An 14 year old, male neuter, domestic shorthair cat was presented to the R(D)SVS Internal Medicine Service for investigation of abdominal enlargement. There was no vomiting, diarrhoea, coughing or sneezing. Appetite was normal but there had been an increase in thirst over the preceding month. The cat had been diagnosed with hyperthyroidism and IRIS stage 2 renal disease by the referring veterinary surgeon (urea 20.6mmol/l (ref 2.80-9.8mmol/l), creatinine of 241umol/l (ref 40-177umol/l), total thyroxine 59.3mmol/l (ref 13-48mmol/l), urine specific gravity 1.016).

On clinical examination, the cat was bright and alert with a body condition score of 5/9 and body weight of 5.1kg. Mucous membranes were pink and moist with a capillary refill time of < 2 seconds. The heart rate was 164 bpm with a grade II/VI systolic murmur and the respiratory rate was 16 breaths/minute. Abdominal palpation revealed a large, firm smooth mass on the left hind side but encroaching onto the right. The mass occupied a large proportion of the abdomen but had a predominantly dorsocranial position. There was no pain or discomfort noted on palpation of the mass. The right kidney was palpable but the left kidney could not be detected. Rectal temperature was normal at 38.2°C.

Abdominal radiographs with orthogonal views were taken with the cat under sedation.
1) *What is your interpretation of the radiographs?*
2) **What are your differential diagnoses for enlarged kidney/kidneys in a cat?**

3) **How would you investigate this case further?**

4) **What are the treatment options?**

1) There is a large soft tissue mass in the left dorsal abdomen which is displacing the intestines both ventrally and to the right. The right kidney is within normal limits but there is no normal left kidney visible. This suggests that the mass is renal in origin. There is also a mineralised fragment in the pubic tendon area, right femoral head luxation with osteophyte formation and subluxation of coccygeal vertebrae 1-2 suggestive of historical trauma (the cat had a road traffic accident aged 2 years).

2) Differentials diagnoses for a renal mass would include neoplasms (malignant: lymphoma (most common in cats-often bilateral), adenocarcinoma/carcinoma, fibrosarcoma, haemangiosarcoma, leiomyosarcoma, nephroblastoma, transitional cell carcinoma, and benign: adenoma, fibroma, haemangioma, interstitial cell tumour, leiomyoma, transitional cell papilloma), hydronephrosis, abscess, granuloma, pyelonephritis and perirenal pseudocyst. Bilaterally enlarged kidneys can be seen with acute nephritis, acromegaly, FIP, polycystic kidney disease and porto-systemic liver shunts.

3) Further investigation would include ultrasound examination of the kidney and aspiration or biopsy as indicated. In this case the left kidney was visualised at the edge of the ‘mass’ which was a large fluid filled cavity at least 9cm in diameter (see ultrasound image below). The left kidney itself has a markedly increased cortical echogenicity with a thickened cortex and had a moderately dilated renal pelvis. Sanguinous fluid was aspirated; creatinine levels were the same as plasma making it unlikely to be urine and on sediment examination, there were numerous red bloods with some macrophages present but no overtly neoplastic cells were seen. Culture of the fluid revealed no bacterial growth.
These findings were consistent with a diagnosis of perirenal pseudocyst with some chronic haemorrhage and inflammation. An abscess (the other major differential diagnosis based on the ultrasound images) was ruled out.

4) Perirenal pseudocysts are most commonly accumulations of fluid (modified transudate/transudate) between the renal capsule and renal parenchyma but can occur between the renal capsule and retroperitoneum. They can be unilateral or bilateral. The pathogenesis for their formation is poorly understood but has been associated with renal pathology (e.g. interstitial fibrosis, polycystic kidney disease) and, rarely, neoplasia. Treatment options are directed at reducing the mass effect of the pseudocyst but do not stop the progression of renal disease.

Treatment options include:

a) Surgical removal of cyst and associated kidney if unilateral
b) Surgical removal of the cyst capsule +/- omentalisation. The fluid produced by the pseudocyst is then reabsorbed by the peritoneum. Some cases have been reported to then have abdominal fluid accumulation but these are the exception.

c) Percutaneous drainage. This is a short term solution with fluid accumulation recurring 2 days- 12 weeks later.
d) Monitoring only in cats without associated clinical signs such as vomiting, abdominal discomfort or reduced appetite.

References
