

GDV !!!

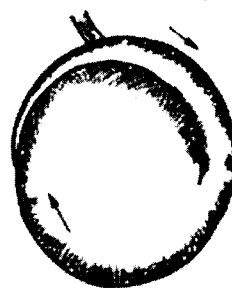
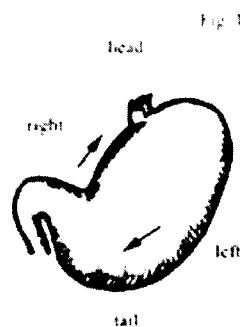
George Chandy¹
and
Reena George²

None of us who were students of COVAS, Mannuthy, during 1995-1996 will forget the frightful evening the ULF milch cow barn was swallowed by fire. Students, teachers and farm workers toiled shoulder-to-shoulder, pulling out cows with varying degrees of burn injuries from the angry tongues of flame yearning to scorch anything that came in their way. The premises of the barn were soon strewn with dead, dying and would-die-soon cows that were till that day the pride of the farm. Many lay gasping for breath with their rumens heavily bloated up.

As the animals lay suffering, a tall, bespectacled, young teacher with a "name" that rhymes with the title of this article, was seen running about from one cow to the other, puncturing their rumens with a sharp knife, thereby relieving the trapped gas that was asphyxiating them. The effect the crude looking but simple procedure had in reducing the suffering of the animals was amazing. Many of the laterally recumbent, dying animals were soon lying on their sternbrae and breathing more peacefully. The teacher had taught the great lesson of the importance of relieving pressure on the diaphragm as an emergency life saving measure in bloated animals.

The lesson learned that day came handy many years later, when a bloated bullock, faintly gasping for breath with its blue coloured tongue sticking out of a limp mouth, could be brought back to life by a "pichathi" puncture of the tympanic rumen, followed by an emergency rumenotomy using more civilized equipment. Many of us would have come across emergency situations like this in our day-to-day practice of veterinary medicine, where the time available was meant only for action. Time spent wondering what to do would mean definite death of the patient. The only way to keep the critically ill animal alive is to be sure of what to do (and what not to), well in advance. GDV is one such dreadful condition.

GDV ?!



Gastric Dilatation and Volvulus Syndrome, *aka* GDV, can be considered the canine equivalent of a very bad case of tympany in a ruminant, but presented in a more complicated form.

In a normal dog, the greater curvature of the stomach lies towards the left abdominal wall with the pylorus

¹ Assistant Professor, Dept. of Surgery and Radiology, Veterinary College, Hebbal, Bangalore 560 024. ² Veterinary Surgeon, Veterinary Dispensary, Kizhakken Perambra, Kozhikkode.

towards the right side. In GDV, the stomach rotates in a clockwise or anticlockwise direction with accumulation of gas.

In most cases of GDV, rotation of the stomach takes place in the clockwise direction (the dog being viewed from its ventral side while it lies on its back). The degree of rotation can be upto 360 degrees. The pylorus shifts from the right side of the abdomen to the ventral midline. It then passes over the gastric fundus and body towards the left abdominal wall close to the oesophagus. The fundus gets displaced ventrally towards the right abdominal wall. It passes under the pylorus towards a position along the right ventrolateral abdominal wall (Fig. 1 to 4).

The position of the spleen varies with the degree of volvulus. It is usually highly congested and enlarged and may undergo torsion on its vascular pedicle.

Aetiology

Large, deep chested dogs are prone for GDV. But, the condition may also be seen in small dogs. We have come across the condition in German Shepherd Dogs, Great Danes, Labrador Retrievers, non-descript native dogs (including a Mudhol hound, a native breed of Karnataka, similar to the Rajapalayam), a St. Bernard and a Dachshund. The condition is said to be most prevalent in old dogs, but may be seen in young ones as well.

Among the other predisposing causes are aerophagia (eating fast and gulping down a lot of air along with food), bacterial fermentation of carbohydrate rich food in the stomach, drinking a lot of water after strenuous exercise, jumping or running around after feeding, gas production from gastric acid-bicarbonate reactions etc.

The condition is usually initiated by gastric accumulation of gas, fluid or both with some degree of gastric outflow obstruction. As the dilatation of the stomach progresses, the normal means of expulsion of gastric contents like eructation, vomiting or pyloric emptying fail to occur. Gastric dilatation usually precedes volvulus. Progressive distension makes a simple dilatation to progress to volvulus.

Clinical Signs

A bloated abdomen is the classical clinical sign of a dog suffering from GDV. The cranial abdomen gets progressively distended and tympanic. Nonproductive retching, hypersalivation, restlessness and depression are seen. Signs of shock like weak pulse, increased heart rate, pale mucous membranes, prolonged capillary refill time and tachypnoea are generally

present. Gastric distension and splenomegaly are evident on palpation of the abdomen.

Pathophysiology

GDV becomes an emergency condition because of its several pathophysiological effects in the body, the most clinically obvious one of which is respiratory dysfunction. The pressure on the diaphragm because of the distended stomach pressing against it causes respiratory compromise by preventing the expansion of the lungs. This leads to decreased blood oxygen tension and tissue hypoxia.

GDV causes compression of the posterior vena cava and the portal vein resulting in sequestration of blood. Venous return to the heart is reduced leading to decreased cardiac output and arterial blood pressure. These can cause cellular hypoxia and shock. Portal vein occlusion can lead to accumulation of gram-negative endotoxins absorbed from devitalized gastric mucosa in the circulation.

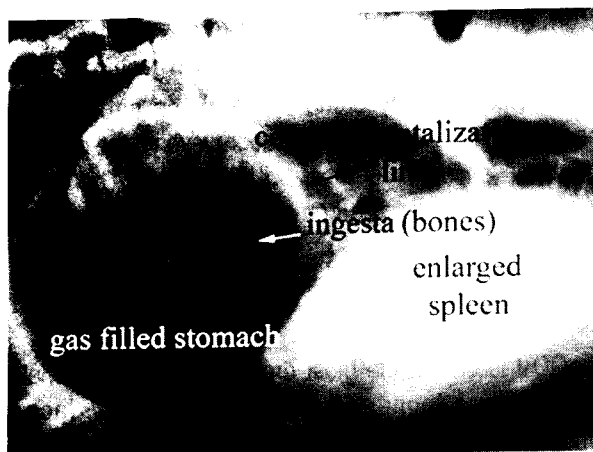
Poor tissue perfusion and organ hypoxia lead to several serious systemic effects. The myocardium may undergo degeneration, inflammation and necrosis. Decreased contractility and arrhythmias result and lead to reduced systemic blood flow.

Increased gastric intraluminal pressure, portal hypertension and venous thrombosis result in mucosal and stomach wall venous stasis. Mucosal and submucosal gastric oedema develops. Vascular wall disruption may occur secondary to tissue hypoxia resulting in mucosal and submucosal haemorrhage. The short gastric and the right gastroepiploic vessels may get avulsed and cause additional vascular restriction to the stomach. The rupture of these vessels can cause hypovolemia and haemoperitoneum.

In simple terms, a dog suffering from GDV, if not treated on an emergency basis, will die of respiratory compromise and shock.

Diagnosis

Clinical signs are usually diagnostic but simple dilatation may not be differentiated from GDV. Passage of stomach tube may not be always dependable in differentiating GDV from simple dilatation, especially when the torsion is less than 180 degrees. Plain radiographs of the abdomen (lateral view) with the dog on right lateral recumbency are usually diagnostic. The pylorus may be seen as gas filled and located dorsally. The fundus is located caudoventrally. A compartmentalization line is usually seen between the pyloric and fundic images (Fig. 5).



Treatment

The ultimate treatment for GDV is surgical, aimed at relieving the distention of the stomach and its repositioning, and returning the spleen to its normal position. However, there are a few preoperative measures that can be attempted by the general practitioner before referring the patient to a specialized hospital.

Preoperative treatment

The two major preoperative measures to be undertaken on presentation of a dog with GDV are treatment for shock and gastric decompression. Intravenous isotonic fluids are recommended to be administered at the rate of 85 to 90 ml/kg during the first 30 to 60 minutes. The cephalic or the jugular vein is used for fluid administration. Saphenous vein is to be avoided initially because of decreased venous return to the heart because of the dilated stomach.

Supportive treatment for shock like the use of corticosteroids (prednisolone sodium succinate @ 50mg/kg IV or dexamethasone @ 2 to 4 mg/kg) and antibiotics (prophylaxis against bacterial absorption from gastrointestinal tract) should also be undertaken.

Once fluid therapy has been initiated, gastric decompression may be undertaken. A stomach tube may be passed through the mouth subject to co-operation by the patient. An un co-operative dog may injure the doctor and damage the stomach tube. The tube should be passed gently. Over-enthusiastic attempts to intubate a stomach through a highly obliterated oesophagus may cause rupture of the oesophagus or the stomach and complicate and worsen the chances for recovery. In case the stomach tube cannot pass easily through the narrowed oesophagus or the patient is not co-operative, percutaneous gastric

decompression (standard terminology for "pichathi" technique!) should be attempted. An 18 gauge needle may be used to puncture the distended stomach through the abdominal wall to relieve the accumulated gas. This also should be carefully performed as repeated attempts and rough technique can cause unwanted trauma to the already devitalized gastric wall leading to intraabdominal contamination and haemorrhage. Larger needles or trocars should also be avoided for the same reasons.

Surgical treatment

As soon as the patient is stabilized, it may be referred to a well equipped hospital so that surgical treatment can be undertaken. Many a dog with GDV die due to iatrogenic damage due to repeated puncture of the stomach and delay in attempting a surgical correction of the condition.

Surgical treatment basically aims at correcting the position of the stomach, assessment and treatment of gastric and splenic ischemic injury and prevention of recurrence by permanent fixation of the stomach to the abdominal wall (gastropexy).

Barbiturates should be avoided because of their depressive action on respiratory function and adverse effects on the functioning of the heart. Isoflurane, a gaseous anaesthetic agent, can be a very safe option because of reduced cardiovascular depressive action. In highly compromised patients, laparotomy and relieving of gastric distention may be attempted under sedation with local infiltration anaesthesia.

A ventral midline laparotomy through the linea alba is performed with the dog on dorsal recumbency. Accumulated gas and fluid may be removed using a 14 or 16 gauge needle. In case of too much of food in the stomach, a gastrotomy may be performed to remove the contents. However, gastrotomy in a devitalized stomach potentiates the risk of developing peritonitis.

After gastric decompression, the stomach has to be repositioned to its normal state. The spleen is examined for its position or the presence of splenic torsion. If abnormally placed, it is returned to its normal location along the greater curvature of the stomach. Torsion should be corrected, if present. If splenic necrosis is present, a splenectomy should be performed. In most of the cases, the enlarged and congested spleen returns to its normal size and colour several minutes after repositioning. Partial gastrectomy may be performed in

case the greater curvature of the fundus and body of the stomach has suffered ischemic necrosis. Devitalization of the lesser curvature also indicates a poor prognosis.

The above procedures are followed by permanent fixation of the pyloric wall to the inside of the abdominal wall by any one of the different methods of gastropexy to prevent the recurrence of the condition. In this technique the pylorus gets fixed in its normal anatomical location in the abdominal cavity thereby preventing chances of displacement in future.

Post operative care and complications

Enrofloxacin (5 to 10 mg/kg IM/IV/SC BID) and metronidazole (20 mg/kg IV BID) are recommended for post operative use following gastrointestinal surgery. Cephalosporins (@ 22 mg/kg IV/IM, general dose, individual doses may vary) may also be used. Parenteral alimentation may be undertaken for two to three days following surgery to allow the damaged stomach to

return to normal function. H₂ blockers like cimetidine (10 mg/kg IM TID) may be given to reduce gastric acidity.

GDV is a highly complex condition capable of leaving behind a trail of complications even if the patient has been saved and stabilized by surgery. The most common postoperative complications are peritonitis, gastric perforation and gastritis. These have to be treated as per the standard means.

Summary

GDV is one of the most dreadful diseases a small animal practitioner may ever have to face. Understanding the condition thoroughly and knowing what to do well in advance alone can save the life of the patient. One may not be able to save all these patients. Nevertheless, survival of even one such patient is guaranteed to give one a euphoria which can be matched by few other diseases a veterinarian may get a chance to treat. □

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Definitive treatment of hypocalcaemia is to eliminate the underlying cause. Supportive measures including the following to restore normocalcaemia can be advocated pending confirmatory diagnosis.

Parenteral Calcium

Hypocalcaemic tetany or convulsions are indications for immediate intravenous administration of 10% calcium. This should be administered as slow infusion. Rate of calcium administration should be adjusted as necessary to maintain a normal serum calcium concentration. Unless other treatment is advocated, continuous infusion when stopped will lead to recurrence of hypocalcaemia.

Oral Calcium

Oral supplementation may be beneficial in some cases. Daily requirements of calcium are 1 – 4 g for dogs. Daily dose of calcium should be based on the amount of elemental calcium in the product rather than the weight of the salt.

Vitamin D

In certain cases, Vit.D supplementation is necessary to increase calcium absorption from the GI tract. Dosage and duration of response depends on the form of Vit.D used. With all preparations and dosage, development of iatrogenic hypercalcaemia is a common complication. □

BOOK REVIEW

വരു! നമുക്കും തുടങ്ങാം ഡയറി ഫാം

The Indian Veterinary Association, Palakkad chapter has made a very good effort in bringing out this book. This book, with a very beautiful cover, has twelve chapters on various aspects of dairy farming as well as the important points to be considered while setting up a dairy farm. The authors of various chapters include Dr. N. Sudhodanan, Dr. K. Muarlidharan, Sri. Mathew Kurian, Dr. G. Dinesh, Dr. Sajith Purushothaman, Dr. raji Ravindran, Dr. V. Dildeep, Dr. R. Babitha, Dr. K.V. Valsalakumari, Dr. M. Beena, Dr. N. Ponnumani, Dr. K. Vinodkumar, Ms. jaya Sudheesh, Dr. Pradeep and is edited by **Dr. M. Jayan.**

