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Ultrasonographic diagnosis of chronic splenic torsion in a Great Dane bitch

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Abstract
Chronic splenic torsion is a less frequently observed condition, usually occurring as a sequelae to gastric dilatation or volvulus. The clinical signs are nonspecific like lethargy, anorexia, vomiting, anaemia, and mimic other systemic conditions. Ultrasonography with B-mode and colour doppler is crucial in diagnosis of the condition. A four years old female Great Dane was presented to small animal medicine referral unit of Veterinary Clinical Complex, VCRI Namakkal, with distended abdomen, anorexia and lethargy for 7 days prior to presentation. B-mode ultrasonography revealed splenomegaly with lacy/ reticulate echotexture and no blood flow in the splenic vein was noticed on colour doppler. Laparotomy confirmed torsion and subsequently splenectomy was performed. The animal made an uneventful recovery.

Keywords: Gastric dilatation, splenic torsion, splenectomy

Introduction
Splenic torsions are generally associated with gastric dilatation or gastric dilation and volvulus. In deep chested animals gastric dilation followed by volvulus is a critical condition requiring emergency intervention and surgery. Acute splenic torsion is usually found secondary to GDV. Whereas in cases of GD that resolve without volvulus the spleen is remains twisted and unable to get back to normal position unlike the stomach. Signs of chronic splenic torsion as exhibited after a week to after few months and are non-specific, therefore leading to possible misdiagnosis. Clinical signs include lethargy, anorexia and anaemia without any significant abdominal discomfort. Diagnosis is made based on ultrasonographic findings along with other imaging techniques like radiography and computed tomography. Lacy or reticulate pattern of splenic parenchyma with absence of blood flow in splenic blood vessels as observed in colour doppler are strong indications of splenic torsion. Occasionally, the abdominal effusions and abdominal adhesions are also recorded by ultrasonography. Prognosis of chronic splenic torsion is good after splenectomy is performed.

Case history and clinical observation
A four years old female Great Dane dog was presented with history of abdominal distension, anorexia and lethargy in the past three days. All the vital parameters were within the normal range. Pale mucous membranes, increased capillary refill time, lymphadenopathy, and tense distended abdomen (Fig. 1) were recorded on physical examination. Significant leucocytosis, neutrophilia and mild anaemia (Table) were observed in haematological evaluation. Serum biochemical analysis revealed mildly elevated serum alkaline phosphatase and elevated serum creatinine (Table).

Fig 1: Distended abdomen

Table 1: Serum biochemical analysis revealed mildly elevated serum alkaline phosphatase and elevated serum creatinine

Parameters		Day of diagnosis	2 weeks after splenectomy	Reference
Hemoglobin (g/dL)		7.1	10.3	12-19
Packed cell volume (%)		24	32	37-57
RBC count (x10^6/µl)		3.7	5.4	5-9
WBC count (x10^3/µl)		50.24	20.3	5-15
Differential leucocyte count	Neutrophils	82	73	60-75
	Lymphocytes	15	24	18-21
	Monocytes	03	02	0-9
	Eosinophils	00	01	2-10
Platelet count (x10^5/µl)		2.22	2.51	1.6-5.1
Alanine amino transferase (u/l)		38	43	21-102
Serum alkaline phosphatase (u/l)		234	184	20 – 156
Total protein (mg/dl)		7.3	4.2	2.1 – 3.9
Albumin (mg/dl)		2.9	4.5	5.4 – 7.9
BUN (mg/dl)		60	21	10 – 28
Creatinine (mg/dl)		3.2	1.0	0.8 – 1.5

In ultrasonography, splenic enlargement with rounded borders and hypoechoic parenchyma with lacy/ reticular pattern were recorded. No signs of blood flow was evident in colour doppler sonography (Fig.2). Moderate abdominal effusions with cellularity was observed. The ultrasonographic findings were indicative towards splenic torsion or splenic thrombus leading to splenic infraction. Upon further enquiry the owner confirmed a history of abdominal distension with discomfort about a month back, which had resolved after treatment by a local veterinarian. With this information and the ultrasonographic findings the condition was diagnosed tentatively as chronic splenic torsion secondary to spontaneous gastric dilatation.

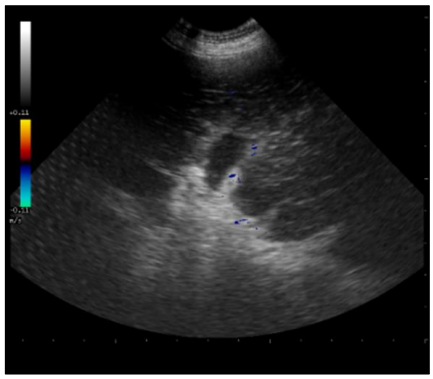

Fig 2: Hypoechoic splenic parenchyma with no blood flow in colour doppler ultrasonography

Treatment

As the animal was stable, laparotomy was performed on the same day, and splenic torsion with mesenteric adhesions was confirmed. Splenectomy (Fig. 3) followed by gastropexy was performed. The excised spleen was 2kgs in weight and had multiple gross necrotic foci. Post-surgically haematinics and immunity booster syrups were administered, along with antibiotics and analgesics. Silymarin based liver supplements were advised in addition. The animals showed remarkable recovery post-surgery. Blood tests performed 14 days after surgery showed improvement in RBC and haemoglobin count and decrease in WBC count (Table).

Discussion

The head of spleen is seen between the gastric fundus and left kidney, at the left hemiabdomen, held loosely in position by the gastrosplenic ligament, while the tail varies in position depending on gastric filling. The parenchyma is homogeneous and slightly hyperechoic than the liver, kidney cortex and mesenteric fat. The capsule is thin and hyperechoic. (Hecht and Mai, 2015) [1].

Splenic torsion is the rotation of spleen around the gastrosplenic or phrenosplenic ligament. It has been hypothesized that primary splenic torsions are preceded by spontaneously resolving GD or partial gastric torsion, particulary in deep-chested breeds like Great Dane and German shepherd (Weber, 2000) [2]. While the dilatation resolves spontaneously or with emergency medical intervention, the spleen may remain twisted, as was suspected in the present case. Gradually, compression of splenic vein, causes congestion and later, infarction and necrosis of the splenic parenchyma occurs. (Salgueiro, 2017) [3].

Animals with chronic splenic torsion have nonspecific signs like anorexia, anaemia, lethargy, vomiting and abdominal distention with mild to no abdominal discomfort, making diagnosis challenging. Chronic inflammation and sequestration within the spleen causes anaemia, thrombocytopenia and leucocytosis. Elevated liver enzymes, presumably due to systemic inflammation or circulatory compromise are common biochemical findings. (Hayes 2012) [4]. In this case anaemia and leucocytosis with elevated SAP, BUN and creatinine was significant.

Abdominal palpation and radiography may suggest splenomegaly but are not conclusive for torsion. In B mode ultrasonography splenic parenchyma is hypoechoic in appearance with small hyperechoic linear echoes separating large anechoic areas referred to as lacy or reticulate pattern. This represents, prominent intraparenchymal veins due to vascular congestion. (Salgueiro, 2017) [3]. Hyperechoic mesentery seen between the engorged vein and splenic parenchyma, forms a hilar perivenous hyperechoic triangle suggestive of splenic torsion. (Mai, 2006) [5]. Peritoneal effusion is observed in a certain cases, as was observed in this case.

Exploratory laparotomy should be performed to confirm splenic torsion. Total splenectomy after stabilising with adequate fluid therapy is the treatment of choice. There is an increased risk of vector-borne diseases, including infection with *Babesia* spp, Mycoplasma *spp.* and *Ehrlichia canis* post splenectomy (Bestwick, 2022) [6]. Therefore it is essential to advice haematinics and immune boosters as adjuvant therapy along with post-surgical antibiotics and analgesic.

Fig 3: Enlarged spleen exteriorised by laparotomy

Conclusion

Ultrasonography, particularly colour flow Doppler sonography are important to accurately diagnose splenic torsions. Splenectomy needs to be performed promptly to ensure good prognosis.

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