CASE REPORT

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# Gastric dilatation and mesenteroaxial volvulus in a two-year-old German Shepherd

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**Abstract**

A 2-year-old male German Shepherd with a complaint of distended abdomen with gas, and difficulty in breathing was presented but died just before any intervention was given. Postmortem examination revealed sunken eye balls (an indication of dehydration). The heart was globous and the lumen of the left ventricle was distended with clotted blood. The gastroesophageal junction and the pyloric part of the duodenum were twisted to over 180° along the mesentery axis. The stomach was markedly distended and the serosa of the gastric mucosa was hyperemic. The mesenteric and splenic blood vessels were engorged with blood. The gastric content was fluidy and gas was expelled when the stomach was opened. The spleen was markedly enlarged (over 2 kg), appearing "C" shaped, and oozed blood when cut. The whole of the intestine was empty. These findings suggest urgent intervention should be given to dogs with pathologic distended abdomen and difficulty in breathing to reduce chances of mortality.

*Keywords*: Dog, Gastric dilatation, German Shepherd, Mesentaroaxial, Postmortem, Volvulus

## Introduction

Gastric dilatation with volvulus is a rapidly progressive condition in dog that usually requires urgent medical attention because it is life-threatening consequently leading to cardiovascular collapse (Hammer & Grand, 2019). Gastric volvulus is described as an aberrant rotation of the stomach to over 180 degrees and it is of two types; organoaxial and mesenteroaxial gastric volvulus (Paravicini *et al.*, 2020). In mesenteroaxial gastric volvulus (Figure I), the pylorus moves ventrally and towards the left body wall, while in organoaxial gastric volvulus (Figure I) the stomach rotates around the long axis that connects the gastroesophageal junction and the pylorus leading to dilation (Gastric Dilatation and Volvulus). The gastric antrum turns in the opposite direction from the stomach fundus. About 60% of

occurrences of this form of gastric volvulus has been recorded (Paravicini *et al.,* 2020).

Several risk factors have been linked to the condition, including breed-specific predispositions in breeds such as Great Danes, German Shepherds, and Standard Poodles. Other risk factors of gastric volvulus are, advancing age, increased thoracic depth-to-width ratio, a thin or lean body condition, and male dogs have been shown to have higher risk of the condition. Purebred dogs, large- and giant-breed dogs are also at higher risk (Glickman *et al*., 2000). Gastric dilatation and volvulus are frequently present in association with splenic torsion. It has been shown that stomach dilatation, which traps fluid or gas, occurs before volvulus (Broome & Walsh, 2003; Hughes *et al*., 2020). Chronic gastric volvulus is subtle with unspecific clinical manifestations

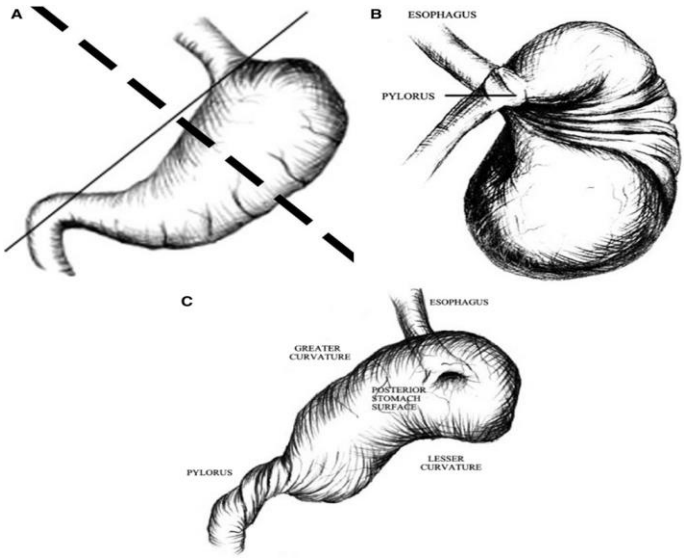


**Figure 1:** Diagrammatic illustration of gastric volvulus (Paravicini *et al.,* 2020)

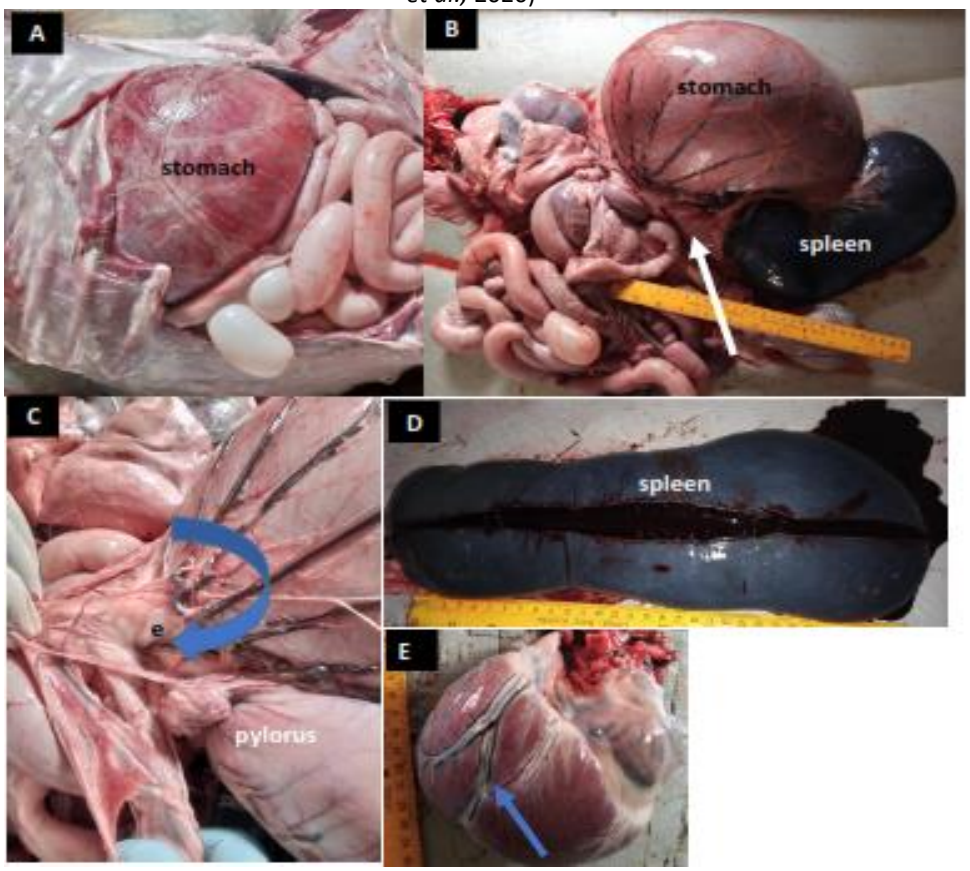


**Plate I**: Gross lesions from German Shepherd showing: **A** distended stomach with hyperemic serosa, **B:** visceral plug showing the twisted oesophagus and the duodenum (white arrow) along the mesenteric axis and the markedly congested and enlarged "C" shaped spleen. **C**. engorge gastric vessels, twisting of the eosophagus (e) and the outlet of the pylorus. **D**., massively enlarged spleen oozing blood from the cut surface **E**. Globus heart with congested coronary blood vessels (arrow)

and may not be diagnosed early until an obvious loss of weight is noticed and this is associated with high mortality (Bhatia *et al*., 2010). This report is to sensitized Veterinarians on the need to consider GDV as an emergency that require urgent intervention.

**Case Presentation**

A 2-year-old male German Shepherd was presented to Veterinary Teaching Hospital, University of Jos on 29th September, 2023 with complaint of distended abdomen and difficulty in breathing. The client also reported that a German Shepherd from one of the kennels in Lagos where this dog came from, was diagnosed of gastric volvulus but was corrected by a non-evasive method. Clinical examination revealed the abdomen was markedly distended with gas. Abdominal ultrasonography was recommended but the dog died shortly thereafter.

The carcass was submitted to the Pathology Unit of the Veterinary Teaching Hospital for post-mortem examination. The carcass was fresh and moderately emaciated. The eyeballs were sunken (an indication of dehydration). The heart was globous and the lumen of the left ventricle was distended with clotted blood (Plate IE). The gastroesophageal junction and the pyloric part of the duodenum were twisted to over 180$^{o}$ along the mesentery axis (Plate IC), consistent with mesenteroaxial GDV. The stomach was markedly distended and the serosa of the gastric mucosa was hyperemic. The mesenteric and splenic blood vessels were engorged with blood. The gastric content was fluidic and gas was expelled when the stomach was opened. The spleen was markedly enlarged (over 2 kg), appearing "C" shaped, and oozed blood when cut. The whole of the intestine was empty.

**Discussion**

Gastric dilatation and volvulus (GDV) cases have become very important in veterinary practice due to its poor prognosis in the absence of urgent medical intervention. The emaciation and dehydration noted at post-mortem examination could be ascribed to the dilatation and volvulus which could have led to inappetence and subsequently dehydration. Animals with GDV normally stay off feed due to the abdominal discomfort as seen in this case. The distended stomach observed was largely due to gas accumulation, which affect breathing and or the cardiovascular system (Broome & Walsh, 2003). Because the major intra-abdominal veins are compressed by the distended stomach, there is a decrease in overall venous return to the heart. The distended stomach observed was largely due to gas accumulation, which affect breathing and or the cardiovascular system leading to circulatory shock (Broome & Walsh, 2003). Since the major intra-abdominal veins are compressed by the distended stomach, there is a decrease in overall venous return to the heart. Other common causes of circulatory shock include acidosis that arise due to respiratory compensation with the accumulation of hydrochloric acid in the stomach, myocardial ischaemia, reduced cardiac output, and decreased venous return (Darko *et al*., 2016; Ruthra *et al*., 2017). Other predisposing factors associated with GDV include feeding dogs with large quantities of food at a time (Bhatia *et al*., 2010; Broome & Walsh, 2003) and this is likely the scenario surrounding this case as the client reported feeding the dog once a day. In another related study by Raghavan *et al.* (2004) it was reported that, dogs fed a lesser ration of food twice daily have low risk of GDV, compared to those provided a bigger volume of food once per day. The findings of an enlarged C-shaped spleen and the engorged mesenteric blood vessels in this case were similar to those reported by Castro *et al*. (2013), Ruthra *et al*. (2017) who displayed a visibly enlarged, V-shaped spleen with a sliced surface indicated congestion. They reported that the V-shaped spleen was formed by the gastrosplenic ligament connecting the spleen to the stomach. However, the spleen in this case appeared "C" and it could likely be due to the magnitude of twisting. As observed by other authors (Bhatia *et al*., 2010, Broome & Walsh, 2011, Ruthra *et al*., 2017), larger breeds of dogs like German Shepherds are predisposed to GDV. Based on the findings reported in this case, large breeds of dogs that are usually restless should not be used for mating immediately following feeding. Feeding large breeds of dogs once daily with large volumes of feed should be discouraged.

In conclusion, this case suggests how important clinicians should consider gastric dilatation and volvulus due to their life-threatening nature, and any waste of time in management will deteriorate the health of the animal and could affect its survival. Veterinarians should be conversant with the rotation of the stomach and adequate diagnostic tool be used to confirm the condition.

**Conflict of Interest**

The authors declare that there is no conflict of interest.

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