# Gall bladder mucocoele in canines

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ROGER WILKINSON discusses the possible causes, diagnosis and treatment of this ever-increasing condition in dogs

**ONLY 15 years ago gall bladder mucocoele was rarely seen in small animal practice.**

Now an emerging problem, it represents one of the most common causes of biliary disease in dogs, although many cases probably still go undiagnosed since it frequently manifests as merely grumbling problems in old patients. The first significant case series has been published within the past 10 years.

The cause of gall bladder mucocoele is unknown, although various pathomechanisms have been proposed. Obstruction of the bile duct appears to be a primary cause in at least some human patients, although this is a rare condition in humans. In dogs, however, postmortem or histopathological evidence of obstruction has not been forthcoming to date, although gall bladder hypomotility has been documented to precede mucocoele formation in some individuals.

An alternative theory is that the primary change is a dysfunction of the mucus-secreting mucosal lining of the gall bladder. Such changes might be induced by changes in the composition of bile. Diet is an obvious potential factor here. In humans, a link between biliary sediment and abnormal lipid metabolism has been suggested. It is possible that idiopathic hyperlipidaemia in specific breeds (Shetland sheepdogs and miniature schnauzers) might be a factor in this process in dogs. Gall bladder mucocoele is certainly much more common in old dogs and small breeds are over-represented.

In our practice, border terriers are the prime candidates, although other reports have particularly found cocker spaniels, miniature schnauzers and Shetland sheepdogs to be at significantly increased risk. Occasional cases are also seen in large breeds such as Labradors and German shepherds.

Changes in the gall bladder are striking. Grossly, the gall bladder usually appears distended. The lumen is packed with a shiny, gelatinous green-black accumulation. The condition may be complicated by necrosis of the wall and, eventually, gall bladder rupture with subsequent bile peritonitis. Bacterial cholecystitis and pancreatitis are other reported sequelae – both of which are potentially fatal. Histologically, there is cystic hyperplasia of the mucous glands in the epithelial lining of the gall bladder.

## Presenting signs

Clinically, gall bladder mucocoele may present as anything from mild, recurrent abdominal pain or colic, to acute collapse with peritonitis. Signs reported in the published case series are described in Table 1. These were cases presenting at referral centres with an average duration of signs of only five days. Our experience in general practice would be that many are milder and more chronic, although these may subsequently progress into acute presentations.

It is not exceptional to find a mucocoele on abdominal ultrasonography in dogs undergoing investigations for other reasons. Concurrent hyperadrenocorticism, for example, has been reported in a number of dogs. Care must be taken to distinguish cases of pancreatitis from gall bladder mucocoele. Clinical signs and clinicopathologic findings may be very similar in these two conditions and there is significant overlap in the predisposed populations. The recent availability of a relatively specific in-clinic test for pancreatitis – the SNAP cPL test from IDEXX – is likely to be very helpful in this respect.

Clinicopathological findings commonly include high serum ALT, alkaline phosphatase, AST and GGT. Hypoalbuminaemia is seen occasionally. Most have elevated bilirubin and many exhibit neutrophilia and monocytosis. Neither physical findings nor routine clinical pathology reliably distinguish between cases with rupture of the gall bladder and those without. However, in one study, venous lactate concentrations were elevated in eight out of eight with rupture and in none out of three without rupture.

## X-ray

Radiographic findings are generally non-specific. Ultrasonography is the crux of diagnosis of gall bladder mucocoele. Refreshingly, findings are typically both striking and diagnostic. The classic appearance is of a stellate pattern of central, echogenic bile with radial extensions into a peripheral zone of hypoechoic bile and/or mucus. It appears that this pattern progresses to a point where the central echogenic area is eventually obliterated, leaving a relatively hypoechoic gall bladder with

distinctive linear striations – the kiwi fruit sign (resembling the cross-sectional appearance of the fruit when cut in half).

These phenomena must be distinguished from gall bladder sludge, which is a common finding in gall bladders of dogs and is thought to be rarely of clinical significance. Sludge generally settles into the lowest area of the gall bladder (depending on the position of the patient) with a horizontal fluid line. Distention of the cystic or common bile ducts may or may not be present in patients with mucocoeles. Presumably, this depends on the level at which obstruction has occurred.

In the event of rupture, loss of integrity of gall bladder wall may be apparent on ultrasound and is frequently associated with increased echogenicity in the pericholecystic fat or ascites – suggesting localised peritonitis.

It may well be advisable to obtain a bile aspirate for bacteriology. A transhepatic approach with a 22G needle is generally advised since the surrounding liver parenchyma may help prevent leakage thereafter. However, in our experience, this is not a problem, largely because the gelatinous bile does not tend to flow anywhere in a hurry. Some cases do have positive bacterial cultures. Typically, aerobic, gram-negative enteric organisms are isolated.

## Treatment

Surgical management of gall bladder mucocoele is currently favoured as the treatment of choice by most authors. This is on the basis that gall bladder wall hyperplasia appears to be irreversible and there is little hope that choleretics, such as ursodeoxycholic acid (Destolit) will achieve resumption of bile flow.

Where there is evidence of rupture then emergency surgical intervention is certainly indicated since the resulting bile peritonitis is frequently fatal. Either cholecystectomy or cholecystoduodenostomy are reasonable options, although the latter should be avoided if viability of the gall bladder wall is in doubt. Simple surgical removal of gall bladder contents at cholecystotomy and/or flushing of the biliary tract without further measures is typically followed by prompt relapse of signs.

Perioperative mortality is high (about 20 to 30 per cent in published series) in dogs undergoing surgery, regardless of whether rupture has occurred or not. However, those that recover appear to do well. Cholecystectomy is relatively straightforward when the gall bladder is intact. Although subsequent flushing of the remaining biliary tract has been advocated, evidence suggests this is not mandatory. Where rupture has occurred, every effort should be made to retrieve all the spilled bile.

Medical measures may involve analgesia, antibiotics and anti- Roger Wilkinson is a partner at Yorkshire Vets – a 20-vet small animal practice based in Leeds and Bradford. Roger has particular interests in dermatology, cytology, critical care, ultrasonography and endocrinology. emetics.

However, there is little evidence that these measures make much difference to the progression of the condition unless accompanied by surgical intervention. Until recently there was no real evidence for either adverse or positive effects of ursodeoxycholic acid in mucocoele patients. Aguirre et al (2007) reported a single asymptomatic case in which a gall bladder mucocoele resolved when treated with ursodeoxycholic acid in combination with the feeding of an ultra low-fat diet.

Where rupture occurs, the resulting peritonitis is septic in a significant proportion of cases. Use of broad-spectrum intravenous antibiotics is probably indicated in all acute cases in the perioperative period – and for some time thereafter.

• References are available by request to the editor.

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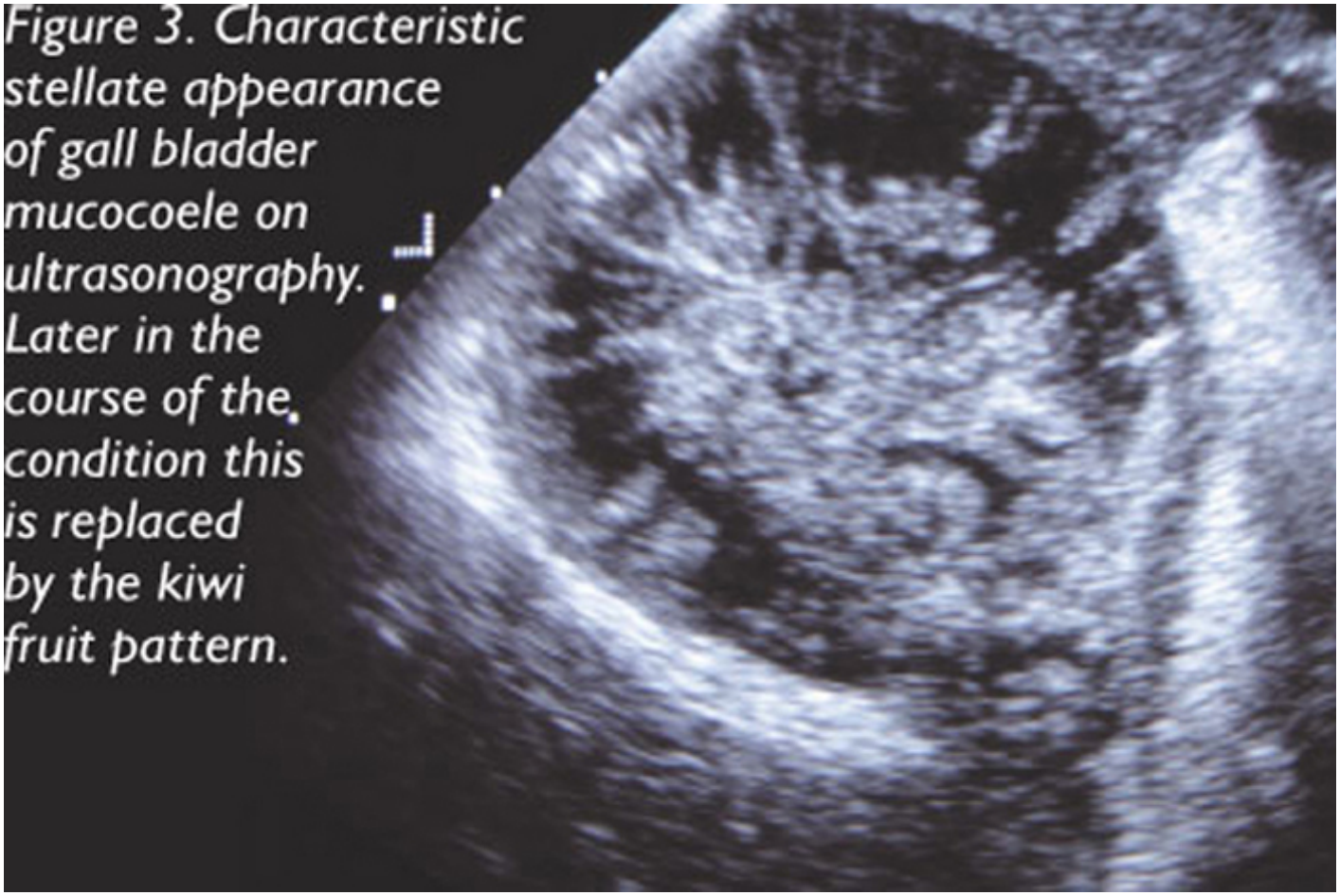


***Figure 3. Characteristic stellate appearance of gall bladder mucocoele on ultrasonography. Later in the course of the condition this is replaced by the kiwi fruit pattern.***


***Above: gall bladder from a 12- year-old Labrador with mucocoele. Cholecystectomy is relatively straightforward when the gall bladder is intact.***

***Right: the abnormal gall bladder contains large quantities of shiny, gelatinous, bile-stained mucus.***

| History/ physical sign | Pike et al (2004) | Besso et al (2000) |
|---|---|---|
| Vomiting | 87% | 85% |
| Anorexia | 78% | 78% |
| Lethargy | 87% | 64% |
| Polyuria/polydipsia | 30% | 35% |
| Diarrhoea | 26% | 14% |
| Abdominal distention | 13% | – |
| Abdominal pain | 87% | 46% |
| Jaundice | 56% | – |
| Fever | 26% | 31% |

**TABLE 1.** Physical signs associated with gall bladder mucocoele in published cases