CASE REPORT

Intracaval misplacement of a double-J ureteral stent

Vera Marques,¹ Belmiro Parada,^{1,2} Francisco Rolo,¹ Arnaldo Figueiredo^{1,2}

¹Serviço de Urologia e Transplantação Renal, Centro Hospitalar e Universitário de Coimbra EPE, Coimbra, Portugal
²Faculdade de Medicina, Universidade de Coimbra, Coimbra, Portugal

Correspondence to
 Dr Vera Marques,
 vm.veramarques@gmail.com

Accepted 20 January 2018

SUMMARY

Double-J ureteral stent (DJUS) is an important therapeutic tool in endourology. There are well-known frequent complications associated with DJUS placement such as distal and proximal migration within the urinary tract. However, perforation and stent misplacement are uncommon but serious complications of this technique. We present a case of a 63-year-old man who had a misplacement of a DJUS into the inferior vena cava during an elective procedure of ureteral catheterisation. The stent placement was performed under fluoroscopic control and it seemed well positioned. Actually, the DJUS was misplaced in the inferior vena cava after drilling at the level of the crossing of the ureter with the ipsilateral iliac vessels. Diagnosis was incidentally made 3 months after the placement of the stent in a renal CT scan. The patient was always asymptomatic. We performed an endoscopic removal of the ureteral stent, which took place without complications.

BACKGROUND

First reported by Zimskind *et al* in 1967,¹ double-J ureteral stent (DJUS) is an important therapeutic tool in endourology. DJUS is indicated in the management and prevention of upper urinary tract obstruction associated with various urological conditions. The procedure is routinely performed under cystoscopic and fluoroscopic guidance. There are well-known complications associated with DJUS placement as urinary tract infection, encrustation, fragmentation, obstruction, distal and proximal migration, malpositioning, stent misplacement, iatrogenic lesions, forgetfulness of the stent and lower urinary tract symptoms. Most of the aforementioned complications can be safely managed with conservative measures and/or endourological interventions.^{2,3}

In this case, we present the successful endoscopic treatment of a misplacement of a DJUS through the right common iliac vein into the inferior vena cava. The literature is scant regarding the management of such situations, which are very rare.⁴ In fact, the consequences related to the treatment of situations like this can be possibly catastrophic. We aim to demonstrate how conservative treatment can be attempted as long as all risks are controlled and ensuring that conversion to an invasive treatment is easily feasible. We also want to emphasise the importance of careful monitoring and follow-up to prevent and predict minor or major complications.

CASE PRESENTATION

A 63-year-old male patient was referred to the urolithiasis consultation because of right renal lithiasis: one heterogeneous right superior calyceal stone (2.5 cm) and one pure radiopaque right pelvic stone (1.7 cm). He had occasional haematuria and right flank pain. In January of 2014, the patient performed his first extracorporeal shock wave lithotripsy (ESWT) treatment with complete fragmentation of the pelvic stone. A right DJUS was placed after the procedure (figure 1), under fluoroscopic guidance, without a retrograde pyelogram. We used an open/closed DJUS 6 Ch with a Tiemann tip and a plastic-coated steel guide-wire, 1.1×900 mm. Both the stent and the guide-wire were inserted as a unit as per protocol. During the follow-up, he was always asymptomatic and presented a normal glomerular filtration rate when evaluated by renal scintigraphy. He remained under treatment with ESWT because of the other stone. In April of 2014, the patient underwent a renal CT scan which revealed that the DJUS had its path inside the right common iliac vein and inferior vena cava (figure 2). Its proximal end was adjacent to the intrahepatic portion of the inferior vena cava. From the crossing of the ureter with the iliac vessels, the tract of the DJUS was intraureteral and its distal end was intravesical. The patient was immediately admitted to attempt an endoscopic removal, since the distal end of the DJUS was accessible intravesically. Intraoperative and postoperative surveillance of any haemorrhagic complication was ensured and the surgical and anaesthetic teams were prepared for the need for a more invasive intervention. The patient was informed of the risks of the surgery. He immediately started antibiotic and venous thrombosis prophylaxis. The endoscopic removal of the catheter was uneventful. There was no visible bleeding from the right ureteral meatus and no haemodynamic rebound was observed. After its removal, the catheter was found to have the lumen obliterated by clots (figure 3).

OUTCOME AND FOLLOW-UP

Postoperative surveillance was performed at the intermediate surgical care unit, and the patient was discharged on the fourth postoperative day. There was no haemorrhagic or thrombotic event during the postoperative period. There were also no long-term complications. The patient continued his follow-up with his urologist.

DISCUSSION

There are few published cases about intravascular misplacement of DJUS. There are several therapeutic approaches described according to the particular clinical circumstances. Hastaoglu *et al*⁵ described a case of a 59-year-old female patient with a DJUS

To cite: Marques V, Parada B, Rolo F, *et al*. *BMJ Case Rep* Published Online First: [please include Day Month Year]. doi:10.1136/bcr-2017-221713

Figure 1 Image of a KUB X-ray of the patient after right double-J ureteral stent placement. KUB, kidneys, ureters and bladder.

misplaced out of the ureter through the inferior vena cava and right ventricle.⁵ In this case, the catheter was removed successfully under cardiopulmonary bypass. Sabnis *et al*³ described a case of a 43-year-old female patient with a complete migration of a DJUS into the external iliac vein with the upper end seen in the inferior vena cava and the atrium.³ The authors initially attempted a ureteroscopic approach, without success. They performed a venotomy to remove the stent through a Gibson's incision. Michalopoulos *et al*² described a case of a 27-year-old woman who developed a pulmonary thromboembolism because of misplacement of a DJUS into the heart and left pulmonary arterial system after a right pyelolithotomy.² They removed the stent by endovascular approach. Farshi *et al*⁶ described a case of a DJUS migration into the cardiovascular system in a pregnant woman.⁶ They performed an endoscopic removal of the DJUS in the postnatal period, with no adverse events. The endoscopic procedure was possible because the tip of the catheter was located in the right ureter.

In our case, the upper end of the stent appeared to be in the liver while the lower end was coiled in the bladder. It was possible and feasible to safely attempt an endoscopic removal, too. However,

Figure 2 Image of a renal CT scan of the patient showing double-J ureteral stent with its path inside the right common iliac vein and inferior vena cava: (A) the proximal end adjacent to the intrahepatic portion of the inferior vena cava; (B) the distal end positioned intravesically.

Figure 3 The double-J ureteral stent after its removal, with the lumen obliterated by clots.

the treatment approach performed in our case could demand an endovascular intervention or an open surgical removal. The treatment was dictated by the position of the distal coil of the DJUS, the general condition of the patient, available expertise and infrastructure. In the majority of cases of misplacement of DJUS described above, there was a complete migration of the stent into the venous system that precluded an intravesical approach. We present one of the few successful reports of an endoscopic recovery of a partially intracaval DJUS.

Learning points

- ▶ The placement of a double-J ureteral stent (DJUS) is a very common urological procedure; however, the surgeon should be always aware of its potential serious complication.
- ▶ DJUS misplacement may be a silent but potentially catastrophic complication.
- ▶ The least invasive therapeutic approach should be the first to be considered, as long as feasible and provided that all scenarios are predicted and prevented.
- ▶ It is very important to perform careful monitoring and follow-up during and after a DJUS placement, in order to prevent and predict minor or major complications.

Contributors Conception or design of the work: VM, BP, FR. Data collection: VM, BP. Data analysis and interpretation: VM, BP. Drafting the article: VM, BP, AF. Critical revision of the article: VM, BP, FR, AF. Final approval of the version to be published: VM, BP, FR, AF.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

© BMJ Publishing Group Ltd (unless otherwise stated in the text of the article)
2018. All rights reserved. No commercial use is permitted unless otherwise expressly
granted.

REFERENCES

- 1 Zimskind PD, Fetter TR, Wilkerson JL. Clinical use of long-term indwelling silicone rubber ureteral splints inserted cystoscopically. *J Urol* 1967;97:840–4.
- 2 Michalopoulos AS, Tzoufi MJ, Theodorakis G, *et al*. Acute postoperative pulmonary thromboembolism as a result of intravascular migration of a pigtail ureteral stent. *Anesth Analg* 2002;95:1185–8.
- 3 Sabnis RB, Ganpule AP, Ganpule SA. Migration of double J stent into the inferior vena cava and the right atrium. *Indian J Urol* 2013;29:353–4.
- 4 Falahatkar S, Hemmati H, Gholamjani Moghaddam K. Intracaval migration: an uncommon complication of ureteral Double-J stent placement. *J Endourol* 2012;26:119–21.
- 5 Hastaoglu IQ, Tokoz H, Kavlak E, *et al*. Double J ureteral stent displaced through the right ventricle. *Interact Cardiovasc Thorac Surg* 2014;18:853–4.
- 6 Farshi AR, Roshandel MR. Intracardiac migration of ureteral double-J stent: a case report and review. *Can Urol Assoc J* 2015;9:661–4.

Copyright 2018 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- ▶ Submit as many cases as you like
- ▶ Enjoy fast sympathetic peer review and rapid publication of accepted articles
- ▶ Access all the published articles
- ▶ Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow