Chronic gastric instability and presumed incomplete volvulus in dogs


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Chronic gastric volvulus in dogs results in long-standing gastrointestinal signs unlike those of acute gastric dilatation and volvulus. This report describes chronic gastric volvulus in seven dogs. The majority of dogs presented with weight loss, chronic vomiting, lethargy and abdominal pain. A combination of radiographic, ultrasonographic and endoscopic imaging indicated altered positioning of gastric landmarks. Dynamic changes were identified in some cases. Exploratory coeliotomy and surgical gastropexy were performed in all dogs. Clinical signs improved or resolved in six of seven dogs post-operatively. Chronic gastric volvulus is an uncommon condition in dogs, but should be considered as a differential in cases presenting with the above clinical signs.

INTRODUCTION

Acute gastric dilatation and volvulus (GDV) is a common, life threatening condition primarily affecting large breeds of dog (Glickman and others 1994, Brockman and others 1995). The condition is characterised as sudden onset of gastric dilatation and rotation about its long axis. Prompt medical and surgical treatment is essential to prevent development of gastric and splenic ischaemia, necrosis and irreversible shock (Glickman and others 1994, Beck and others 2006, Buber and others 2007, Mackenzie and others 2010). In spite of immediate intensive treatment, mortality rates in acute GDV range from 10 to 67% accounting for 2·5% of all reported canine deaths (Mathiesen 1983, Evans and Adams 2010, Mackenzie and others 2010).

In comparison chronic gastric volvulus has rarely been described in dogs (Leib and Blass 1984, Leib and others 1987). Affected dogs do not present as acute cases but with more subtle, non-specific clinical signs which do not suggest that gastric volvulus should be considered in the differential diagnoses.

This report describes chronic gastric volvulus in a series of seven dogs. The presenting clinical signs, results of diagnostic imaging, clinicopathological data, treatment and outcome are described. The use of abdominal ultrasound and endoscopy are described for the first time in the diagnosis of chronic gastric volvulus.

Case series

All dogs in this study were presented as referral patients between 1995 and 2010. Clinical signs had been present for between 2 weeks and 2-5 years with a median of 5 weeks. Seven different breeds were represented. Dogs ranged from 11 months to 12 years of age (median 6 years), with a bodyweight of 12 to 44 kg (median 26 kg) and body condition score of 2 to 4/9 (median 4/9). Six dogs were male and one was female. The majority presented with a chronic history of vomiting, weight loss, lethargy and perceived abdominal pain (Table 1). Some dogs had concurrent problems, such as prostatomegaly (case 3), osteoarthritis (cases 1, 2, 4) and a systolic heart murmur (case 4).

Following admission, patients underwent various diagnostic procedures to determine the cause of their clinical signs. These tests varied between dogs, but included haematology, serum biochemistry, faecal analysis, urinalysis, trypsin-like immunoreactivity and pancreatic lipase immunoreactivity assays. Diagnostic imaging was performed as deemed appropriate based on the problem list of the individual patient. In addition to plain radiographs of the abdomen, two dogs underwent contrast radiography, three dogs had abdominal ultrasound and four dogs had upper gastrointestinal endoscopy performed (Table 2). Radiographic changes varied from dog to dog, but usually included various combinations of gaseous distension of the stomach, a soft tissue band across the stomach resulting in compartmentalisation and displacement of the pylorus (Figs 1 and 2). At endoscopy, difficulty in passing through the cardiac sphincter and changes in the position of normal gastric landmarks were observed in some cases (Fig 3). In one dog (case 1) the anatomical landmarks usually observed in the stomach were abnormal at the start of the endoscopy procedure. Whilst maintaining a set view, the stomach was seen to move spontaneously without any change in position.
Table 1. Signalment and clinical signs in dogs with chronic gastric volvulus

<table>
<thead>
<tr>
<th>Case</th>
<th>Breed</th>
<th>Age</th>
<th>Sex</th>
<th>Clinical signs</th>
<th>Body condition score*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Labrador</td>
<td>8</td>
<td>Male entire</td>
<td>One month of exercise intolerance, lethargy, weight loss (11% of body weight), abdominal pain, intermittent vomiting ±diarrhoea</td>
<td>4/9</td>
</tr>
<tr>
<td>2</td>
<td>Rottweiler</td>
<td>4</td>
<td>Male neutered</td>
<td>Five months of weight loss (13% of body weight); lethargy (once), vomiting (twice)</td>
<td>4/9</td>
</tr>
<tr>
<td>3</td>
<td>Springer spaniel</td>
<td>7</td>
<td>Female neutered</td>
<td>Two and a half years of postprandial gastric bloating and discomfort, eructation, flatus and borborygmi</td>
<td>4/9</td>
</tr>
<tr>
<td>4</td>
<td>Basset hound</td>
<td>12</td>
<td>Male entire</td>
<td>Two weeks of vomiting, anorexia, lethargy, polyuria and polydipsia</td>
<td>3/9</td>
</tr>
<tr>
<td>5</td>
<td>Alaskan malamute</td>
<td>11</td>
<td>Male entire</td>
<td>Two weeks of vomiting ±diarrhoea, borborygmi, weight loss (11% of body weight); unproductive retching and pain (once)</td>
<td>4/9</td>
</tr>
<tr>
<td>6</td>
<td>Border collie</td>
<td>6</td>
<td>Male entire</td>
<td>Sixteen months of intermittent vomiting/regurgitation, weight loss (9-5% of body weight)**</td>
<td>2/9</td>
</tr>
<tr>
<td>7</td>
<td>German shepherd dog</td>
<td>3</td>
<td>Male entire</td>
<td>Five weeks of progressive salivation, dysphagia, regurgitation, weight loss and intermittent cough***</td>
<td>4/9</td>
</tr>
</tbody>
</table>

*Range 1-9; where 5/9 is ideal, 1/9 is emaciated, 9/9 is obese
**Thoracic radiographs identified megaoesophagus cranial to a vascular ring anomaly. Endoscopy confirmed moderate oesophageal narrowing at the site
***Thoracic radiographs identified megaoesophagus. Myasthenia gravis diagnosed based upon the post-mortem examination results of acetylcholine receptor antibody test

Table 2. Diagnostic imaging and surgical findings in dogs with chronic gastric volvulus

<table>
<thead>
<tr>
<th>Case</th>
<th>Radiography</th>
<th>Ultrasound</th>
<th>Endoscopy</th>
<th>Surgical findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Delayed gastric emptying (barium series) – possible pyloric outflow obstruction</td>
<td>Reduced gastric motility; gas, ingesta, fluid in stomach; pylorus displaced towards midline</td>
<td>Difficulty passing through cardia; gastric landmarks incorrectly positioned; dynamic change during endoscopy and normal landmarks appeared – Fig 3</td>
<td>90° Clockwise gastric torsion</td>
</tr>
<tr>
<td>2</td>
<td>Gas dilated stomach in right cranial ventral abdomen compartmentalised by soft tissue line; gas and fluid distended small intestine</td>
<td>Abnormal gastric orientation; pronounced fold and sharp angle between fundic region and body of stomach; pylorus displaced dorsally and to the left</td>
<td>Not performed</td>
<td>No significant findings</td>
</tr>
<tr>
<td>3</td>
<td>Displaced, horseshoe shaped (pylorus cranial) and gas dilated stomach, gas dilated small intestines; delayed gastric emptying (barium series) – possible pyloric outflow obstruction – Fig 1</td>
<td>Not performed</td>
<td>Not performed</td>
<td>90° Clockwise gastric torsion; adhesions and hairs throughout abdomen; spleen bent double pulling gastric fundus craniodorsally, gastrointestinal motility reduced</td>
</tr>
<tr>
<td>4</td>
<td>Displaced, horseshoe shaped (pylorus cranial) gas dilated stomach</td>
<td>Not performed</td>
<td>Not performed</td>
<td>90° Clockwise gastric torsion</td>
</tr>
<tr>
<td>5</td>
<td>Performed after initiation of endoscopy: megaoesophagus, but no gas in stomach</td>
<td>Not performed</td>
<td>Unable to pass through cardiac sphincter; radiographs taken; endoscopy resumed, scope passed with difficulty; gastric landmarks incorrectly positioned; normal gastric landmarks upon repeat endoscopy (same occasion)</td>
<td>90° Clockwise gastric torsion; hypermotile gastrointestinal tract; stomach in normal position initially, but filled with gas and started to twist intra-operatively</td>
</tr>
<tr>
<td>6</td>
<td>Pylorus displaced dorsally (left lateral) and pylorus and fundus displaced to the right (dorsoventral view); compartmentalisation of the stomach by a soft tissue line; megaoesophagus – Fig 2</td>
<td>Not performed</td>
<td>Gastric landmarks incorrectly positioned</td>
<td>90° Clockwise gastric torsion</td>
</tr>
<tr>
<td>7</td>
<td>Gastric fundus gas filled and moderately distended pylorus just right of midline, “gravel sign” at pylorus suggesting pyloric outflow obstruction or dysmotility; gas distended small intestine far craniodorsally; megaoesophagus</td>
<td>Considerable gas in stomach and intestines, displaced small intestine, spleen folded at the head and tail</td>
<td>Oesophageal dilatation, abnormal appearance to stomach; large flaccid sac, no obvious pyloric outflow</td>
<td>90° Anticlockwise torsion, stomach large and flaccid, fundus folding over antrum</td>
</tr>
</tbody>
</table>
Chronic, incomplete, gastric volvulus in dogs

out in one dog (case 7) due to additional concerns over pyloric outflow obstruction. Gastropexy was performed in all dogs to anchor the pylorus to the right body wall using belt loop, incisional or tube techniques.

Gastrointestinal biopsy samples were collected from five dogs. These revealed the following abnormalities: jejunitis (case 1), gastric serositis (case 3), necrotising duodenitis (case 4), eosinophilic colitis (case 5) and low-grade Helicobacter infection (case 7). Specific treatments administered on the basis of biopsy results consisted of sucralfate, ranitidine, metronidazole (case 4) and fenbendazole with prednisolone (case 5). Cases 1 and 3 received no specific therapy. Case 7 received amoxicillin clavulanate and enrofloxacin for aspiration pneumonia. Concurrent disease was confirmed in four dogs and included cystitis (case 4), eosinophilic bronchitis and salmonella infection (case 5), vascular ring anomaly (case 6) and myasthenia gravis (case 7).

All seven dogs recovered from surgery although one died postoperatively following aspiration pneumonia (case 7). The remaining six dogs showed a dramatic improvement in their clinical condition in the period of follow-up (2 weeks to 2 years, median 12 months).

DISCUSSION

Chronic gastric volvulus has rarely been described in dogs. The condition was first reported in two dogs with chronic vomiting of 2 weeks duration (Boothe and Ackerman 1976). A subsequent report described gastric volvulus as an incidental finding in a dog undergoing routine preoperative radiographs for a gastropexy.
The dog had been treated medically for two previous acute GDV episodes in the preceding 2 months, but was asymptomatic at the time of diagnosis (Leib and Blass 1984). The most recent report of chronic gastric volvulus described a 10-year-old German shepherd dog with a 3.5-year history of weight loss, vomiting and recurrent bloating (Leib and others 1987). Chronic gastric volvulus was suspected based upon results of a barium contrast study, and subsequent surgery revealed a 45° clockwise torsion of the stomach. Gastropexy resulted in significant weight gain and almost complete resolution of clinical signs.

The cases presented in this report also had a chronic history of non-specific clinical signs, including weight loss, vomiting and bloating. In contrast to the common syndrome of acute GDV, these dogs were not presented as emergencies, and were not considered to be in a critical condition at the time of admission to the hospital.

In case 3, clinical signs developed following a routine, elective ovariohysterectomy surgery and worsened in the 18 months before presentation. Surgery identified gastric and splenic displacement, in addition to multiple adhesions. Prior abdominal surgery and the presence of adhesions may increase the risk for chronic gastric volvulus in dogs.

Historically, a diagnosis of canine chronic gastric volvulus has been made using plain and contrast radiography. A barium contrast study was used in 2 of 7 dogs in this study. Gastric malpositioning was detected in one dog, and delayed gastric emptying was documented in both cases. Incomplete gastric volvulus was identified at surgery in both dogs. Delayed gastric emptying may have been the result of altered gastrointestinal motility, and/or a partial pyloric outflow obstruction in these dogs. In one dog (case 7), a partial pyloric outflow obstruction was suspected based upon plain radiographs and endoscopy. These observations suggest that chronic gastric volvulus should be considered as a differential for partial pyloric outflow obstruction in dogs.

This case series demonstrates the role of endoscopy as an adjunctive diagnostic imaging modality for chronic gastric volvulus in dogs. Endoscopy was performed in 4 of 7 dogs described in this report. Abnormal findings included incorrect positioning of gastric landmarks (4 of 4 dogs), difficulty passing the endoscope through the cardiac sphincter (2 of 4 dogs), a dilated flaccid appearance to the stomach and an inability to locate the pyloric outflow (1 of 4 dogs). In addition, a dynamic component was observed in 2 of 4 dogs, with an abrupt gastric movement resulting in the reappearance of normal gastric landmarks at the time of endoscopy. Endoscopy may be of particular value in dogs with intermittent, dynamic gastric volvulus.

Endoscopy is frequently used in the diagnosis of gastric volvulus in human medicine, with an estimated diagnostic yield of 73% (Gourgiotis and others 2006). Reported findings are similar to those observed in this case series, and include a loss of normal gastric landmarks, twisting of gastric folds and difficulty visualising the gastric pylorus (Tsai and Tseng 2009).

It is important to emphasise that chronic gastric volvulus may be intermittent and that during evaluation the stomach may appear normal. This makes the diagnosis of chronic gastric volvulus difficult and may explain why there are few reports of this syndrome. For example, in cases 2 and 5, the stomach appeared to be in a normal position at surgery, despite the fact that either radiography or endoscopy had revealed abnormal positioning of the stomach preoperatively. Intermittent gastric malpositioning has been described previously in association with various non-specific gastrointestinal signs. In one report, three dogs with radiographic evidence of gastric displacement were subjected to fundic gastropexy, and in each case the stomach was lying in a normal position at surgery (Frendin and others 1988). Similar instability of the stomach has been observed for several months following an acute attack of gastric torsion treated conservatively (Funquist 1969).

This case series is the first to describe the use of multiple imaging modalities for the diagnosis of chronic gastric volvulus in dogs. In view of the large variation in diagnostic imaging findings, and the dynamic nature of chronic gastric volvulus in some dogs, this approach is likely to increase overall diagnostic yield. Practitioners should be prepared to carry out multiple diagnostic tests, potentially repeatedly, to arrive at a diagnosis of chronic gastric volvulus.

Two of the dogs described in this report presented with megaesophagus in combination with chronic gastric volvulus. Megaesophagus may have contributed to the clinical signs of weight loss and vomiting/regurgitation in these cases. The owners of both dogs were informed before surgery that gastric volvulus may be an incidental finding, and that gastropexy may not alleviate clinical signs. Interestingly, short-term follow-up of one dog recorded a dramatic improvement, with almost complete resolution of vomiting/regurgitation, in addition to weight gain. Unfortunately, the case was subsequently lost to follow-up. The second dog (case 7) was euthanased postoperatively due to aspiration pneumonia.

In this study, all dogs suspected of having chronic gastric volvulus were taken to surgery for exploratory coeliotomy. A 90° gastric volvulus was identified in 5 of 7 cases, necessitating gastric re-positioning. Prophylactic right-sided belt loop, incisional or tube gastropexy was carried out in all cases. Although this approach was standard for the present study, it is not clear whether all dogs with chronic gastric volvulus require surgery. It has been suggested that dogs with chronic gastric volvulus are at greater risk for developing acute GDV, but evidence for this is lacking. A stronger indication for surgery in these dogs may be prevention of clinical signs relating to chronic gastric volvulus. The marked clinical improvement in 6 of 7 cases in this case series confirms that gastropexy is useful for the treatment of chronic gastric volvulus in dogs.

There are several limitations to this case series. The study was retrospective so the data available for each dog varied, as did the diagnostic tests and imaging modalities used in each case, for example gastrointestinal biopsies were not consistently obtained.

The presence of coexisting disease in several dogs is another limitation, although there did not appear to be over-representation of any particular disease. In case 5, the clinical improvement could have been attributed to corticosteroid treatment for eosinophilic disease. However, this dog’s vomiting and unproductive
retching had worsened in the 14 days before surgery despite treatment with corticosteroids during this period, and clinical signs only started to improve after gastropexy had been performed.

In conclusion, chronic incomplete gastric volvulus should be considered as a cause of non-specific, chronic gastrointestinal signs in dogs. Practitioners should be aware that multiple diagnostic imaging modalities may be required to reach a diagnosis, including endoscopic evaluation. Gastropexy may result in resolution of clinical signs.

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Conflict of interest
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References


