Adult duplex kidneys: an important differential diagnosis in patients with abdominal cysts

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Duplex kidneys are a rare presentation in adults. We report a case and literature review discussing the diagnostic difficulties.

Case report

A 30-year-old-man who initially presented three years previously to the emergency department with right loin pain and a three-month history of haematuria. He reported no other urinary symptoms and was otherwise fit and well with no significant past medical history. Flexible cystoscopy was unremarkable and evaluation with ultrasound and a computed tomography (CT) scan demonstrated a large right-sided renal cyst (Figure 1a), which was subsequently treated with laparoscopic marsupialization, draining 2.2 L.

The patient was re-referred two years following this with recurrence of his right loin pain and a general feeling of discomfort. Investigation by a repeat CT scan revealed the presumed renal cyst was in fact a dilated non-functioning upper moiety and dilated ureter that traced downwards into the pelvis. The patient underwent excision of the non-functioning right upper pole moiety and megaureter using an open approach. Prior to incision the patient underwent cystoscopy and stenting of the lower pole normal ureter.

A subcostal incision was used with retroperitoneal mobilization of the kidney and upper dilated segment. The cystic segment was opened and drained 2 L of cloudy urine. The dilated upper pole segment was then excised (Figure 2). An oblique incision in the right iliac fossa was used for retroperitoneal mobilization of the grossly dilated ureter. As the dilated upper ureter ran close to the lower pole ureter, the distal end of the dilated ureter was divided to excise the ureter, leaving a ureteral stump. The postoperative period was uneventful and the patient was discharged home within five days. The stent in the lower pole ureter was removed endoscopically at routine follow-up and the patient has remained well.

Discussion

Duplex collecting systems are one of the most common congenital anomalies, with an incidence of 0.8%. It is bilateral in 20% of these and is more common in women than in men. Ureteral development begins at four weeks in the fetus with the ureteral bud (which determines the entire collecting system) branching from the mesonephric duct. The ureteric bud is absorbed into the bladder trigone, leaving the ureteric orifice in its normal position. If two ureteral buds arise, the caudal ureter drains the lower pole and the cephalic ureter drains the upper pole. Upper pole ureters are more susceptible to obstruction if associated with ureteroceles or ectopic insertion.

Most patients remain asymptomatic despite the relatively common incidence. Patients usually present in childhood, however, in rare instances can present as adults. Presentation can include recurrent urinary tract infections, flank pain, incontinence and haematuria. Duplex systems are occasionally found incidentally on abdominal examination or during surgery.

Diagnosis is usually made in childhood or antenatally, although it can be found in...
adulthood. Imaging modalities used include ultrasound, nuclear medicine, excretory urogram and CT. In adults, CT often demonstrates hydronephrosis, with a greater prevalence in the upper pole moiety. This dilation results in an atrophic and non-functional moiety appearance and can mimic the appearance of a simple renal cyst, a more common CT finding, and as in our case can lead to diagnostic confusion. It is therefore important that duplex kidneys with hydronephrosis is considered in all patients with abdominal cysts.

When symptomatic the recommended treatment for a duplex system is by ureterectomy or upper-pole heminephrectomy. Surgical approaches can be either open or laparoscopic, with laparoscopic gaining more favour except in complicated cases such as in our patient.

Postoperatively patients tend to recover well, though some patients may experience a decline in renal function in the remaining renal moiety or recurrent urinary tract infections which may necessitate further surgery.

**Conclusion**

Duplex kidneys are usually clinically silent, however, when significant will tend to present in children. In rare instances duplex kidneys can appear in adults, leading to diagnostic challenges. The imaging modality of choice is CT; however, these may give a similar appearance to a simple renal cyst. Moreover, laparoscopic surgeons should be careful as duplex systems may be overlooked perioperatively, a finding that we propose would be less likely to occur using an open approach. It is thus important that all clinicians consider this rare diagnosis when presented with a patient with abdominal cysts.
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