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## Surgical management of gastric dilatation and volvulus (GDV) in a German shepherd dog

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### Abstract

A four year old female German Shepherd dog was presented to University veterinary hospital, Kokkalai with clinical signs of acute bloating, anorexia, hyper salivation, unproductive retching and respiratory difficulty. On radiographic evaluation, the condition was diagnosed as gastric dilatation and volvulus (GDV). Managed the condition surgically with incisional gastropexy. Animal had an uneventful recovery.

**Keywords:** Gastric dilatation and volvulus (GDV), CRP, incisional gastropexy

### Introduction

Gastric dilatation and volvulus (GDV) is an emergency condition that causes significant mortality rates in canines (Mackenzie *et al.*, 2010) [7]. Among the breeds, the German shepherd dogs are the commonly affected with GDV. According to Bell (2014) [1], large deep chested breeds of dogs are more prone to GDV. Gastric dilatation has been diagnosed in dogs ranging from 10 months to 14 years of age. Since it causes accumulation of air in the stomach and a rapid development of pressure inside the stomach (Mazzaferro and Monnet, 2023) [8], resultant gastric mal-positioning, compression of the diaphragm and caudal vena cava causes compromised respiratory and cardiovascular function and leads to shock. The specific etiology of GDV is not completely understood (Neil *et al.*, 2017) [10]. The management of GDV involves initial medical stabilisation, followed by timely surgical decompression and realignment of the stomach to its usual anatomical position. To prevent future episodes, gastropexy is performed to firmly attach the stomach to the wall of the body. In the present case, the timely diagnosis and management of the condition gave good result.

### Case history and clinical observations

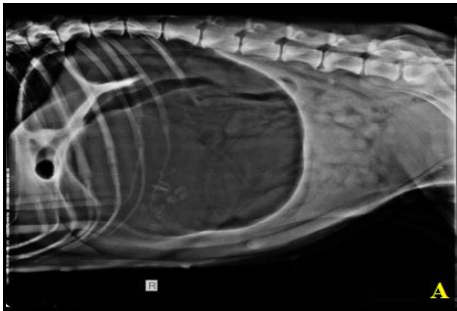
A four year old female German shepherd dog was presented to University Veterinary Hospital, Kokkalai, with the history of acute abdomen, anorexia and respiratory distress for the past 12 hours. On clinical examination temperature was normal but the animal was dull and was with congested conjunctival mucous membrane, hyper-salivation, tachypnoea and tachycardia. On abdominal palpation animal showed discomfort and on percussion tympanic sounds were evident. On haematological evaluation (Table no.1) all the parameters were in normal range except for leukocytosis. All the serum biochemical parameters were also in normal range. Radiographic evaluation (Fig no.1A &B) of right lateral abdomen showed double bubble appearance confirming the diagnosis as GDV and prepared the case for emergency surgical management. Attempts were made to relieve gas from the stomach using a lubricated oro-gastric tube without suction and emergency surgical intervention was decided to save the patient.

**Table 1:** Results of hematological evaluation

Sl. No.	Parameter	Value
1	RBC ( $10^6/\mu\text{L}$ )	5.91
2	WBC ( $10^3/\mu\text{L}$ )	28.08
3	HGB (g/dL)	13.9
4	HCT (%)	40
5	Platelet ( $10^3/\mu\text{L}$ )	282

**Table 2:** Results of serum biochemistry

Sl. No.	Parameter	Value
1	Creatinine	0.726 mg/dL
2	BUN	9.26 mg/dL
3	Total protein	7.24g/dL
4	C-reactive protein	5.73 mg/dL



**Fig 1A:** Right lateral abdomen showing double bubble appearance



**Fig 1B:** Vento-dorsal view of abdomen

**Treatment and discussion**

The ventral abdomen of the animal was prepared for aseptic surgery. The anaesthesia was induced with intravenous administration of a combination of inj. butorphanol at the dose rate of 0.2mg/kg body weight, inj. midazolam at the dose rate of 0.2 mg/kg body weight and inj. propofol at the dose rate of 2.0 mg/kg body weight. General anaesthesia was maintained by using isoflurane 2% in 100% oxygen. The dog was positioned in dorsal recumbency. Made a linear incision from xiphoid to umbilicus through the ventral midline and was further extended caudally. The stomach was found to be rotated and severe congestion of serosal blood vessels were also noticed. Along with GDV, the spleen was mal-positioned to right side and discolouration was also evident (Fig. 2A).

Dilated stomach was decompressed through gastrotomy and around 500 ml of fluid and food particles were removed through suction and derotated to normal anatomical position (Fig. 2B) along with Spleen. Permanent incisional gastropexy was performed. An incision was made in the sero-muscular layer of the gastric wall, parallel to the long axis of the

stomach between the lesser and greater curvatures at the level of the pyloric antrum (Fig. 3A). An incision of equal length was made through the peritoneum and left transvers abdominis muscle parallel to the muscle fiber direction. The edges of the gastric incision was sutured into the abdominal wall incision in a simple continuous pattern with chromic cat gut size- 1/0. After the surgical procedure abdominal incision was closed in routine manner.



**Fig 2A:** Discoloured spleen



**Fig 2B:** Derotated stomach and spleen to normal position



**Fig 3A:** Gastropexy- sutured stomach to abdominal wall



**Fig 3B:** Animal 3rd day after surgery

Post-operatively, the dog was maintained on parenteral nutrition along with antibiotic cover using ceftriaxone at the dose rate of 20 mg/kg body weight and pantoprazole at the dose rate of 1.0 mg/kg body weight intravenously for five days and inj. meloxicam at the dose rate of 0.1 mg /kg body weight intramuscularly for three days. Sutures were removed

on 10<sup>th</sup> post-operative day. Animal had an uneventful recovery (Fig. 3B).

Potential risk factors for GDV beyond those related to breeding, encompassing dietary aspects, such as the practice of consuming a substantial amount of food during each meal, small particle size of food (Theyse *et al.*, 1998) <sup>[13]</sup>, feeding a single food type and the occurrence of aerophagia (Elwood, 1998) <sup>[3]</sup>. Sharp and Rozanski, (2014) <sup>[11]</sup> stated that GDV is linked to significant alterations in cardiovascular, respiratory, renal and gastrointestinal physiology and it result in the occurrence of systemic inflammatory response syndrome (SIRS) and development of multiple organ dysfunction syndrome (MODS). Failure of timely intervention may result in progression of shock and ultimately to the death of the patient.

Numerous factors which predisposes to the present condition included, advanced age, neutered male dogs, a familial history of GDV in a first-degree relative, a temperament characterised by aggression or fearfulness, higher ratio of thoracic depth to width, reduced frequency of meals per day, fast eating habits, smaller food particle sizes, an elongated hepato-gastric ligament, the use of elevated feeding bowls, and engaging in exercise or experiencing stress before or after meals (Glickman *et al.*, 2000) <sup>[5]</sup>. Early diagnosis and surgical correction is the only way to reduce mortality rates. Increased levels of C-reactive protein (CRP) are often linked to acute infections and should be viewed as supplementary information for diagnosing infections (Sproston *et al.*, 2018) <sup>[12]</sup>. In the present case study the C-Reactive protein was in the normal physiological range indicative of good prognosis. Funkquist (1979) <sup>[4]</sup> suggested radiographic imaging aids in distinguishing between gastric dilation and gastric dilation-volvulus syndrome, where in double bubble appearance of stomach could be seen on right lateral recumbent position. These two bubbles are formed due to the buildup of air in the pylorus and the fundus. In the initial hematology findings, a stress leukogram could be seen, characterized by an increase in leukocyte count, decreased lymphocyte and thrombocyte and packed cell volume (Glickman *et al.*, 1998) <sup>[6]</sup>. The surgical approach for treating GDV involved decompressing and derotating the stomach, as well as removing any damaged tissue. Subsequently, a gastropexy was conducted to establish an adhesion between the pyloric antrum and the right lateral abdominal wall, in order to prevent recurrence. Failure to perform gastropexy after gastric derotation in dogs has been linked to a potential recurrence risk as high as 80% (Benitez *et al.*, 2013) <sup>[2]</sup>.

### Conclusion

Successful management of gastric dilatation and volvulus in a four year old German shepherded dog was done by gastric decompression and derotation of spleen and stomach to normal anatomic position. Gastropexy was done in order to prevent the occurrence of the condition.

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### Conflict of Interest

The authors declare that they have no conflict of interest.

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Not available

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