

Percutaneous silicon catheter insertion into the inferior vena cava, following percutaneous nephrostomy exchange

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Abstract

Percutaneous nephrostomy (PCN) has been widely used to drain an infected, obstructed kidney. Few major complications have been associated with it. Few publications have reported the misplacement of nephrostomy tube into the inferior vena cava (IVC), following percutaneous nephrolithotomy. We report a case of a misplaced silicon catheter, through the left renal vein, extending into the IVC, following nephrostomy tube exchange. Our case was safely managed, and we concluded that although PCN and nephrostomy tube exchange are relatively simple procedures, they should be done cautiously, by a well-trained urologist, and preferably under ultrasound or fluoroscopic guidance.

Introduction

Percutaneous nephrostomy (PCN) has been widely used to temporarily drain a dilated, infected, obstructed kidney. Hemorrhage, requiring blood transfusion, after a PCN, has been reported to occur in up to 4%, while documented vascular injury requiring intervention in up to 1% of cases.¹ Sampaio and colleagues demonstrated the intrarenal free anastomosis between veins that unite to form 3 large venous trunks, within the renal parenchyma, before joining the main renal vein.²

We report a case where a percutaneous silicon catheter insertion was done in exchange for percutaneous pigtail nephrostomy tube. This procedure resulted in perforating the renal parenchyma, passing through the renal vein, to the inferior vena cava (IVC).

Case report

A 50-year-old male underwent a left PCNL 3 years ago. The patient presented with a recurrent renal pelvic stone,

with an obstructed infected system. PCN was inserted under ultrasound guidance. Antibiotics were started, according to culture and sensitivity. The patient was discharged and came back to the hospital after 3 months for definitive treatment of his recurrent kidney stone. When he came to the outpatient clinic, 12-Fr pigtail nephrostomy tube was in place, draining turbid urine. The senior resident, in conjunction with a more senior physician, decided to exchange the catheter with a silicon catheter, before admission, thinking that exchanging the catheter may improve the present infection before the urine culture and sensitivity test. This is occasionally done, without major issues, in the outpatient clinic, using the already existing track, without ultrasound or fluoroscopic guidance. The nephrostomy tube was removed, and then 12-Fr silicon catheter was pushed through the track to the collecting system. Intense bleeding was observed through the catheter. The catheter was then closed and the patient was admitted to our department. He was hemodynamically stable, but every time we tried to open the catheter, intense bleeding was seen and on aspiration it was as if we were withdrawing blood from a vein. Doppler ultrasound showed the catheter inside the IVC. A computed tomography (CT) scan was ordered and showed that the silicon catheter was traversing the renal parenchyma, passing through the left renal vein and ending, with the balloon inflated, in the IVC (Fig. 1). There was also a thrombus extending from the catheter to the proximal ends of both common iliac veins.

A decision was made to explore the case, through a flank retroperitoneal incision, pull the catheter out and extract the renal pelvic stone through a pyelotomy. Before we did the exploration, we consulted with cardiology. The cardiology team encouraged us to proceed safely, confirming that there would be no bleeding. We asked them to start anticoagulant therapy, before we removed the catheter. The cardiology team, however, informed us that any intervention from their side before the catheter removal can facilitate thrombus detachment during our procedure; it was therefore better to send the patient to cardiology after the catheter removal to

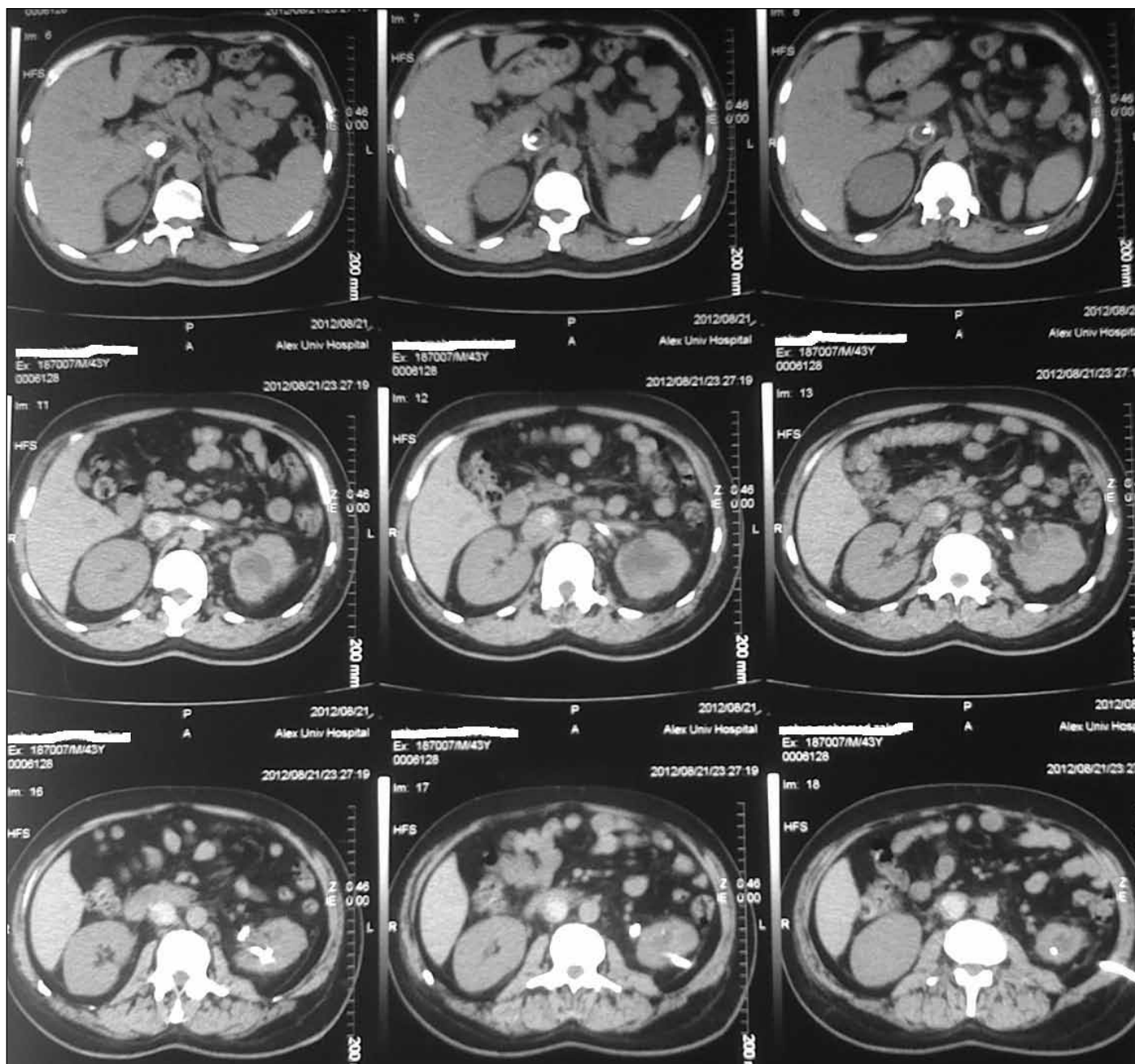


Fig. 1. The computed tomography showing the silicon catheter traversing the renal parenchyma, passing through the left renal vein and ending, with the balloon inflated, in the inferior vena cava.

begin anticoagulant therapy and monitoring. In the end, the case was done as planned; the catheter was pulled out with no bleeding, then a simple pyelolithotomy was done. The postoperative course was smooth, with no bleeding through the drain and no hematuria. The patient was discharged on postoperative day 5.

Discussion

There are few reported cases on the misplacement of a nephrostomy tube into the IVC, following PCNL. Mazzucchi and colleagues reported 2 cases, both of which were done at the end of PCNL procedures, and discovered few days later.³ The authors withdrew the catheters, in the presence of a surgical team, with no bleeding. They explained that the mishap occurred due to an injury of a large venous trunk during the

procedure, with the presence of an Amplatz sheath near the venous injury, which dislodged the catheter into the IVC.

Dias-Filho and colleagues reported a case of misplaced catheter into the IVC, extending into the right atrium.⁴ In their case, PCN was done, for an obstructed kidney, and the nephrostomy tube was exchanged by passing a guidewire blindly dilating the tract, before inserting a new silicon catheter. They explained that the perforation of a large venous trunk by the guidewire, with dilatation of the injured vein, resulted in the catheter migrating to the venous system. Skolarikos and colleagues published their 10-year experience in ultrasound-guided PCN.⁵ They had one case (0.1%) with an IVC nephrostomy tube misplacement. They reported that the ultrasound-guided technique was a safe procedure in experienced hands.

More interestingly, Goel and colleagues reported an interesting case of upper tract urothelial tumour, where percutaneous endoscopic resection of renal urothelial carcinoma, resulted in severe venous bleeding.⁶ The advancement of the endoscope resulted in padding through a large vein, into the renal vein to the IVC. The case was managed conservatively by inserting a nephrostomy tube and clamping it, with no later major complication.

In our case, the initial nephrostomy tube was inserted under ultrasound guidance, draining infected urine. The catheter was maintained, and antibiotics were initiated according to culture and sensitivity. No single attack of hematuria occurred during the 3 months after the PCN insertion. Later, however, when the patient came to the clinic, it was clear to the residents that the kidney was infected, and they blindly exchanged the pigtail nephrostomy with a 12-Fr silicon catheter, depending on the presence of a mature track, allowing its easy introduction. We believe the kidney was severely infected; the relatively rigid silicon catheter could have easily penetrated the infected renal parenchymal tissue, passing into a major vein, then to renal vein, extending to the IVC.

Our case, like the few published cases, was safely managed by just withdrawing the catheter, under general anes-

thesia and close monitoring. No bleeding was encountered as a result of the catheter removal. We did open surgery for this case, mainly to remove the renal pelvic stone using pyelotomy, and to be ready for any possible adverse event. If the patient did not have a stone, it may have been safely managed, with no open surgery. Postoperative follow-up was smooth, except that the patient developed deep vein thrombosis that is currently under the care of a vascular surgeon.

Conclusion

PCN exchange should be done cautiously, by a well-trained urologist, and under ultrasound or fluoroscopic guidance. It is not accepted to insert any catheter blindly, into the kidney, even with the presence of a mature track.

Competing interests: None declared.

This paper has been peer-reviewed.

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