



## Gastric Dilatation-Volvulus in a 2-Month-Old Puppy: A Case Report

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### ABSTRACT

A 2-month-old intact female crossbreed puppy presented with acute abdominal distension, tympany, and respiratory distress shortly after a meal. Abdominal radiographs revealed a “Popeye arm” sign, consistent with gastric dilatation-volvulus (GDV). Emergency stabilization, gastric decompression, surgical derotation, and gastropexy were performed. This case emphasizes the importance of including GDV in the differential diagnosis of young, round-chested dogs presenting with compatible clinical signs. Prompt diagnosis and surgical intervention are critical for favorable outcomes.

**Key words:** Gastric dilatation volvulus; Management; Puppy; Radiography; Surgical treatment

### INTRODUCTION

Gastric dilatation-volvulus (GDV) is a rapidly progressive, life-threatening condition characterized by gas accumulation in the stomach followed by rotation along its mesenteric axis, leading to gastric outflow obstruction, reduced venous return, gastric ischemia and potential systemic shock. In dogs, the rotation commonly occurs along the mesenteroaxial axis (Ettinger et al. 2024), whereas in humans, it typically follows an organoaxial pattern (Chau and Dufel 2007; Peterson et al. 2009).

Although the precise etiology of GDV remains unclear, multiple risk factors have been identified, including large or giant breed status, deep-chested conformation, advancing age, feeding practices (e.g., once-daily feeding, rapid ingestion, dry food), postprandial exercise, stress-prone temperament, a history of splenectomy and familial predisposition (Glickman et al. 2000a; 2000b, Song et al. 2020; Rosselli 2022). While GDV is most commonly observed in older, purebred dogs, it can also occur in mixed breeds. Olimpo et al. (2025) reported that 23% of GDV cases (30 of 130 dogs) were crossbred. However, GDV in very young puppies remains exceedingly rare and limited data exist documenting such cases (Hammer and Grand 2019; Border et al. 2024). This report presents an unusual instance of GDV in a 2-month-old crossbreed puppy.

### Patient presentation

A 2-month-old, intact female crossbreed puppy (6.4kg) was presented to the Emergency Unit of Kasetsart University Veterinary Teaching Hospital (KUVTH), Kamphaeng Saen campus, with a history of acute abdominal enlargement following a meal. The dog, primarily outdoor living and the only pet in the household, was fed once daily with home-cooked rice and chicken. No history of trauma or previous gastrointestinal issues was reported.

### Physical examination

On physical examination, the puppy appeared depressed, with a severely distended tympanic abdomen and signs of respiratory distress. Mucous membranes were pink and moist, with a capillary refill time of 1-2 seconds. The body temperature was 38.1°C. Abdominal-focused assessment with sonography for trauma (AFAST) revealed a markedly dilated stomach filled with fluid and gas but no free peritoneal fluid. Radiographic examination showed a classic “Popeye arm” sign, dorsal displacement of the pylorus, and ventral positioning of the fundus consistent with GDV (Fig. 1).

### Blood profiles and treatment

Emergency stabilization included fluid therapy and gastric decompression via percutaneous trocarization, which released only a minimal amount of gas. Hematology revealed leukocytosis with neutrophilia and monocytosis

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**Fig. 1:** Abdominal radiograph demonstrates gastric dilatation secondary to gas accumulation. Ventrodorsal (A), Right lateral (B) position

(Table 1). Serum biochemistry was primarily within reference ranges, except for mild hypoalbuminemia and elevated alkaline phosphatase (Table 1). Blood pressure was elevated at 170mmHg and blood glucose was 153mg/dL.

**Table 1:** Signalment, hematological, and serum biochemical parameters

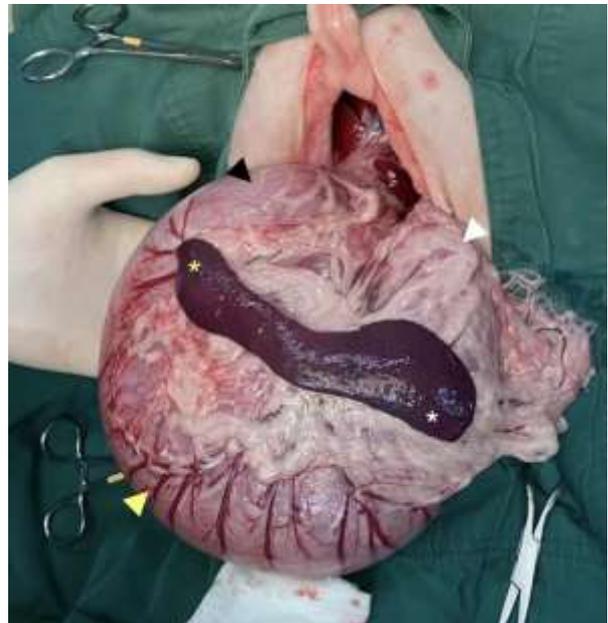
Parameter	Unit	First Visit	Postoperative Day 11	Reference value
Age		2-month-old		-
Gender		Female		-
Breed		crossbreed		-
WBC	(cells/uL)	21,670	17.78	5,000–14,100
RBC	(x10 <sup>6</sup> /uL)	5.38	5.38	4.95 – 7.87
HGB	(gm/dL)	11.6	9.7	11.9 – 18.9
PCV	(%)	35.1	29.7	35-57
Platelets	(x10 <sup>3</sup> /uL)	461	518	211 - 621
Segmented neutrophil	(cells/uL)	18202.8	12214.86	3,000–12,000
Lymphocyte	(cells/uL)	1300.2	3591.56	1,000 – 5,000
Monocyte	(cells/uL)	2167	1689.1	100 – 1,000
Eosinophil	(cells/uL)	0	248.92	100 – 1,250
Basophil	(cells/uL)	0	35.56	Rare
BUN	(mg%)	10.2	-	<34
Creatinine	(mg%)	0.23	-	<1.8
ALP	(U/L)	305	276	<108
ALT	(U/L)	36	41	<74
Total Protein	(g/dL)	4.83	3.66	5.4-7.5
Albumin	(g/dL)	2.27	1.94	2.3-3.2

Anesthesia was induced with IV fentanyl (3.9mcg/kg), followed by a slow IV infusion of propofol (3.1mg/kg). Isoflurane inhalation anesthesia was used to maintain surgical depth. Attempted orogastric intubation failed, prompting immediate surgical intervention.

The patient was placed in dorsal recumbency, and the surgical field (mid-thorax to pubis) was prepared using a chlorhexidine-based antiseptic. Exploratory laparotomy revealed a clockwise-rotated, gas-distended stomach. Gas was aspirated using an 18G needle attached to suction. Derotation of the stomach allowed passage of an orogastric tube to evacuate gastric contents. The stomach wall, spleen, and surrounding vasculature appeared viable with adequate perfusion (Fig. 2). An incisional gastropexy was performed by suturing the pyloric antrum to the right abdominal wall using 3-0 polydioxanone in a layered closure.

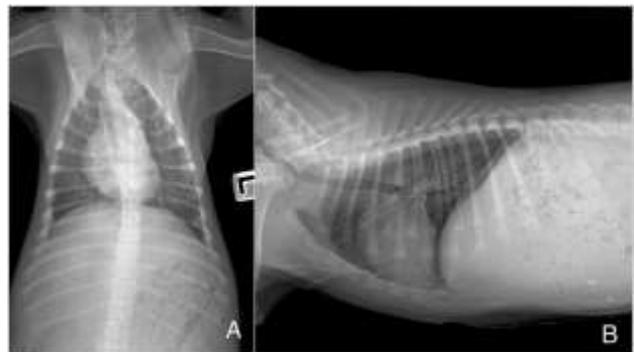
Supportive care included IV fluids, Amoxicillin-Clavulanic acid (20mg/kg IV every 8 hours), fentanyl (4mg/kg IV every 12 hours), carprofen (4.4 mg/kg every 24

hours), and supplemental oxygen due to concerns for aspiration pneumonia. By postoperative day 1, the patient was alert and eating soft food, and the abdominal ultrasound showed no free peritoneal fluid. A moderate amount of fluid was seen in the stomach. Electrocardiography revealed no arrhythmias, and bloodwork indicated mild anemia (PCV 32%, TP 5.6g/dL). Oxygen therapy was discontinued due to clinical improvement and financial constraints.



**Fig. 2:** Intraoperative photograph. Demonstrates gastric distension with abnormal rotation. Black arrow head; stomach fundus. White arrow head; stomach pylorus. Yellow arrow head; greater curvature of the stomach. Yellow star; head of spleen. White star; tail of spleen

On postoperative day 2, the puppy remained stable and was discharged at the owner’s request. At the 7-day follow-up, the dog exhibited normal behavior and appetite, with no respiratory abnormalities, and mild inflammation was observed at the surgical site. On postoperative day 11, the dog was alert, and all sutures were removed. The radiograph revealed food in the stomach with no sign of malposition or volvulus (Fig. 3). Blood work showed mild leukocytosis, mild anemia, elevated alkaline phosphatase, and hypoalbuminemia (Table 1).



**Fig. 3:** Radiograph at postoperative day 11 demonstrates the normal position of the stomach containing food. Ventrodorsal (A), Right lateral (B) position.

## DISCUSSION

The vast majority of GDV cases occur in older, large breed dogs, with a median age of 8 years and a median weight of 38.8kg (range 3.7- 87.0kg) (O'Neill et al. 2017). The current case involved a 2-month-old, 6.4kg crossbreed puppy, an extremely uncommon presentation. This suggests that factors beyond age and breed conformation, such as feeding practices (once-daily feeding and rapid ingestion) or postprandial excitement, may precipitate GDV, even in young dogs.

Although cardiac arrhythmias, gastric necrosis, and prolonged time to surgery have been associated with poorer outcomes, this patient exhibited none of these indicators (Mooney et al. 2014; Ettinger et al. 2024). Plasma lactate measurement, a useful prognostic tool, was unavailable in this case. Nevertheless, early surgical intervention, along with the absence of necrosis and arrhythmias, may have contributed to the favorable outcome.

Gastropexy, though effective in preventing the recurrence of GDV, carries potential risks, particularly in growing animals. Previous reports have linked prophylactic gastropexy in juvenile dogs to postoperative complications such as gastric malposition and chronic vomiting, possibly due to rapid skeletal and organ growth. Although this puppy's estimated adult weight (approximately 25kg) is less than that of large breeds, growth-related complications remain a concern. Continued monitoring is advised to detect signs of delayed gastric emptying, nausea, or regurgitation.

Gastropexy is a procedure that permanently adheres the gastric wall to the abdominal wall. The most common indications are GDV and hiatal herniation (Radlinsky and Fossum 2018). It was performed in puppies for the management of acute gastro-esophageal intussusception (Greenfield et al. 1997). However, the long-term effects are unknown. A previous study showed that prophylactic incisional gastropexy in a 6-month-old Great Dane can cause gastric malposition and subsequent partial gastric outflow tract obstruction, resulting in chronic vomiting 14 months later (Sutton et al. 2019). The authors suggested that the rapid growth during that period (increasing from 32 to 56kg) may have worsened the abnormal positioning of the gastric axis. In this crossbreed round-chested dog, complications from gastropexy at a young age are still possible, even if a predicted adult weight is approximately 25kg. Therefore, long-term follow-up is recommended to observe signs of nausea and vomiting that may be caused by delayed gastric emptying time (Hall et al. 1992).

## Conclusion

GDV should be considered in the differential diagnosis of young dogs presenting with acute abdominal distention, especially in the presence of compatible radiographic signs. While GDV is typically associated with older, large-breed, deep-chested dogs, it may also occur in young, smaller-breed, or crossbreed puppies. Prompt diagnosis, stabilization, surgical derotation, and gastropexy remain the cornerstone of successful treatment. Long-term follow-up ( $\geq 6$  months) is recommended in juvenile patients to assess for potential postoperative complications related to growth and development.

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