obtain a check X-ray to confirm its position postprocedure. Patients should always be counseled on the importance of follow-up and the complications of forgotten stents. Although various modalities of treatments are

available for removal and correction of the displaced stents, the treatment should be made patient specific (laparoscopy being the ideal mode in our patient).

Disclosure Statement

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Abbreviations Used

KUB = kidney, ureter, and bladder
DJS = Double-J stent
POD = postoperative day

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