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Scientific Report

Gastroesophageal intussusception in a domestic short-hair cat

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Summary

A 4-month-old, intact male domestic short-hair cat was presented to Veterinary Hospital with an acute onset of regurgitation and respiratory distress. Thoracic and abdominal radiographs identified a mass consisted of a heterogeneous mixture of soft tissue and gas densities between heart and craniodorsal part of the diaphragm that was shifted to the left. The stomach could not be seen clearly. Radiographic signs suggested a tentative diagnosis of gastroesophageal intussusception (GEI). Esophagoscopy revealed gastric mucosa in the lumen of the esophagus, and a diagnosis of GEI was made. The GEI was manually reduced by use of insertion tube of scope. Ten days later, the case was euthanized because of GEI recurrence and aspiration pneumonia. Gastroesophageal intussusception is a rare condition in cats. This case report shows that gastropexy along with manual reduction of GEI is essential for prevention of recurrence and reduction of mortality.

Key words: Gastroesophageal, Intussusception, Cat, Esophagoscopy

Introduction

Gastroesophageal intussusception is a life-threatening condition that requires an accurate diagnosis with urgent surgical intervention. It is a rarely reported condition but should be considered a differential diagnosis in cases of unresponsive vomiting or regurgitation (Graham *et al*., 1998; Hettlich *et al*., 2010).

Case description

A 4-month-old, intact male domestic short-hair cat was presented to the Veterinary Hospital for evaluation of persistent vomiting and regurgitation during last 5 days and acute onset of respiratory distress.

Upon admission, the cat was depressed, lethargic, dehydrated, tachycardic and tachypenic with expiratory distress and muffled heart sound. Core body temperature was normal (39.1°C). No abnormality was detected in abdominal palpation. Complete blood cell count (CBC) was performed and results are shown in Table 1.

In radiographs (Figs. 1 and 2), a large mass consisted of a heterogeneous mixture of soft tissue and gas opacities were seen between heart and craniodorsal part of the diaphragm that was shifted to the left. The mass pushed the heart in cranioventral direction and cranial border of the heart made contact with the sternum. The stomach could not be seen clearly in the abdominal cavity. Severe osteoporosis and associated deformities were noted, especially in the pelvis and vertebral column. Pulmonary involvement with alveolar pattern was seen mainly in caudal parts. Large bowel was distended with gas. The texture and location of the mass led to a tentative radiographic diagnosis of GEI.

After appropriate fluid therapy, esophagoscopy was performed by a 3.3 mm

Table 1: Results of complete blood cell count and biochemical profile of the patient

Test	Units	Patient values	Reference range
WBC	($10 \times 3/mm^3$)	21.3	5.5-19.5
Neutrophils	(%)	80	35-75
Lymphocytes	(%)	15	20-55
Monocytes	(%)	5	1-4
Hematocrit	(%)	41	29-45
RBC	($10 \times 6/mm^3$)	9.5	6.0-10
Hemoglobin	(g/dl)	11	9.5-15
Serum total protein	(g/dl)	8.4	5.9-8.5
Serum potassium	(mEq/L)	3.4	3.9-5.3
Serum sodium	(mEq/L)	168	147-156

Fig. 1: Lateral radiograph of the thoracic and abdominal cavities. Notice the big mass with a heterogeneous mixture of soft tissue and gas opacities between heart and craniodorsal part of the diaphragm (arrows). The mass pushed heart in cranioventral direction. The stomach could not be seen clearly in the abdominal cavity. Severe osteoporosis and associated deformities are noted, especially in pelvis and vertebral column. Gastroesophageal intussusception is suspected

bronchoscope (Olympus BF type 3C40) under general anesthesia and observation of a fleshy mass with apparent rugal folds encountered in the distal part of the esophagus confirmed the tentative diagnosis of GEI. Using gentle pressure with insertion tube of scope was successful to bypass the mass. Unfortunately, the owner did not agree to surgery and therefore, gastropexy was not performed for this case.

Following up the patient, clinical signs of GEI improved temporarily but after 10 days, the case was referred with severe respiratory distress, nasal mucopurulent discharge, cyanosis and progressive vomiting and regurgitation. Prior to treatment, the cat's condition deteriorated and it was euthanized at the owner's request.

Post-mortem examination of the abdomen found that the esophageal hiatus was enlarged and that a large portion of the stomach had telescoped into the thoracic esophagus. The pylorus and approximately 2.5 cm of distal stomach remained in the abdomen (Fig. 3). The stomach was congested with dark, purple discoloration of some parts of the body. The rest of the abdomen was explored and no other abnormality was detected. The cranial lung lobes were heavy with almost no air in them and accumulation of foamy discharge in airways.

Fig. 2: Ventrodorsal radiograph of the thoracic and abdominal cavities. Notice the big mass consisted of a heterogeneous mixture of soft tissue and gas opasities in caudal part of thorax that is shifted to the left (arrows). The stomach could not be seen clearly in the abdominal cavity. Gastroesophageal intus-susception is suspected

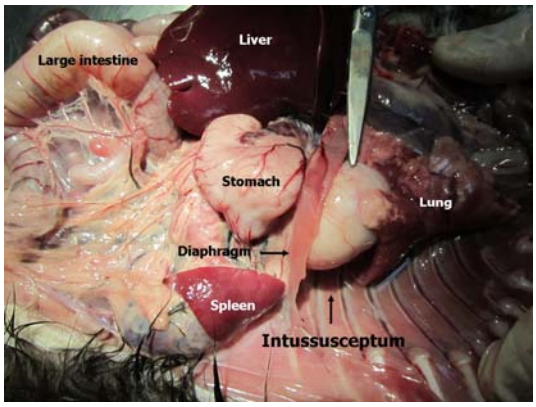

Fig. 3: View of GEI at necropsy. Notice the intussuscipiens (long arrow) which almost completely entered thoracic cavity

Discussion

Gastroesophageal intussusception is the invagination of whole or parts of the stomach and occasionally other structures - such as the spleen, proximal duodenum, and pancreas - into the esophagus (Ettinger and Feldman, 2009). It is a rare, life-threatening condition in dogs and cats and little information is available in the literature regarding it (Crowe, 1986; van Camp *et al*., 1998; Martinez *et al*., 2001; Owen *et al*., 2005; van Geffen *et al*., 2006). However, GEI should be considered as a differential diagnosis in cases of unresponsive vomiting or regurgitation.

Etiology of GEI is unknown and it has a guarded to poor prognosis. The young age of the affected animals suggests that preexisting esophageal disorders, specifically megaesophagus, or other congenital anatomical abnormalities, such as a wider than normal esophageal hiatus, may increase the risk of GEI due to decreased esophageal motility and reduced lower esophageal sphincter (LES) tone (Graham *et al*., 1998). Although a specific esophageal disease was not recognized in our patient, he was suffering from severe osteoporosis, which may have a relation with GEI and should be investigated in future studies. Nutritional secondary hyperparathyroidism in advanced stages can cause hypocalcemia, resulting in muscular malfunction and weakness. Ionized calcium, the active form of calcium, is involved in the release of acetylcholine during neuromuscular transmission and is essential for muscle contraction (Ettinger and Feldman, 2009). Consequently, hypocalcemia and mal-function in lower esophageal sphincter can be considered as one of the predisposing factors for GEI. Furthermore, there are some reports describing hiatal hernia in osteoporotic patient due to kyphoscoliosis and increased abdominal pressure (Tavakoli *et al*., 2008). However, these associations have not yet been approved.

The diagnosis of GEI can be made from the lateral and ventrodorsal survey of the thoracic radiographs. A soft-tissue mass may be identified in the caudal mediastinal area of the thorax, and the gas bubble usually associated with the fundus of the stomach is absent (Graham *et al*., 1998). Eso-phagoscopy is also useful for initial diagnosis or confirmation of a tentative diagnosis.

As in our case, some of the patients dying or being euthanized before treatment can be initiated (Owen *et al*., 2005). However, there are rare reports describing surgical intervention and gastropexy for correction of this condition in cats or other felidae with remarkable results (Hettlich *et al*., 2010). Indeed, gastropexy in patient suffering from GEI is used to maintain the stomach in its normal position and to reduce the recurrence of intussusception. The outcome of the current case report insists on the importance of this surgical intervention and it shows that correction of GEI without fixation of intussusceptum should not be considered as an appropriate therapeutic protocol.

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