Risk Factors for Canine Bloat

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Canine bloat, or gastric dilatation-volvulus (GDV), is the number-one cause of death for several large and giant breeds. If this painful disorder is not treated within one to two hours, it is life-threatening.

Twenty-five percent of bloat cases are caused by gastric dilation. The stomach fills with gas. The increased pressure compresses both ends of the stomach, preventing the gas from escaping. But most cases - 75 percent - are due to gastric volvulus, where the stomach actually twists, crimping and cutting off the inflow and outflow from the stomach. When the stomach gases cannot get out, they expand.

Affected dogs drool saliva because they cannot swallow. Also, they cannot belch or vomit, which would help relieve the mounting pressure from the stomach gases. The pressure causes the abdomen to become distended. When tapped, the abdomen can sound like a drum.

Risk Factors

The breed with the highest average lifetime likelihood of a bloat episode is the Great Dane, at 42.4%. Other breeds at higher-than average risk include the Bloodhound, Irish Wolfhound, Irish Setter, Akita, standard Poodle, German Shepherd Dog, and Boxer. Other deep-chested breeds and deep-chested mixed-breed dogs are also at higher risk.

Dr. Larry Glickman, an epidemiologist at the Purdue University School of Veterinary Medicine, conducted a controlled study on canine bloat, beginning in 1994. He followed 1,914 dogs who did not have a prior history of bloat. Eleven large and giant breeds were represented in the study.

Several risk factors were identified. The dogs with the greatest risk of developing bloat have chests that are deep and narrow. This can be evaluated by measuring the depth and the width of the chest. Then the depth is divided by the width. The depth-to-width ratio reflects the amount of room there is for stomach movement in the abdomen, behind the ribcage. The higher the result, the more room there is for movement. Dogs with more room have a greater risk of developing bloat.

Lean dogs were found to be at higher risk than overweight dogs. It is hypothesized that this is because fat takes up space in the abdomen. The lack of fat in the abdomen of a lean dog creates a basic situation similar to that of a dog with a deep and narrow chest: A lean dog has much more room in the abdomen for the stomach to move around than a fat dog. This does not mean, of course, that overweight dogs are generally healthier than lean dogs.

Risk is also higher for older dogs. For large breeds, the risk of developing bloat goes up 20 percent each year after the age of 5. For giant breeds, it goes up 20 percent each year after the age of 3. First degree relatives of dogs that have had bloat have a 63 percent greater risk of developing bloat themselves. Dogs that eat quickly have a 15 percent higher risk of developing bloat. This may be related to increased swallowing of air.

One traditional preventative has been to raise the height of food and water bowls, but this was found to actually increase risk by 110 percent. This correlation of risk was verifiable; the dogs of the breeders in this study did not have close relatives that had experienced bloat.

The study also found that fearful, nervous, or aggressive dogs had a much higher incidence of bloat than did dogs perceived by their owners as having happy temperaments. Stress can also be a precipitating factor, and many dogs bloat after recent kenneling, or a recent long car ride. A slightly higher percentage of males than females developed bloat.

Several diet-related factors were associated with a higher incidence of bloat. These include feeding only dry food, or feeding a single large daily meal. Dogs fed dry foods containing fat among the first four ingredients had a 170 percent higher risk for

developing bloat. Dogs fed dry foods containing citric acid and were moistened prior to feeding had a 320 percent higher risk for developing bloat.

Conversely, feeding a dry food containing a rendered meat-and-bone meal decreased risk by 53 percent in comparison with the overall risk for the dogs in the study. Mixing table food or canned food into dry food also decreased the risk of bloat.

During the past 30 years there has been a 1,500 percent increase in the incidence of bloat, and this has coincided with the increased feeding of dry dog foods. There is a much lower incidence of bloat in susceptible breeds in Australia and New Zealand. Feeding practices in these countries have been found to be less dependent on dry foods.

As for feeding one large meal a day, this can weigh down the stomach and stretch the hepatogastric ligament, which usually maintains the stomach's normal position in the abdomen. Dogs that have bloated were found to have a much longer hepatogastric ligament; it is thought that this is due to chronic stretching. This could also explain why bloat risk increases with age.

Several popular theories regarding bloat were not substantiated during the study. There was no correlation of bloat risk to exercise before or after eating, as most dogs bloated in the middle of the night with an empty, gas-filled stomach. There was also no correlation to vaccinations, to the brand of dog food consumed, or to the timing or volume of water intake before or after eating.

From the research performed to date, we can list several factors that, added together, can characterize the typical dog that develops bloat: a deep and narrow chest; leanness; a relative that has had a bloat episode; eating quickly; a dry-food diet; a single, large daily meal; stress; and a fearful, nervous, or aggressive temperament.

Treatment

Approximately 30 percent of dogs that develop bloat die or have to be euthanized. This can be due to shock, to arrhythmia (fatal irregular heart beats), or to rupture or death of the stomach wall. Studies have shown that 40 percent of dogs that bloat have some heart arrhythmia during the bloat episode. Affected dogs usually receive fluids and shock therapy at the time of treatment in an attempt to attempt to control this.

Emergency treatment of bloat begins with decompression, or alleviating the gas pressure. This can be accomplished by passing a stomach tube. If a tube cannot be passed due to torsion, the use of a hypodermic needle through the side of the abdomen can help relieve the pressure. If a dog survives decompression but the stomach is still twisted, emergency surgery is required to straighten it. Some dogs may also require removal of a damaged spleen, or a portion of the stomach wall.

Once normal anatomy is re-established, the most important aspect of bloat surgery is a gastropexy. This procedure "tacks" or attaches the stomach wall to the body wall and prevents it from twisting in the future. Studies have shown that 76 percent of dogs that do not have a gastropexy will bloat again; more than half will bloat again within three months. Only 6 percent of dogs that have had a gastropexy have another bloat episode. Dogs that can be stabilized without surgery should have a gastropexy performed as soon as possible.

In breeds that are at high risk, many experts recommend having a preventative gastropexy performed instead of waiting for an episode of bloat. In pet dogs, this surgery is usually performed at the time of neutering. In the December 1, 2002, *Journal of the American Veterinary Medical Association*, researchers described a new laparoscopic gastropexy technique. This technique requires only a small incision on the side of the abdomen.

There is no single, major gene that controls bloat. This is because dogs do not inherit bloat; they only inherit a predisposition for the condition. As with other polygenic disorders, breadth of pedigree normalcy increases the selective pressure against the condition.

Perhaps the best selective tool against bloat is the chest-depth to chest-width ratio. Dogs that have lower ratios and whose littermates have not bloated are the best breeding candidates. If prospective breeding dogs are compared, and breeders select against those with high ratios, the prevalence of bloat should diminish.