Prophylactic Gastropexy for Prevention of Gastric Dilatation Volvulus in Dogs

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Gastric dilatation volvulus (GDV) is a life-threatening disease that predominantly occurs in large and giant breed dogs. GDV is characterized by severe gastric distention, displacement of the stomach, and severe alterations of the gastrointestinal and cardiopulmonary systems. The syndrome is more common in large, deep chested dogs. Affected dogs have laxity of the gastric ligaments, particularly the hepatoduodenal ligament that maintains the position of the pylorus on the right side of the abdominal cavity. The gaseous distention of the stomach is due to aerophagia. Therefore, anything that causes dogs to ingest air, such as panting, will allow air accumulation of air in the stomach and may lead to GDV. Postprandial exercise has also historically been thought to contribute to episodes of GDV although clinical studies have not proven this to be an important factor. Epidemiologic studies have also found familial tendencies toward developing GDV. Additionally, dogs that are fast eaters or eat from a raised food bowl may be at increased risk for GDV.

Anatomic Changes
Critical to successful management of GDV is an appreciation of the anatomic changes that occur in the stomach and associated structures. A key aspect of the stomach rotation is that the pylorus moves from right to left (Fig 1). It does this by rotating first ventrally, then dorsally and to the right. When viewing the dog from the rear, this is a clockwise rotation of the stomach. The stomach fundus moves to the right side, and the spleen may also move from left to right. Occlusion of the pylorus and cardia results from this malposition of the stomach.

Gastropexy
In addition to repositioning the stomach and removing devitalized tissues, a critical part of the operative treatment for GDV is to perform a gastropexy. Creating a permanent adhesion between the pyloric antrum and the right side of the abdominal cavity prevents recurrence of rotation of the stomach. Many options for gastropexy are available, including tube gastrostomy, circumcostal gastropexy, belt loop gastropexy, or incisional gastropexy. Because of its simplicity, incisional gastropexy has gained popularity among surgeons in recent years. Creating a seromuscular incision in the pyloric antrum and a similar incision in the interior abdominal wall starts the incisional gastropexy. These two incisions are sutured to each other to create the permanent adhesion. Incisional gastropexy is a straightforward technique and studies have shown it to be very effective at preventing gastric volvulus in dogs.

In addition to performing the procedure for dogs that have already developed GDV, gastropexy should be considered for dogs that are considered predisposed to GDV, such as those having the following risk factors: large or giant breeds, deep chested conformation; parent or sibling that was affected by GDV; large dogs that are fast eaters and prone to aerophagia; dogs that have previously developed gastric dilatation without volvulus; large dogs that are high strung, excitable, and not “happy”; dogs undergoing splenectomy for large splenic masses.

Surgical Technique
A ventral midline abdominal approach is performed from the xiphoid to 2-4 cm caudal to the umbilicus. After a thorough examination of abdominal structures the gastropexy is created. A simple interrupted suture of 2-0 PDS (taper needle) is placed at the lesser curvature of the pyloric antrum and sutured to the interior of the abdominal wall just caudal to the last rib. A second suture is placed at the greater curvature of the antrum and then sutured to the interior of the abdominal wall at a point approximately 4-6 cm caudal to the first suture depending on the size of the animal (Fig. 2). The needles are left on these initial sutures since they will be used to suture the stomach to the abdominal muscle after incisions are made.

A seromuscular incision is made in the pyloric antrum being careful not to enter the stomach lumen. The incision is perpendicular to the long axis of the stomach. To start this incision, the stomach wall can be pinched between the thumb and first finger. Allow the gastric mucosal layer to slip through the fingers and thus not be included in the incision. Metzenbaum scissors or scalpel are used to incise the tissue being held by the fingers which amounts to a seromuscular incision. This incision is then lengthened by using the Metzenbaum scissors to undermine the seromuscular layer and separate it from the mucosal layer. The scissors are then used to incise the seromuscular tissue to complete the stomach incision. A corresponding incision is then made in the interior abdominal musculature the exact same length as the stomach incision (Fig. 3). Use the previously placed PDS sutures to oppose the stomach incision to the abdominal incision. Suture the lateral aspect of the stomach incision to the dorsal aspect of the abdominal incision with one suture line (Fig. 4). Then suture the medial aspect of the stomach incision to the ventral aspect of the abdominal incision with the other suture line (Fig. 5).
Post-Operative Care for GDV Patients
Maintain supportive care, consisting of intravenous fluids, antibiotics (if indicated), analgesics, and routine monitoring of vital signs. Famotidine or another H2 receptor blocker drug should be administered to reduce gastric acidity. Sucralfate is also given to coat mucosal ulcers or inflamed areas. Dogs are maintained NPO for 12-24 hours, then water and small feedings of a bland diet are offered. Closely monitor for evidence of cardiac arrhythmias, a common complication of GDV. Obtain serial ECG’s if arrhythmias are suspected. Ventricular arrhythmias are most common. Lidocaine is the usual drug of choice for these arrhythmias. Be sure serum K+ concentrations are normal as hypokalemia decreases the effectiveness of Lidocaine for cardiac arrhythmias.

For long-term care, recommend frequent small feedings with no post-prandial exercise for 1-2 hours. Metoclopramide may be indicated for recurrent gastric dilation.

The incisional gastropexy has been shown to be an effective prophylactic measure for dogs at risk for GDV. The surgical technique is straightforward and postoperative complications of the surgery are rare.

Figure Legends
Fig 1: Schematic representation of the rotation of the stomach in a gastric dilatation volvulus viewing the dog lying on its back. Normal stomach position is on the left and various stages of volvulus are depicted to the left. (P: pylorus, A: pyloric antrum)

Fig 2: The pyloric antrum is attached to interior of abdominal wall with 2 sutures of 2-0 PDS. (Cr: cranial, Ca: caudal, R: right side, L: left side)

Fig 3: A seromuscular incision has been made in the pyloric antrum and an incision has been made in the interior abdominal muscle.

Fig 4: The first suture line has been placed from the gastric to abdominal incisions in a simple continuous pattern.

Fig 5: Completed incisional gastropexy of the pyloris antrum to the right side of the interior of the abdominal cavity