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Case Report

Diagnosis and Surgical Treatment of a Congenital Type-IV Hiatal Hernia in a German Shepherd Pup

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Abstract

Congenital para-oesophageal type-IV hiatal hernia was diagnosed in a 45-day old male, German Shepherd pup presented with the history of regurgitation since weaning. The diagnosis was confirmed by Barium oesophagram and at surgery. Surgical reduction of the hernia and successive plication of the oesophageal hiatus and left flank gastropexy restored normal function. By 75 days of age, the patient was asymptomatic. This article describes the diagnosis and treatment of a congenital para-oesophageal type-IV hiatal hernia.

Keywords: Barium Oesophagram, Congenital, Herniorrhaphy, Para-oesophageal hiatal hernia-Type-IV

Introduction

Hiatal hernia is herniation of the anterior stomach through the diaphragm and is a genetic disease of dogs. It is defined as any protrusion of abdominal contents through the oesophageal hiatus of the diaphragm in the presence of an intact phrenico-oesophageal ligamentinto the thoracic cavity (Pairolero, 1989). Hiatal herniation is assumed to develop where there is a laxity or abnormality in the phrenico-oesophageal ligament which allows for excessive movement of the oesophagus, gastro-oesophageal junction, gastric cardia and/or other abdominal organs (Prymak *et al*., 1989).

Most of cases of hiatal hernia were reported congenital (Guilford and Strombeck, 1996; Hunt, 2002) occurring secondary to incomplete fusion of the diaphragm during early embryonic development (Callan *et al*., 1993). Other congenital defects such as soft-palate defects (Dvir *et al*., 2003), umbilical hernia, inguinal hernia and chiari malformations have also been reported (Baig *et al*., 2006).

History

A 45-day old male German Shepherd pup was presented to the Veterinary Clinical Complex, Madras Veterinary College with the history of regurgitation of milk. The pup was weaned at 25 days of age and fed only on milk. The patient had a good appetite though occasional respiratory embarrassment post milk intake had been reported. An episode of 4-5 regurgitations per day without retching was reported on presentation. The pup had been dewormed at one month of age and not yet vaccinated.

Diagnosis and Surgical Management

The regurgitated matter was brownish and viscous suggestive of mild haemorrhage/extravasation of red blood cells from the gastric wall blood vessels. The pup on presentation was thin with a body condition score of 2.5/9, but alert and responsive to external stimuli with pink and moist visible mucous membranes, and stable vital signs. Thoracic auscultation had revealed normal heart sounds and no sign of respiratory distress on presentation.

Haemato-serological parameters were found within the normal range. A preliminary tentative diagnosis of megaoesophagus was concluded on the basis of a plain film radiographic study. Further,the study also elicited from lateromedial and ventro-dorsal radiographic views an oval soft tissue opacity in the midline of the caudo-dorsal thorax superimposed on the diaphragm, causing border effacement with the right crus. The opacity extendedcranially to the level of the heart base. A faint radiolucency of an irregular shape in the centre of the soft tissue mass, suggested that the opacity was a partially herniated gastric fundus containing rugal folds. The intra-abdominal gas shadow of the gastric fundus could not be identified in either of the views. The thoracic oesophagus was much distended and gas filled whereas it cranially simulated a megaoesophagus. The plain thoraco-abdominal radiographs (Fig. 1), revealed no evidence of a gas filled pylorus or stomach parts or any contours of spleen in the abdomen but segments of air-filled small intestinal loops were curiously found more cranio-dorsally in-continuum, in the apparent radio-anatomic space of the gastric fundus and pylorus just caudal to the left crura of diaphragm. The lung pattern was within normal limits with no evidence of aspiration pneumonia. All the aforesaid conclusions were also confirmed by a Barium swallow oesophagram (Fig. 2).

Figure 1: Pre-operative plain radiography

Figure 2: Pre-operative barium oesophagram left lateral

Ultrasonography of abdomen of the pup was done using Sonoscape Ultrasound equipment with a linear probe of 7.0 – 13.0 MHz frequency. The pup was placed on dorsal recumbency for a transabdominal sonogram with the linear probe placed just behind the xiphoid cartilage. The stomach couldn't be visualized within the abdominal cavity. Liver could be visualized as a hypoechoic structure just beneath the abdominal wall and the diaphragm was found just cranial to the liver as a hyperechoic curvilinear structure. Cranial to the diaphragm in the thoracic cavity a folded structure with hyperechoic wall and hypoechoic mucosal layer with a lumen was observed which was deduced as the herniated stomach. Upon the changing the view of axis from longitudinal to transverse it was found that the structure with lumen was extending into the abdominal cavity indicating the pylorus/ duodenum in-continuum to the herniated gastric tube (Fig. 3). A differential diagnosis for congenital hiatal hernia was made ruling out gastritis, persistent right aortic arch, diaphragmatic hernia, megaoesophagus and gastroesophageal intussusception. As the patient's condition was deteriorating following malnourishment, a surgical intervention was decided on. The pup weighed 2.0 kgpre-operatively. To compensate fluid loss due to regurgitation (24hours prior surgery), he was administeredwith IV fluids such as Lactated Ringer's Solution (20ml, tid, I.V., @ 2ml/20min,Baxter), I.V Colloid (10ml I.V.@ 6 drops per min, t.i.d.I.V, Voluven-Hydroxy ethyl starch 6%, Fresenius Kabi)- so that prolonged maintenance of interstitial volume could be expected, antibiotics (Cefotaxime sodium; C-Tax,Zuventus,@10mg/kg b.wt) and Pantoprazole sodium (@1mg/kg t.i.d., I.V, Zuventus) and food was withheld. The pup was premedicated with Diazepam (@0.2mg/kg I.V.; Lori-Neon Pharma), induced with Inj. Propofol (Neon-@5mg/kg slow I.V bolus) followed by maintenance with Isoflurane Post intubation with endotracheal tube of I.D.#4. Upon celiotomy, herniation of fundus and cardia of stomach and one-third of spleen (Fig. 4) was found thus, in consistence with the diagnosis of with type-IV congenital para-oesophageal hiatal hernia.

Figure 3: Pre-operative ultrasonography

Figure 4: Herniation of fundus, cardia of stomach and part of liver

Surgical reduction of the hernia followed by plication of the oesophageal hiatus and left flank gastropexy permitted restoration of normal function (Fig. 5). Brownish fluid (haemorrhagic) regurgitation persisted post 24hours surgery while the pup was put on I.V. fluids and Pantoprazole injections and oral feeding was withheld till 72 hours post-operatively. After which the pup was found asymptomatic and had recuperated with no respiratory distress.

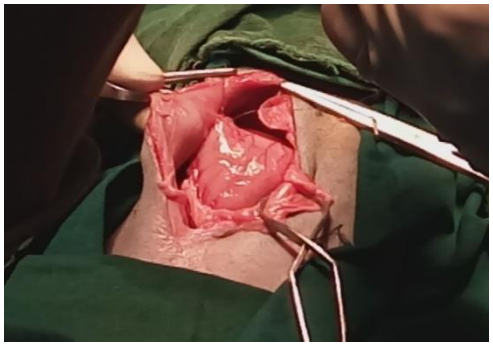

Figure 5: Left flank gastropexy

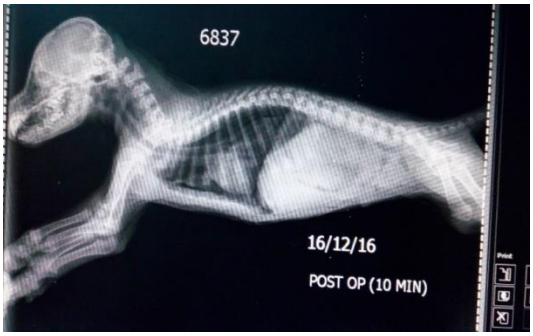

Figure 6. Post-operative plain radiogarphy

Post-operatively, elevated feeding of gruel diet was advised for a week and progression to semi-solids successively to manage the temporary megaoesophagus or cranial dilatation of the cervical oesophagus which had been precipitated by the herniation of gastrum. The signs of regurgitation waned away in a week and the pup was asymptomatic by 75 days of age. The post-operative plain radiographs of thorax and abdomen; lateral and ventro-

dorsal; elicited no abnormal soft tissue masses or shadows and were of normal study pattern (Fig. 6).

Discussion

Four types of hiatal hernias have been reported in the dogs. The Type I also called; sliding, axial or oesophageal hiatal hernias are the most commonly reported type in small animals which are characterised by axial displacement of distal part ofoesophagus, gastro-oesophageal junction and part of stomach through oesophageal hiatus intothoracic cavity. (Pratschke *et al.*, 1998; Ellison, 1987; Callan *et al*., 1993, Gaskell *et al.,* 1974; Lorinson and Bright, 1998). In type II that is, rolling or paraoesophageal hernias, a portion of the fundic region of the stomach herniates into the mediastinum alongside the thoracic oesophagus whereas the distal segment of the oesophagus and lower oesophageal sphincter remain in a fixed position. Type II hiatal hernia is reportedly less common in dogs (Miles *et al*.,1988; Kirby *et al.*,2005). In type III that is mixed hiatal hernia, characteristics of both types I and II are evident (Williams,1990). Type IV hernia is similar toa type III hernia complicated by the stomach or other abdominal viscera when located in the paraoesophageal sac (Baig *et al.*, 2006; Rahal *et al.*,2003). Differentiation between the types of hiatal hernia was indispensable because the underlying pathology and pathophysiology were different which necessitate different treatments and managemental methods for each condition (Williams, 1990; Rahal, 2003). Clinically affected dogs were reportedly often young, orhad a long history of vague gastrointestinal signs including regurgitation, coughing, anorexia, dyspnea and ptyalism (Lorinson and Bright, 1998) as a result of reflux esophagitis (Han, 2003). Secondary aspiration pneumonia wasoften reported (Callan, 1993), and in rare cases, rupture or strangulation of the short gastric vessels caused a haemorrhagic pleural effusion that precipitated severe acute dyspnoea.

Radiographic and CT imaging usually revealed soft tissue opacity in the caudodorsal thorax along with varying degrees of pleural effusion (Gordon *et al.*,2010). A barium meal swallow is usually required to highlight barium in the distended region anterior to the diaphragm. This was clearly elicited by Barium swallow radiographic studies in this patient. Fluoroscopy and oesophagoscopy were additional ancillary tests reported to assist in procuring a diagnosis (Lorinson and Bright, 1998). A definitive diagnosis usually required an exploratory celiotomy to confirm the presence of herniation of the gastric cardia, fundus, and body through the oesophageal hiatus and an adjacent, distinct defect in the diaphragm (Sivacolundhu *et al.*, 2002). A differential diagnosis would include gastritis, diaphragmatic hernia, megaoesophagus, gastroesophageal intussusceptions (McGill *et al.*, 2009) and myasthenia gravis. Temporary medical relief of symptoms might be achieved by drugs such as omeprazole or cimetidine, however, recurrence of symptoms was common (Guiot *et al*., 2008). In this case, pantoprazole intravenous medications were administered post-operatively @1mg/kg IV. tid for next 3 days along with parenteral IV fluids and oral feeding were withheld for 72 hours post operatively. In most cases, surgical correction of the hernia is required, usually involving surgical reduction of the hernia followed by plication of the oesophageal hiatus, oesophagopexy and left flank gastropexy. But in this case, only a surgical reduction of the hernia followed by plication of the oesophageal hiatus and left flank gastropexy was performed. A transient megaoesophagus might occur post-operatively but will be resolved spontaneously (Kirby *et al*., 2005) which was found and diagnosed concurrently in this case. So, elevated feeding out of a bowl, post 72 hours surgery for a month was advised. This case was a rare-Type IV para-oesophageal hiatal hernia wherein the anterior fundus and cardia of stomach along with a third of the spleen was found herniated into the para-oesophageal sac via hiatus oesophagi. This was evident in the ultrasonography, contrast radiographic study and on celiotomy. The megaoesophagus was presumed to be concurrence diagnosed along with the hiatal hernia. The megaoesophagus progressively resolved within few weeks markedly as the pup recovered uneventfully from the surgery. The patient reported asymptomatic, healthy and active at 12 months of age.

The case report aims at highlighting the need for a good radio-diagnosis and timely surgical intervention of gastrointestinal tract (GIT)-disorders in young pups and the significance of differential diagnosis for proper therapeutic measures in purview of such congenital GIT-issues in puppies.

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Conflict of Interests

There is no conflict of interest.

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