Diagnostic techniques in two rare canine conditions

Aideen Moore MVB GpDI, locum for the Pet Emergency Hospital, The Irish Blue Cross and Villages Vets, Argyle and Bainbridge, Co Dublin, outlines a case report featuring two rare conditions – perinephric cyst associated with a ureteral fibroepithelial polyp and suspected subclinical chronic pancreatitis in a dog

An eight-year-old, female dog presented with abdominal pain and polydipsia. Routine bloods were unremarkable. Urinalysis revealed haematuria. Serum canine pancreatic lipase (cPL) concentrations were abnormal. Abdominal radiography identified a left-sided abdominal mass which ultrasonography revealed to be a perinephric cyst (PNC) surrounding an abnormal left kidney (LK) (No pancreatic lesions (PLs) were seen). Exploratory laparotomy and referral were declined. Ultrasound-guided centesis of the PNC led to a dramatic clinical improvement in the patient. Fluid analysis revealed a transudate, characteristic of a PNC.

Monitoring was performed on a monthly basis for three months. The dog remained clinically asymptomatic. On ultrasound, there was no recurrence of the PNC but the LK became hydronephrotic. On the third ultrasound exam, a cystic left ovary, mucometra and left hydroureter were observed. Serum cPL concentrations remained abnormal. Referral to a specialist ultrasonographer revealed an obstructive lesion in the distal left ureter and no PLs.

An ovariohysterectomy and a unilateral left ureteronephrectomy were performed and recovery was uneventful. Histopathology revealed the left ureteral (LU) lesion to be an ureteral fibroepithelial polyp (UFEP) which is a rare benign neoplasm with an excellent prognosis. Subclinical chronic pancreatitis (SCP) was suspected but not confirmed.

To the authors' knowledge, this is the first report of a PNC and an UFEP occurring concurrently in the same dog.

INTRODUCTION

Perinephric cysts (PNCs) are mainly found in older, male cats (50% bilateral) (Beck et al, 2000) with just two cases reported in dogs (both unilateral) (Miles and Jergens, 1992; Orioles et al, 2014) and a single case in a ferret (bilateral) (Puerto and others 1998). Cats, humans, one dog and the ferret presented with abdominal enlargement, but abdominal pain (humans) and dysuria (dog) were also seen. Their aetiology is unknown. They are not true cysts as they do not have a secretory epithelial lining, most are sub-capsular and contain a low-protein transudate (Nyland et al, 2015b). Drainage and surgical excision provide relief of clinical symptoms, but renal disease, if pre-existing or develops secondary to the PNC, determines prognosis.

Ureteral fibroepithelial polyps (UFEPs) are rare benign neoplasms with only eight canine cases reported (Hattell et al, 1986; Burton et al, 1994; Reichle et al, 2003; Farrell et al, 2006). All cases reported unilateral (five left-sided) ureterohydronephrosis due to obstruction of urinary outflow by the UFEP. Clinical signs varied with each case, abdominal pain and urinary incontinence being the most common. The aetiology of UFEPs remains unknown. Middle-aged or older, entire, large breed dogs are over-represented with no sex predisposition. Surgical excision carries an excellent prognosis.

This case report describes a PNC and an UFEP in a Cavalier King Charles Spaniel (CKCS) and demonstrates the difficulties in confirming an ante-mortem diagnosis of SCP.

HISTORY AND CLINICAL SIGNS

A 7kg, eight-year-old, female CKCS dog presented on February 13, 2015, with a three-day-history of polydipsia, poor appetite, one episode of vomiting and odd behaviour, such as hiding. The dog had no history of previous illness, weight loss, dysuria, trauma, dietary indiscretion or recent oestrus.

The dog had a body condition score of 2.5/5 and appeared bright with normal gait and mentation. The mucosal membranes were pink but dry and capillary refill time was two seconds. A left-sided, grade 2/5 systolic murmur, sinus arrhythmia and normal lung sounds were heard on auscultation. The heart rate (120 beats per minute) and respiratory rate (16 breaths per minute) were within normal range. Rectal examination and temperature (38.7degrees C) were normal but no faeces were palpated per rectum. The abdomen was painful and tense on palpation, the pain could not be localised but it impaired further abdominal assessment.

DIAGNOSTIC TECHNIQUES

A jugular blood sample was taken, routine haematology, biochemistry and electrolyte screening were performed and results were normal. Urinalysis demonstrated a low urinary -specific gravity of 1.005 (dilute urine) and a moderate haematuria. Serum canine pancreatic lipase (cPL) concentrations were abnormal when measured using an in-clinic 'qualitative' assay kit (SNAPcPLTest; IDEXX [McCord et al, 2012]). Abnormal meaning the cPL concentrations were equal to or higher than the upper limit of the reference interval, the actual cPL concentrations may have been in the grey zone (200-400µg/L) or consistent with the diagnosis of pancreatitis (>400µg/L; [Beall et al, 2011]).

The owners declined a cardiac work-up for the murmur. The dog was sedated. A right lateral (RL) and a ventrodorsal (VD) view of the abdomen were taken. Equipment and exposure factors used are recorded.

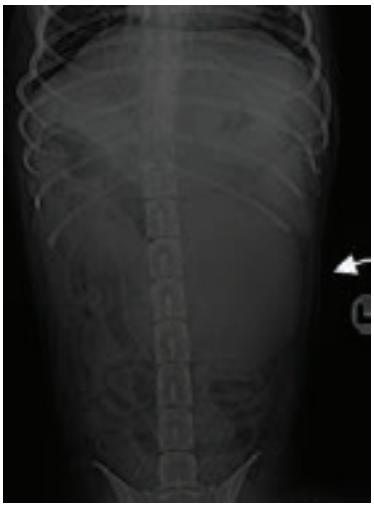

Figure 1: Ventrodorsal abdominal view. In the radiograph, a large, circular, soft tissue/fluid opacity is visible occupying the entire middle-third of the left abdomen (medium arrow), at the level of the 1st to 4th lumbar vertebrae, displacing the gas-filled intestines caudally and to the right. The RK is visible in the right cranial abdominal quadrant, at the level of the 11th to 13th thoracic vertebrae, but is partially obscured by a gas-filled loop of bowel.

The RL view was slightly underexposed. The VD view was slightly overexposed with slight rotation of the body to the right side. Increasing the KV (RL view) and reducing the exposure time and better positioning of the chest sandbags (VD view) would have improved the radiographic images.

Both the VD (see Figure 1) and RL views showed a single, large (5cm x 5cm), circular, soft tissue/fluid opacity with smooth edges just caudal to the ribcage in the cranial abdomen.

It was obscuring the kidneys (RL view) and displacing the small intestines caudally (both views). On the VD view it appeared to be filling the entire middle-third of the left abdomen. Differentials for the opacity were an abnormal LK, left ovary (LO), left pancreas (LP) or left adrenal gland (LAG). A normal right kidney was visible (VD view) in the cranial right abdominal quadrant (CRAQ). The bladder and uterus were not visible (both views). Intravenous urography (IVU; [Larson, 2012]) was not performed as the animal was dehydrated (a contraindication for the procedure). There was no loss of serosal detail in the CRAQ (VD view) to suggest pancreatitis (Hess et al, 1998), no radiopaque foreign body (both views), and the gastrointestinal tract appeared normal.

An abdominal ultrasound examination was performed. The bladder, uterus and pancreas appeared normal (Hammond, 2012; Hecht, Henry, 2007).

With the dog in right lateral recumbency and using a left paralumbar approach the probe was placed on the abdominal wall with the marker pointing cranially. A small, single, slightly ovoid-shaped LK surrounded by a very large, fluid-filled anechoic structure (consistent with a PNC) was seen (Nyland et al, 2015b; Graham, 2012). It obscured the LO, LP and LAG. The dog was placed in left lateral recumbency and using a right paralumbar approach a single, normal right kidney (RK) was identified. The right ovary, ureter and AG were not visible caudal to the RK. Exploratory laparotomy and referral were declined (due to costs). Forty-eight hours later, the PNC was larger and the LK was no longer visible on ultrasound (see Figure 6).

The animal was placed under general anaesthesia. Ultrasound-guided centesis of the PNC was performed.

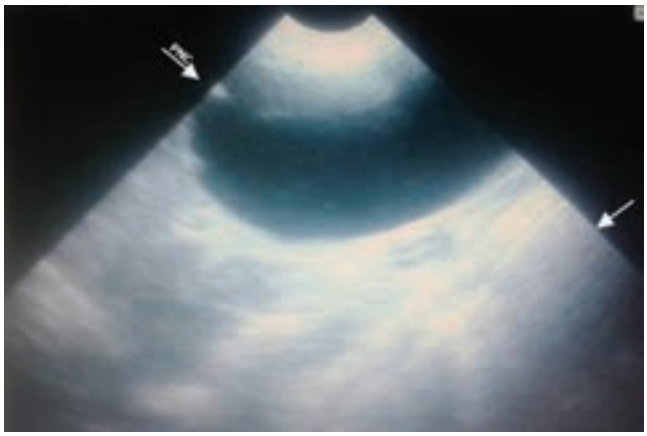

Figure 6: PNC with no LK 48 hours after initial presentation. In the ultrasonographic, the LK is no longer visible and the anechoic PNC is larger (near field/top half of image) with some distal acoustic enhancement (unlabelled arrow) in the tissues beneath the PNC (due to the fluid nature of the PNC).

About 180ml of fluid was removed and samples were sent to an external lab and analysed in-house. Results were consistent with a typical PNC transudate (Larson, 2012) and there was no urine in the PNC. Urinalysis was repeated in-house and by the external lab confirming no pyuria. The patient improved and was discharged 24 hours later.

FURTHER DIAGNOSTIC TESTS

Monitoring was done on a monthly basis for three months. No recurrence of the PNC occurred but the LK became hydronephrotic, On the third scan, a left cystic ovary, mucometra left hydroureter and severe left hydronephrosis were seen (Nyland et al, 2015b). Kidney profile and electrolyte blood analyses were repeated and remained normal. SNAP cPL remained abnormal, the owners declined a 'quantitative' cPL measurement (SpecTest; IDEXX) (Steiner et al, 2008; Steiner, 2010). Urinalysis was not repeated (to reduce costs).

Referral to a specialist ultrasonographer revealed an intraluminal lesion in the distal LU (see Figure 12), no PLs and both AGs appeared normal.

Following surgery, samples of the LK, LU, LU intraluminal lesion, ovaries and the uterus were sent for histological analysis RK or pancreatic fine needle aspiration (FNA) or biopsy was not performed due to safety concerns and lack of gross lesions (Vaden et al, 2005; Pratschke et al, 2015). Histology confirmed the LU intraluminal lesion to be an UFEP.

DIAGNOSIS

A PNC, an UFEP and a cystic ovary/mucometra. SCP was suspected but not confirmed.

TREATMENT

On initial presentation the dog was hospitalised. A 22-gauge intravenous catheter was placed in the cephalic vein and intravenous fluid therapy was initiated at 5ml/kg/hour using Hartmann's solution (Aquapharm11; Animalcare Ltd), continued for 48 hours and then reduced to 2.5ml/kg/hour for a further 24 hours. Maropitant 10mg/

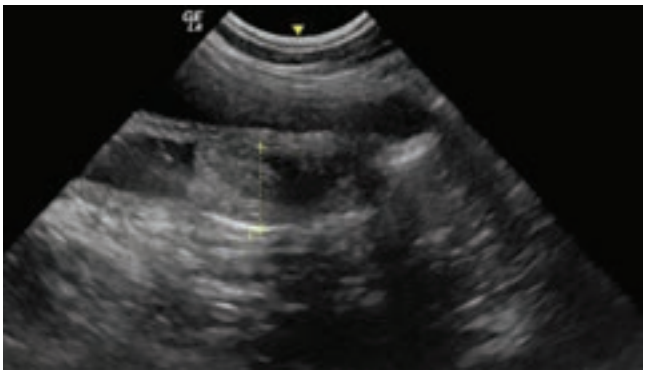

Figure 12: Distal LU Lesion (UFEP). In the above image, there s a lesion measuring 1cm (yellow + and broken lines) in diameter located in the distal LU. The lesion has an outer isoechoic (relative to the ureter wall) wall, its inner layer is irregular with a mixed echogenicity (anechoic and slightly hypoechoic to the ureter wall). Cranially to the lesion, the LU is dilated with anechoic fluid (left of image).

ml (Cerenia injectable solution; Pfizer PGM) was given subcutaneously at a dose of 1mg/kg bodyweight (1ml per 10kg) once daily. Ranitidine hydrochloride 25mg/ml (Zantac injectable solution; GlaxoSmithKline S.p.A.) was given subcutaneously at a dose of 2mg/kg bodyweight (0.4ml per 10kg) twice daily. Buprenorphine 0.3mg/ml (Buprenodale multidose injectable solution; Dales Pharmaceuticals) was given at 20µg/kg bodyweight (0.6mls per 10kg) intravenously three times daily.

Due to persistent abdominal pain, ultrasound-guided centesis of the PNC was performed 48 hours after initial presentation. A dramatic clinical improvement (marked reduction in abdominal pain, improved appetite and demeanour) followed and the patient was discharged 24 hours later. Tramadol 50mg capsules (Tramadol hydrochloride capsules; Actavis) were dispensed at a dose rate of 2mg/kg bodyweight twice daily for seven days along with amoxicillin/clavulanic acid 250mg palatable tablets (Noroclav; Norbrook laboratories Ltd) at a dose rate of 12.5mg/kg bodyweight twice daily for seven days. The dog remained clinically asymptomatic for three months.

Following the referral scan, consent was given for an exploratory laparotomy. Pre-operative bloods were normal. The dog was placed under general anaesthesia, and aseptically prepared for surgery. Intravenous Hartmann's was administered at 5ml/kg/hour (½ surgical rates due to underlying cardiac disease). Cefovecin 80mg/ml (Convenia; Haupt Pharma Latina S. r. l.) at a dose of 8mg/kg bodyweight (1ml/10kg) was administered subcutaneously.

A midline celiotomy, an ovariohysterectomy and a left ureteronephrectomy (see Figure 16) were performed.

All major blood vessels (renal, ovarian and uterine), the cervix and the distal LU were double ligated using glyconate monofilament absorbable (Monosyn; Braun) 2-0 USP/metric 3 suture material before resection and removal of the associated organs.

Care was taken that the renal artery and vein were ligated separately so as to avoid an arteriovenous fistula formation. Grossly, the RK, right ureter, and pancreas appeared normal in situ.

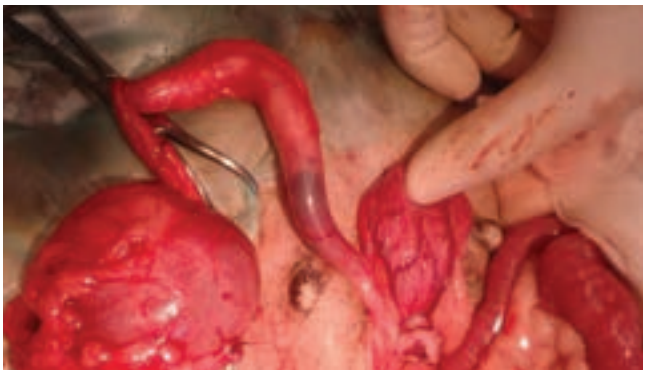

Figure 16: Ureteronephrectomy. (Left to right): LK, dilated LU and normal bladder.

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Figure 22: LU intraluminal lesion (split in 2), ie. UFEP – a non-adherent, firm white tube with a grooved surface/haemorrhagic tips.

routine three-layer abdominal closure was performed. Gross examination of removed organs is outlined in Figure 22. The dog was continued on buprenorphine at 20µg/kg (0.6mls/10kg) given at eight-hour intervals and Hartmann's fluid rates of 5mls/kg/hour for 12 hours. The fluid rates were then reduced to 2.5ml/kg/hour for a further 12 hours. Bloods taken 24 hours post-operation were normal. The dog was discharged 36 hours post-surgery on tramadol 50mg capsules at 2mg/kg bodyweight twice daily for 10 days.

OUTCOME

Surgery was curative and the dog made an uneventful recovery.

Monitoring for potential renal failure and chronic pancreatitis sequelae (Davison, 2015; Watson, 2015) was recommended.

A follow-up, 18 months post-surgery found the dog was remaining clinically asymptomatic.

DISCUSSION

The diagnosis and management of this case was impaired for several reasons.

Confirming if SCP was present in this case was difficult. Quantitative Spec cPL measurements were not performed (due to cost) and doubt existed about the in-house ultrasonographic findings (due to operator inexperience/ machine quality).

However, the specialist found no PLs either. Pancreatic biopsy, the 'gold standard' for diagnosis, was not performed as it was an invasive procedure which the surgeon was unfamiliar with and there were no gross PLs (Pratschke et al, 2015).

CKCSs have an increased risk for chronic pancreatitis (CP; [Watson et al, 2007; Watson et al, 2010]). CP may not show up in tests (including ultrasound scans) or be clinically significant even when cPL levels are high (Xenoulis, 2015). On this basis, SCP was suspected but not confirmed.

In this case, the abdominal pain was attributed to the PNC (as the dog remained clinically asymptomatic post-centesis) and was thought to be caused by the stretching of the renal capsule (Stone and Kyles, 2000).

As PNC differentials, pancreatic pseudocysts (VanEnkevort et al, 1998; Nyland et al, 2015c) were excluded as they are usually associated with an inflammatory exudate and ultrasonographic PLs. Cystic adrenal lesions have been identified in humans (Thurston and Wilson 2005) but there are no reports in dogs (Nyland et al, 2015a). The specialist confirmed normal AGs. An ovarian cyst was not identified until the third scan.

Aetiology (of the PNC/UFEP) was unknown in this case. Possible causes have been suggested (Miles and Jergens 1992; Farrell et al, 2006; Orioles et al, 2014). Congenital or developmental defects were not excluded. Hormonal imbalances were a possibility (similar to this case, half of the reported UFEP cases had reproductive tract lesions (Reichle et al, 2003).

An obstructive (urinary) aetiology was considered, but there was no history of trauma (common cause of PNC in humans), urinary tract infections, urolithiasis or increased ureteric pressures (causes a urine-filled PNC) in this case. The PNC/UFEP were also 'obstructive' lesions in their own right and it was postulated that the UFEP could have caused the PNC (or vice versa) but a causal relationship could not be proven.

In one previous PNC canine case (Miles and Jergens, 1992), an older, small breed dog with a left unilateral lesion was reported. The dog presented with dysuria, had histological renal lesions, and despite excision of the PNC, died of chronic renal failure (a common sequel to PNCs). In contrast, the current case presented with abdominal pain and remained non-azotaemic post-treatment. IVU and renal biopsies were not performed on the RK so an uncertain prognosis was given regarding the future development of renal failure in this case.

The second previous PNC case (Orioles et al, 2014), despite presenting differently (as a young, large breed dog with abdominal enlargement due to ascites and association with a renal cyst) had a similiar successful treatment and outcome as this case.

This case was similar to previous UFEP cases but was unusual in that it occurred in a small breed dog. Seven of the eight UFEP cases reported were treated by unilateral ureteronephrectomy with all but one having a successful outcome. In contrast, in human cases earlier diagnosis is common and minimally invasive ureteroscopic resection of the UFEP is the treatment of choice (Turunc et al, 2008). This likely reflects reduced availability and prohibitive cost of ureteroscopic procedures in veterinary medicine. Animal size and sex no longer appear to be a limiting factor, specific instrumentation and techniques have been developed to overcome this (McCarthy, 2015).

It's uncertain whether an earlier diagnosis (of UFEP) in this case would have meant a less invasive treatment option was viable, as the possible existence of PNC-associated LK lesions and cost could have been prohibitive.

CONCLUSION

This case reports two rare conditions (PNC and UFEP) occurring concurrently in a dog and demonstrates the difficulties in confirming an ante-mortem diagnosis of SCP. It also emphasises the need for specialist ultrasonographers and for greater availability and affordability of less invasive procedures, such as cystoscopy, to veterinary patients.

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