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Removal of an intra-renal migrated ureteral stent through a percutaneous nephroscopy in a 2-year-old child

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ABSTRACT

Ureteral stents are widely used to facilitate ureteral patency in the postoperative period of pyeloplasty and they are usually removed using forceps under cystoscopic guidance. Proximal migration of the ureteric stent is a rare but known complication and it is even less common in the pediatric age group. We present a case of antegrade retrieval of ureteral stent through a nephroscopic approach in a 2-year-old boy after unsuccessful cystoscopic, ureteroscopic and fluoroscopic attempt of removal due to intra-renal migration.

Introduction

Proximal migration of the ureteric stent is a rare but known complication and it is even less common in the pediatric age group. Various methods of retrieval have been described in adults,[1–3] but these are technically more challenging in children and infants due to the small anatomical caliber. An antegrade approach through a nephroscopy is an alternative if retrograde retrieval is difficult or impossible.[3,4]

Case presentation

The patient is a 2-year-old male referred from another center. He was diagnosed in the newborn period of grade IV left hydronephrosis due to ureteropelvic junction obstruction with subsequent deterioration of renal function to 27.72% and a cutaneous pyelostomy was performed. The differential renal function remained stable after the urinary diversion.

A dismembered Anderson-Hynes left pyeloplasty and pyelostomy closure was performed in our institution with a 3 Ch and 16 cm double-J catheter placed in an antegrade manner, leaving the proximal curl in the renal pelvis and the distal curl in the bladder (Fig. 1). The postoperative course was uneventful and the patient was asymptomatic.

At the time of cystoscopy for elective removal of the double-J, 6 weeks after the pyeloplasty, the stent was not visualized. An x-ray was performed and it showed the distal curl of the double-J stent in the distal ureter (Fig. 2), so ureteroscopy and stent retrieval was attempted at the time of detection of stent migration, however, without success. The ureteroscope was introduced into the left distal ureter but the catheter moved proximally through the ureter to the renal pelvis, probably helped by hydrostatic pressure. Due to the small caliber of the patient's ureter, the ureteroscope did not progress so we did not have the possibility of stent traction under direct vision. We tried a 2D fluoroscopic guided retrograde retrieval with a C-arm X-ray machine using forceps, helical basket and goose-neck snare that we had progressed from the ureteroscope through the ureteropelvic junction but we were not able to catch the stent after multiple attempts. To avoid extending surgery time, a second catheter was introduced to prevent obstruction of the ureter, without complications. The distal end of the second double-J was fixed to preputial skin in order to avoid remigration (Fig. 3).

A percutaneous nephroscopy was performed through a 4 mm incision with a Seldinger technique from 6 to 12Fr (size of Amplatz sheath) under ultrasound guidance. The double-J stent was removed with flexible forceps under direct vision. An 8Fr nephrostomy tube was left in place due to concerns about the urine drainage through the ureteropelvic junction for the previous manipulation. The second double-J sent was removed in postoperative day 1 and the nephrostomy in postoperative day 2, prior to discharge. There were no postoperative complications. All the techniques were performed by Pediatric Urologists.

After 3 years of follow up, the patient has an asymptomatic residual renal dilatation, without obstruction and preserves the renal function.

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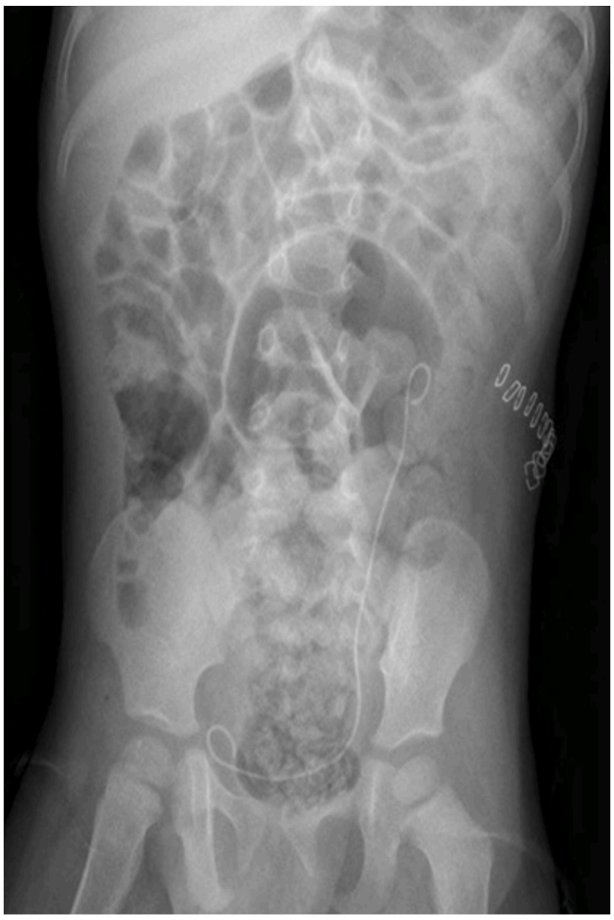

Fig. 1. After Anderson-Hynes left pyeloplasty, the proximal end of the left ureteral stent was in the renal pelvis and the distal end in the bladder.

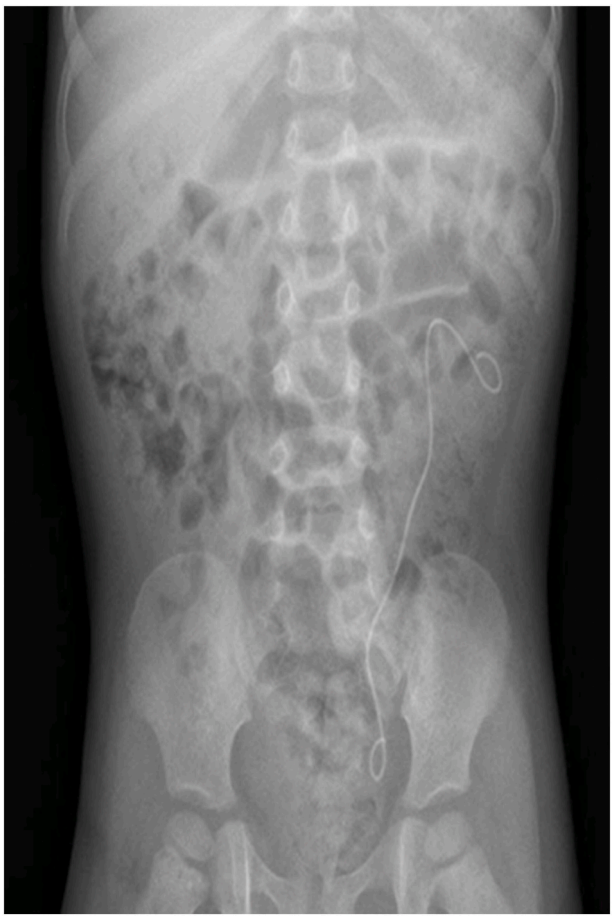

Fig. 2. Migration of the double-J catheter into the distal ureter.

Discussion

Migration of double J ureteric stents is a rare but known complication. The stent commonly migrates in the caudal direction and its found coiled up in the urinary bladder. Proximal migration of the stent is less common and has a reported incidence of 0.6–3.5% of cases in adults and it is even less common in the pediatric age group. To the best of our knowledge, there are few reported pediatric cases with this complication.[2] Risk factors for migration are the duration of stenting, a shorter than ideal stent, proximal curl in the superior calyx, inadequate distal curl (<180°), use of silicone catheters, hydronephrotic kidneys and the presence of an ureteric stone.[1,2] In our case, we hypothesize that the grade IV hydronephrotic kidney associated with a too soft 3Ch double J catheter favored some movement of the stent. Comparing Figs. 1 and 2, it seems that the proximal curl moved from the renal pelvis to a calix; the stent folded and consequently, the distal curl ascended to the distal ureter. Then, the irrigation fluid pressure during ureteroscopy has completed the proximal migration of the stent, coiling it inside the renal pelvis.

It is important to reposition or remove a proximally migrated stent as it may cause obstruction or poor drainage to the urinary flow. This can be achieved either by an invasive procedure opening the renal pelvis or via less invasive methods, often requiring a combination of multiple procedures. Numerous methods of retrieval of ureteric stents have been described in the literature as ureteroscopy, percutaneous retrieval, nephroscopy, laparoscopy and open procedures. The ureteroscopic removal is the preferred method for upward migrated stent. The use of various types of baskets, forceps and balloons has been described. Fluoroscopic guided retrieval through a retrograde or an anterograde approach is an alternative method, but the use of grasping instruments blindly or even under fluoroscopic guidance can potentially produce inadvertent pelvic or ureteral damage. Another concern, especially in children, is the ionizing radiation exposure.[1–4]

The presented case was specially challenging for us due to the small size of the ureter of our patient, the lack of a miniaturized enough ureterorenoscope and the lack of 3D spatial information in the fluoroscopic vision. We were not able to catch the double-J through a retrograde approach, which was moving inside a big residual hydronephrosis. The alternative if the nephroscopy has failed, would have been an invasive approach opening the renal pelvis via laparoscopy or open.

Conclusion

Antegrade percutaneous nephroscopic retrieval of a ureteral stent is a reliable method that can be used when retrograde cystoscopic, ureteroscopic and fluoroscopic extraction is not possible.

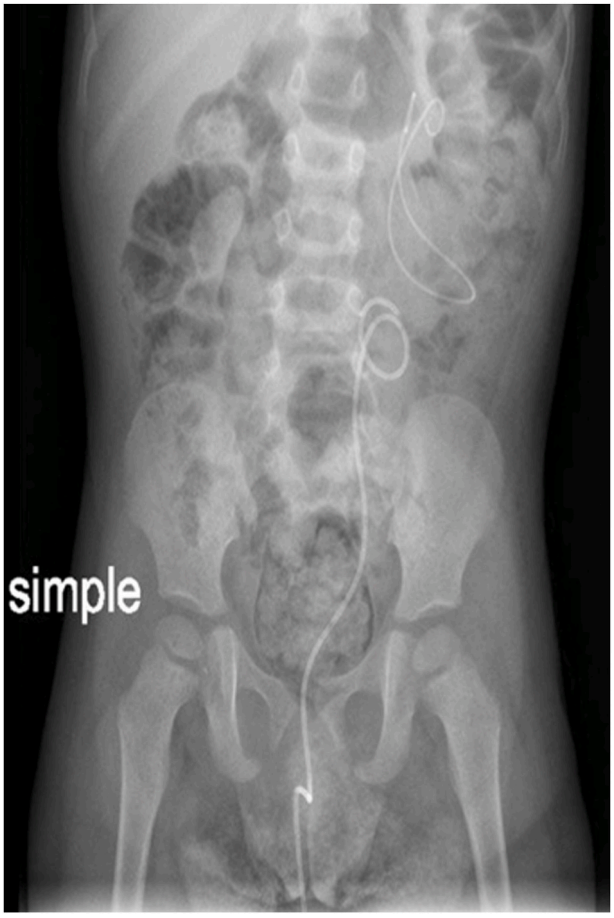

Fig. 3. Migration of the stent into the renal pelvis. Another stent was placed in the left ureter after multiple attempts of retrograde retrieval.

Declaration of competing interest

None.

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