

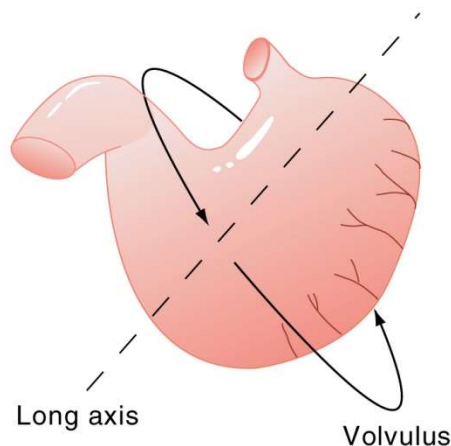
GASTRIC DILATATION AND VOLVULUS (GDV) Commonly referred to as “Bloat”

What is GDV?

Gastric Dilatation and Volvulus (GDV). *Dilatation* means that the stomach is distended with air, but it is located in the abdomen in its correct place. *Volvulus* means that the distention is associated with a twisting of the stomach on its longitudinal axis. The term refers to a gas-filled stomach that twists upon itself, from 180 to 360 degrees or even more. It is a potentially life threatening medical emergency that requires surgery to correct, right away. Some call it “the mother of all emergencies.” Immediate veterinary attention is required to save the dog’s life.

What causes the condition?

The exact cause is still unknown. The most common history is a large breed dog that eats or drinks rapidly and then exercises. In recent studies, stress was found to be a contributing factor to GDV. Dogs with a more relaxed and calm personality were at less risk of developing GDV than dogs described as “hyper” or “fearful.” Sometimes the condition progresses no further than simple gastric dilatation, but in other instances the huge, gas-filled stomach twists upon itself so that both entrance and exit to the stomach become occluded. The medical emergency occurs with the twist, as dilation with gas can sometimes resolve on its own. Gastric dilatation (bloat), usually without volvulus (twist), occasionally occurs in elderly small dogs.



Statistically we know that large, deep chested breeds are more prone to GDV. These include Great Danes, Saint Bernards, Weimaraners, Setters, Standard Poodles, Doberman Pinschers, Old English Sheepdogs, German Shepards, Akitas, Greyhounds and other sight hounds, etc. Most commonly, the condition occurs within two to three hours of eating a large meal. One in five dogs weighing more than 99 pounds will suffer from GDV. Bloat is occasionally reported in the Dachshund or Basset hound.

Stomach Developing Bloat

The diagram consists of five sequential illustrations of a stomach, showing the progression of bloat. Each illustration is labeled with 'esophagus' and 'pylorus'. The first shows a normal, upright stomach. The second shows the stomach beginning to rotate and fill with air. The third shows the stomach twisted, with the pylorus moving to the opposite side. The fourth shows the stomach nearly upside down, with blood vessels being compressed. The fifth shows a severely distended stomach with discolored tissue, indicating compromised blood flow.

Normally positioned stomach	As the stomach distends and rotates, the esophagus twists and the pylorus begins to point upwards.	The stomach twists and the pylorus moves to the opposite side. Air is trapped in the stomach and the stomach continues to dilate.	In a nearly upside down and backwards position the blood vessels to the stomach are compressed and/or torn. Early treatment can reduce this complication.	Within minutes, the blood flow becomes compromised. Over time, this causes stomach tissue discoloration and irreversible damage. The bloated stomach presses on the caudal vena cava, causing decreased blood return to the heart and shock.
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How can you recognize GDV and what should you do?

The normal stomach sits high in the abdomen and contains a small amount of gas, some mucus, and any food being digested. It undergoes a normal rhythm of contraction, receiving food from the esophagus above, grinding the food, and meting the ground food out to the small intestine at its other end. Normally this proceeds uneventfully except for the occasional burp.

GDV often begins with anxiousness, pacing, discomfort and sometimes stretching the belly. This progresses in a short time to drooling, and then unsuccessful attempts to vomit – lots of abdominal heaving and gagging that produces nothing but a small amount of white foam. The distended stomach pushes the rib cage out, so that the dog's belly appears swollen or "bloated", and the dog will become agitated and uncomfortable, and then tremendously painful. The swelling is most obvious on the left side right behind the ribs, and gentle tapping of the swelling just behind the last rib often produces hollow, drum-like sounds. The enlarged stomach presses on the diaphragm and breathing becomes labored. The swollen stomach also presses on the larger blood vessels in the abdomen and circulation is seriously compromised, resulting in shock. Ultimately, the dog collapses and the huge size of the abdomen can be seen as the dog lies on its side. If untreated, the dog often dies within a few hours.

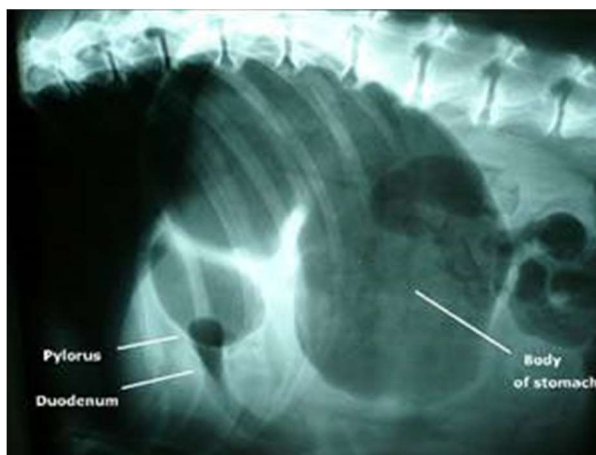
As soon as you see first signs of bloat, get your dog to the vet ASAP. If you are not sure, err on the side of caution and take them in. Do not attempt to give anything by mouth, nor try to relieve the gas yourself.

Why does the dog collapse?

Twisting of the stomach prevents any fluid, food or gas from leaving the stomach. As a result, the stomach becomes progressively larger, pressing on the large veins in the abdomen that carry blood back to the heart, and compromising blood supply. Vital tissues become deprived of blood and oxygen, resulting in systemic shock. In addition, the pressure of the gas on the stomach wall results in inadequate circulation to the wall, causing tissue death. Digestion ceases and toxins accumulate in the blood, exacerbating the shock. As the distension continues to build, the stomach wall can rupture.

What can be done?

Veterinary assistance must be sought immediately. It is imperative that the pressure on the stomach wall and internal organs is reduced as soon as possible. The veterinarian may first attempt to pass a stomach tube, after sedating the dog. If it is not possible to pass a stomach tube due to twisting of the stomach, a large bore needle may be passed through the skin into the stomach to relieve the pressure in the stomach. The x-ray image to the right shows the enormously distended stomach nearly upside down and shows what is often called the "double bubble" sign where the stomach is divided into two gas-filled sections suggesting the twist (volvulus) that makes the emergency so dire.



Shock treatment by administering intravenous fluids and emergency medications will begin immediately. Once the patient has been stabilized, the dog is taken to surgery. After the expense and effort of successful stomach decompression, it is tempting to forgo the further expense of surgery. However, consider that the next time your dog bloats, you may not be there to catch it in time and, according the study described below, without surgery there is a 24% mortality rate and a 76% chance of re-bloating at some point. The best choice is to finish the treatment that has been started and have the abdomen explored. If the stomach can be surgically tacked into place, recurrence rate drops to 6%. Surgery is

likely to prevent the stomach from twisting in the future but the stomach is still able to periodically distend with gas. This is uncomfortable but not usually life-threatening.

The primary goals of surgery are to return the stomach to its normal position, to remove any dead or dying tissues damaged by lack of blood supply, and to help prevent future GDV by tacking the outflow tract of the stomach (pylorus) to the body wall in an attempt to prevent recurrence of bloat. . This tacking procedure is called “gastropexy,” and there are several available techniques. Your veterinarian will choose the technique or combination of techniques best for your pet’s condition.

What is the survival rate?

Decades ago, a diagnosis of bloat was almost always a death sentence because only 25% survived. Today the survival rate is better than 80%. Part of the reason for this is increased owner awareness. The earlier treatment begins, the better. Mortality rate can be higher for complicated cases. Anesthesia can be dangerous in a shocky dog, but many times it is the only chance for survival. If all goes well, your dog will likely be hospitalized for 2-5 days after surgery. However, there are a number of complications that can occur during the recovery:

1. *Cardiac arrhythmias* (abnormal heart beats). They are common and often resolve on their own, but can on occasion be live threatening.
2. *Aspiration pneumonia*. During GDV or decompression, fluid and food sometimes bubble up into the throat, and can be inhaled into the lungs, leading to pneumonia, which can prolong recovery and hospitalization.
3. *Sepsis, systemic inflammatory response syndrome, acute respiratory distress syndrome (ARDS), and disseminated intravascular coagulation*. When the stomach is distended, digestion stops. This results in the accumulation of toxins that are normally removed from the intestinal tract. These toxins activate several chemicals that cause inflammation, and the toxins are absorbed into circulation (endotoxemia/sepsis). This sometimes causes problems with breathing, blood clotting, and organ shut down, called acute respiratory distress syndrome (ARDS), disseminated intravascular coagulation (DIC), and Systemic Inflammatory Response Syndrome (SIRS). These are very serious complications that carry high fatality rates.
4. *Stomach and/or spleen tissue death (necrosis)*. This can usually be detected and corrected during surgery by removing the devitalized tissue. This makes recovery more difficult as well as worsens the prognosis. Sometimes the tissues look healthy during surgery, but afterwards, the stomach can die and perforate, so that stomach contents can leak into the abdomen. This may not manifest for 3-5 days after surgery. Symptoms include loss of appetite, fever, abdominal pain, abdominal swelling, vomiting, and lethargy. This complication is potentially life threatening.
5. *Blood loss*. The spleen is attached to the stomach by its blood supply and when the stomach twists, so does the spleen. This can cause tearing of the vessels leading to the spleen and significant blood loss. In some cases, the spleen will have to be removed and your pet may require a blood transfusion.



Can the condition be prevented?

Gastropexy (surgical attachment of stomach to the body wall) is the most effective means of prevention. In high-risk breeds, some veterinarians recommend preventative gastropexy, often done at the time of spay, neuter or other elective procedure. This does not

prevent dilatation (bloat) but does often prevent twisting (volvulus) in the majority of cases.

Factors Increasing the Risk of Bloating

- Feeding only one meal a day
- Having closely related family members with a history of bloat
- Eating rapidly
- Being thin or underweight
- Moistening dry foods (particularly if citric acid is listed as a preservative)
- Feeding from an elevated bowl
- Restricting water before and after meals
- Feeding a dry diet with animal fat listed in the first four ingredients
- Fearful or anxious temperament, resulting in swallowing of air
- Dogs with chronic GI problems resulting in increased gas formation
- Male dogs and older dogs (seven - 12 years)

Factors Decreasing the Risk of Bloat

- Including canned dog food or table scraps in the diet
- Happy or easy-going temperament
- Feeding a dry food containing a calcium-rich meat meal (such as meat/lamb meal, fish meal, chicken by-product meal, meat meal, or bone meal) listed in the first four ingredients of the ingredient list.
- Eating two or more smaller meals per day

Urban Legends about Bloat:

- Contrary to popular belief, cereal ingredients such as soy, wheat, or corn in the first four ingredients of the ingredient list do not increase the risk of bloat.
- A 2007 email still makes the rounds, stating that ice or ice water causes a dog's stomach to spasm, and then swell and potentially bloat. Dogs can safely be given ice cubes in their drinking water, or as a treat, without worry of bloat or frigid water gastric cramping. Ice cubes in water can actually slow down the speed of intake, thus lessening the possibility of bloat. On a far less life-threatening level, the only real danger of ice cubes is of cracking the teeth of dogs who chew on them.

Please do not hesitate to discuss any concerns you have regarding this serious condition with your veterinarian.

Ashe Catherine DVM – Client Handouts for Common Emergencies

Blount Wendy DVM, PracticalVetMed

Brooks Wendy DVM, ABVP – Pet Health Care Handouts

Gfeller Roger W, DVM, DipACVECC, Michael W. Thomas, DVM, and Isaac Mayo, Veterinary Information Network Homecare Handouts

Johnson Tony, DVM, ACVECC

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Wellness Handouts