

Gastric dilatation volvulus

Adapted from an article by Professor Eric Monnet, DVM, PhD, FAHA, DACVS, DECVS

Gastric dilatation volvulus syndrome is an acute medical and surgical condition due to several pathophysiological effects occurring secondary to gastric distension and mal-positioning. It occurs most commonly in large, deep chested dogs.

Aerophagia is the most likely source of gas accumulation. Bacterial fermentation of carbohydrate, gas production from acid-bicarbonate reactions may contribute to gas accumulation. The fluid component of gastric contents is a combination of ingesta, gastric secretions, and transudate from venous obstruction.

Acute gastric dilatation volvulus has been recognized for many years in dogs; however, its exact cause is still not clearly understood – only risk factors have been identified. Decreased stomach motility and delayed gastric emptying have been mentioned as a risk factor but never been demonstrated. Diet, the amount of food ingested, the frequency of feeding, behaviour (fast eating style), exercise and stress after a meal are contributing factors for the development of gastric dilatation volvulus. Large breed dogs, dogs with large thoracic depth-to-width ratio, underweight dogs and older animals are at higher risk to develop a gastric dilatation volvulus.

A clockwise or a counter-clockwise rotation of the stomach is possible. The most common rotation is clockwise. Displacement of the pylorus occurs from right toward ventral midline, passing over the gastric fundus and body to an area along the left abdominal wall close to the lower oesophageal sphincter. At the same time the fundus goes in a ventral direction toward the right abdominal wall. Because of the attachment of the omentum to the greater curvature of the stomach, the omentum covers the stomach after volvulus. The displacement of the spleen may vary from the degree of volvulus. The spleen is usually engorged or can undergo torsion on its own pedicle. Thrombosis of the splenic artery can also occur. Most commonly 180° degree of rotation is seen but 360° rotation is possible. Counter-clockwise rotation is not common. In this type of rotation, the pylorus and antrum displace dorsally along the right abdominal wall. Fundus and body of the stomach go through minimal ventral displacement, and the omentum does not cover the stomach. The degree of rotation is limited to 90°.

Gastric dilatation causes compression of the caudal vena cava and portal vein. Sequestration of blood in the spleen, kidney, and gastrointestinal tract occurs. Compression of the caudal vena cava and portal vein induces a decreased venous return resulting in hypovolemic shock. Hypotension and venous stasis result in cellular hypoxia and anaerobic metabolism. Focal myocardial ischemia and hypoxia will reduce contractility and induce arrhythmias. Vascular stasis, hypoxia and acidosis can predispose to the development of disseminated intravascular coagulopathy. Respiratory dysfunction results from decreased pulmonary compliance and mechanical restriction of diaphragmatic movement by a dilated stomach. Tissue hypoxia results from decreased cardiac output and respiratory impairment. Increased gastric intraluminal pressure, portal hypertension, and venous stasis with thrombosis result in gastric mucosa stasis, hypoxia, and oedema. Gastric wall necrosis can then develop in the fundus along the greater curvature. Vascular wall disruption results in mucosal haemorrhage.