CASE OF THE MONTH

Be careful where you inject!

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Case report

A 55-year-old quadriplegic female was admitted with clinical features of urosepsis. She had suffered a spinal cord injury at C5–6 as a result of a road traffic accident several years previously. Prior to admission she was managing her bladder with intermittent self catheterisation, and had been known to the urology department with recurrent urinary tract infections and bilateral renal stones. To monitor her urine output, she was catheterised by a staff nurse with a size 14 Ch Foley catheter. A CT scan on admission showed a left hydroureter, a right staghorn calculus and the balloon of the urinary catheter in the right proximal ureter, which was initially overlooked (Figure 1). The patient underwent a left percutaneous nephrostomy, which drained pus. Urine output from the urethral catheter was initially reasonable, but reduced on day 4 after admission. Catheter washouts were instigated to facilitate draining. A few hours later, the patient became hypotensive with a significant drop in haemoglobin. A subsequent CT scan was performed (Figure 2).

What does it show?

Why has this occurred?

Figure 1. Axial CT scan at the level of the right renal pelvis (white arrow). The left ureter is seen to be dilated.

Figure 2. Axial CT scan 4 days later demonstrates a break in the right renal parenchyma (red arrow) and a large perinephric haematoma. Left nephrostomy tube in situ (white arrow).

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The second CT scan (Figure 2) demonstrates rupture of the renal parenchyma at a scarred thin part of the renal cortex, with a large perinephric collection of mixed attenuation, consistent with a mixed haematoma and urinoma. Curved coronal multiplanar reconstruction (MPR) of the original CT on admission demonstrated the tip of the catheter located in the right proximal ureter (Figure 3), which was not seen originally. The injection of fluid through the catheter (believed to lie within the bladder) had caused rupture of the diseased renal parenchyma. The patient was treated conservatively and the catheter kept *in situ* in an attempt to tamponade any bleeding, and to drain the collecting system. Several weeks after the trauma, the catheter was removed with no adverse events. In the interim, the mixed perinephric collection had markedly reduced in size (Figure 4).

Accidental misplacement of a urethral Foley catheter into the ureter or renal pelvis is a rare complication, but has been previously reported in the literature [1–5]. In all reported cases, previous physiological or pathological disruption to ureters or ureteric orifices was present, and was a possible cause of this complication. The introduction of a Foley urethral catheter through a normal ureteric orifice without previous ureteric dilatation is not usually expected.

Shindel et al [5] described a case of ureteric catheterisation with a size 16F Foley catheter in a recently pregnant patient. The authors hypothesised that the physiological hydronephrosis and hydroureter that occur in pregnancy, especially on the right side, could distort the

ureteric orifice. Moreover, pathologically dilated ureters with hydronephrosis secondary to vesicoureteric reflux in a contracted fibrotic bladder has been reported to carry a risk for accidental ureteric catheterisation during change of long-term urethral catheters, especially in female patients [2–4]. A congenitally dilated ectopic ureter is, not surprisingly, at risk of such a complication as its orifice is situated medially and distally to its normal trigonal location and is often present at the bladder neck [1].

Patients with suprasacral spinal injuries often have detrusor hyperreflexia and detrusor sphincter dyssynergia resulting in elevated voiding pressures. This causes vesicoureteric reflux and dilated ureteric orifices. Therefore, they are at a higher risk of ureteric or renal pelvic iatrogenic trauma during replacement of long-term catheters.

Owing to the rarity of this problem, it is often not clinically suspected, unless complications such as bleeding occur; hence the delay in diagnosis. A CT urogram is the most appropriate radiological tool in identifying injury to the collecting system [6]. Since excretory phase images are obtained, extravasation of excreted contrast material can be detected, and the presence of a leak can be seen. In this case, a CT scan was performed in the portal phase to look for the cause of the sepsis; initially the balloon of the Foley catheter within the right proximal ureter was overlooked. Subsequent review with coronal multiplanar reconstruction was particularly helpful in diagnosing the incorrect position of the Foley catheter in the renal pelvis. Coronal reformation provides a longitudinal, rather than a cross-sectional, view of the ureter. Curved coronal reconstruction along the entire right ureter had been performed to demonstrate the catheter, but it was equally well seen on the standard coronal MPR. With submillimetre reconstructions and isotropic voxels, the resolution will be as good as the axial data set. Therefore, interpretation of abdominal CT findings, especially in cases of ureteric injuries, should be performed using both the axial and coronal images.

Conclusion

Accidental advancement of a urethral catheter in the collecting system should be considered in patients with

Figure 3. Curved coronal multiplanar reconstruction image shows the Foley catheter traversing the bladder and right ureter (red arrows).

Figure 4. There is good resolution of the right perinephric haematoma on follow-up axial CT 2 months later.

anatomical or functional abnormalities in the urinary tract. When reviewing abdominal CT in such patients, coronal MPR can add valuable information when diagnosing this rare complication.

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