

GASTRIC DILATATION AND VOLVULUS - "BLOAT"

Introduction

Gastric dilatation and volvulus (GDV), commonly called "bloat," is a life-threatening medical condition where a dog's stomach becomes filled with gas that cannot escape. It can occur in any dog but is most common in older large and giant breed dogs, especially those with very deep chests. GDV is rare in small dogs. By itself, bloat technically refers only to the gaseous distension of the stomach. However, the gas-filled stomach can rotate around its short axis, carrying the spleen along for the dangerous ride. This is called "torsion." However, most owners think of bloat as a syndrome of both gastric distension and rotation, and we will refer to that syndrome as "bloat" in this article.

Digestive (Gastrointestinal) Anatomy 101

A little anatomy may be helpful. Obviously, food enters a dog through the mouth, where it (sometimes) is chewed and then swallowed. It passes under the hard palate ("roof of the mouth") and through the throat, or "pharynx," which is the crossroad between the digestive and respiratory tracts. The pharynx is located behind the mouth, tongue base and nasal cavities and in front of the larynx and esophagus. Air and food both pass through the pharynx. From there, air normally travels through the larynx ("voice box"), which is a complex structure of muscles and cartilage situated at the upper end of the trachea ("windpipe"). Food and fluids normally travel from the pharynx down the esophagus into the stomach. Each end of the esophagus has a functional sphincter muscle which helps regulate the passage of ingested material ("ingesta"). The entryway from the esophagus into the stomach is called the "cardia." The exit passage from the stomach into the upper small intestine is called the "pylorus." In normal dogs, food stays in the stomach temporarily, where it mixes with gastric enzymes that are secreted by the stomach lining to aid in digestion. ("Gastric" means pertaining to the stomach.) The main gastric enzymes are pepsin, rennin and hydrochloric acid. Ingesta moves

out of the stomach through the pylorus into the upper part of the small intestine, called the "duodenum," and from there through the other two sections of small intestine, the "jejunum" and "ileum." The small intestine is the main site of digestion and absorption of nutrients. From there, what is left of the ingesta passes into the large intestine- through the "cecum," "colon," "rectum" and "anal canal," in that order. The large intestine functions to dehydrate fecal contents by reabsorbing water. The end product finally exits the dog through its anus as feces.

Causes of Canine Bloat

The causes of bloat in domestic dogs are not well-understood, but the physiological processes are. When the stomach rotates, even partially, the openings between the stomach and esophagus on one end, and between the stomach and small intestine on the other, become blocked. Gas and air can no longer escape out the esophagus through burping ("eructation") or out through the lower parts of the gastrointestinal tract. Digestion shuts down. The increasingly distended stomach pushes on the diaphragm and major blood vessels in the abdomen, reducing blood return to the heart. This decreases the amount of blood in circulation, which causes an inadequate supply of oxygen and nutrients to be distributed throughout the dog's body. Without sufficient oxygen, vital organs start to fail. The stomach and small intestine rapidly start to ulcerate, blacken and die ("necrose"). Within a very short period of time, the affected dog will go into hypovolemic and hypotensive shock (from low circulating blood volume and low blood pressure, respectively). At this point, the dog is fighting for its life.

Think of bloat as if the dog's stomach is a balloon being filled with air that has no escape route. Eventually, the balloon will burst. In dogs with GDV, gastric acids, gasses and digestive products continue to be produced, secreted and processed inside the blocked-off stomach, with no way out. Like the balloon, the dog's stomach can rupture, spilling its bacteria-laden contents into the normally sterile abdominal cavity. Usually, the diminished blood and oxygen supply causes death before the stomach bursts. Bloat is extremely, heart-wrenchingly painful and must

always be considered life-threatening. Most cases require immediate and aggressive medical intervention if the dog is to survive. Unfortunately, bloat can kill a dog within a matter of hours, and recurrence is common. Even surgery may not prevent death if the internal damage is too great. Some of the most tragic cases happen in the middle of the night, or during the workday, when owners aren't able to notice their dog's symptoms.

Why dogs bloat remains a medical mystery. A number of different contributing factors have been suggested, but none have been scientifically proven.

Signs of Bloat

The signs of bloat are not always easy to distinguish from signs of other types of gastrointestinal distress, except that bloat usually comes on extremely quickly, progresses rapidly and is excruciatingly painful. The signs can mimic those of poisoning. A dog that stands with its front legs apart, head down and seems to be in obvious abdominal discomfort could be suffering from bloat, or it could have eaten something toxic or just have gotten into the neighbor's garbage. However, because bloat is so dangerous and so prevalent in large and giant deep-chested dogs, it should always be considered a true medical emergency. Owners of Great Danes need to be able to recognize the signs of bloat to preserve any chance of saving their dogs if and when this deadly condition occurs.

In the early stage (which doesn't last very long), a dog that is bloating will be uncomfortable and edgy for no apparent reason. It will rapidly deteriorate. In no particular order, the dog will become increasingly restless, painful, weak and despondent. Its abdomen typically becomes visibly swollen and firm. The dog may cry out and look at its belly. It may retch and try to vomit, but those attempts won't be productive. Its breathing will become rapid, shallow and difficult ("tachypnea," "dyspnea"). Its gums and other mucous membranes will become pale to blue, and it will salivate profusely (drooling, foaming at the mouth). Its pulse will weaken while its heart races. Without medical intervention, the dog will collapse and die within a matter of a few hours. Basically, if your large dog is retching and trying to vomit but cannot, is restless, painful and drooling profusely, take him or

her to your veterinarian immediately. It is best to call the clinic to let them know you are bringing in a dog suspected of bloating, so that they can prepare the surgical team.

Deep-chested, older, large and giant-breed dogs of either gender are the most susceptible to bloat, although almost any dog of any age or breed can be affected by this condition. Large purebred dogs seem to be bloat more often than mixed breed animals. Having a parent or sibling who has bloated is associated with an increased risk of developing the disorder. Other risk factors include dogs with narrow chests and those who are fed only once-a-day, eat rapidly, exercise soon after eating and/or consume large amounts of food and water at one sitting. Stress, low body weight and a timid, fearful temperament also seem to predispose dogs to bloat. Breeds commonly affected include the Great Dane, Weimaraner, Saint Bernard, Gordon Setter, Irish Setter, Doberman Pinscher, Old English Sheepdog, Standard Poodle and Bassett Hound.

Diagnosing Bloat

It is not difficult for a veterinarian to diagnose bloat. The dog's size, breed and history will often strongly suggest that bloat is the culprit, especially if the patient is a large, deep-chested dog over 4 years of age. The veterinarian's initial inspection usually reveals the telltale signs of GDV: a tight grossly distended abdomen, a hanging head, severe abdominal pain and excessive frothing at the mouth. The onset of shock is indicated by pale mucous membranes and poor capillary refill time ("CRT"). CRT normally is assessed by looking at the dog's gums, pressing them firmly with a finger and counting how many seconds it takes for the pressed area to return from whiteish to pink. Other indications of shock are increased heart rate (tachycardia) and poor pulse quality.

Radiographs ("X-rays") are usually taken immediately. If a dog is bloating, the radiographs will show a stomach distended with gas. The pylorus, which is the passageway from the stomach into the small intestine, will be displaced if the dog's stomach has torsioned. This looks like a "double bubble" on the films and is considered to be diagnostic for gastric dilatation and volvulus in dogs.

Treating Bloat

Owners of Great Danes and other large or giant dogs must keep their eyes open for any signs of bloat. This is a potentially fatal condition that can occur at any time or under any circumstances during a dog's life. It is very treatable, but only if it is caught very early. When a Dane owner sees her dog in abdominal distress, she should take it to the hospital immediately. If left untreated, and if the dog is in fact bloating, it will die in almost every case. The goals of treating bloat are to resolve the shock caused by decreased circulating blood volume (hypovolemia), decompress the stomach, correct the position of the stomach surgically if it has torsed and remove devitalized or dying stomach, spleen or intestinal tissues as necessary.

When a dog comes into the veterinary hospital with clinical signs of bloat, the veterinary team will unite to prepare for emergency surgery to save the dog's life. Typically, catheters will be placed to administer intravenous fluids to the dog to try and combat shock. Antibiotics may be given. Many veterinarians will try to decompress the dog's stomach by inserting a flexible tube through its mouth down into its stomach, to provide an escape route for the accumulating gas. This is called "orogastric intubation." If this is not possible or is unsuccessful, the veterinarian may try to relieve the pressure by "percutaneous trocarization" of the stomach. This involves preparing an abdominal entry site and then inserting a large-bore needle directly through the body wall into the stomach. If successful, there will be a hissing sound and foul-smelling gas will come out through the needle, much like "popping" a balloon. These techniques may permit the accumulating gas to escape, but they don't always work and won't return the stomach to its correct position if it already has torsioned.

Surgery is the only way to return a torsed stomach to a normal position. There are several different surgical procedures that veterinarians can use. It may be necessary to remove the spleen, depending upon the extent of its involvement. When abdominal surgery is necessary, the surgeon may recommend physically suturing ("tacking") the stomach to the abdominal wall. This procedure is called a "gastropexy." A gastropexy can greatly reduce the risk of recurrent bloat

episodes. Some owners have their Danes' stomachs surgically tacked prophylactically, even before they have ever bloated, as a preventative measure.

Heart arrhythmias (irregular heartbeats) are common within the first 36 hours after bloat surgery. Most veterinarians will keep the patient hospitalized for at least a day or two post-operatively, to monitor heart activity and function.

Prognosis

Dogs that bloat and are treated surgically still have an approximately 15% - 25% chance of dying, depending on how early their condition was caught. If the dog's stomach or intestines have already started to necrose before surgery, survival rates are worse. However, if caught early, and if a gastropexy is successfully performed, the chances of recurrent bloating are slim.

Preventing Bloat in Dogs

Once a dog has bloated, it is more likely to bloat again. Surgical options are available to reduce the chance of bloating even before it has happened, as well as to prevent recurrence. There are several different ways that veterinarians can surgically attach, or "tack," the stomach to the abdominal wall in an attempt to prevent it from torsioning in the future. While these procedures are usually very helpful, they are not fail-proof. Other preventative measures involve dietary and exercise management and moderation. Many breeders and veterinarians recommend feeding at-risk dogs from elevated feeders, while a few advise against this practice. Other suggestions are to restrict activity for an hour or so before and after meals, and to feed at least twice daily. Dogs that eat a single, large meal of dry kibble, and then drink large amounts of water and become active, seem predisposed to bloat.

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