

## Beating Bloat

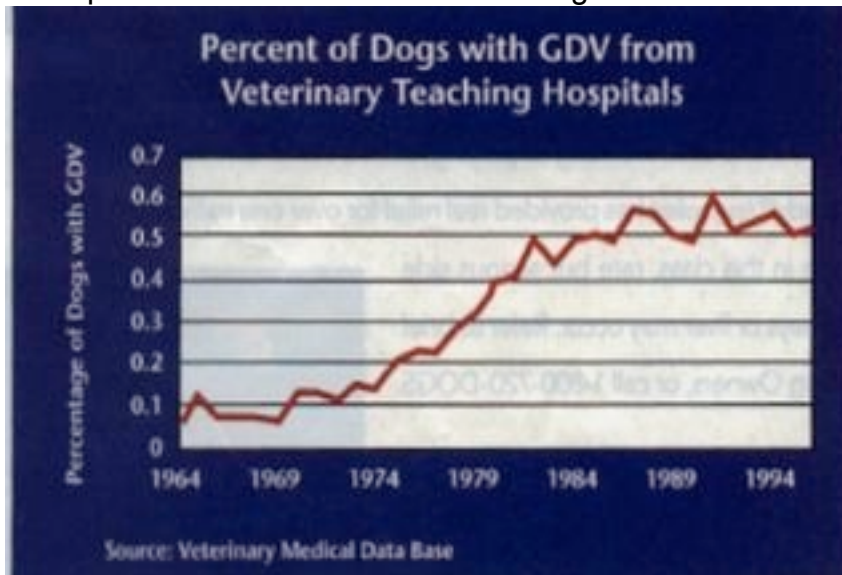
### An Analysis Of Risk And Prevention

by SHARON PFLAUMER

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It's an owner's nightmare: returning home or waking up to find a beloved pet has died of gastric dilatation-volvulus, or bloat and torsion as it more commonly is known, an agonizing condition that can strike suddenly and fatally. Sadly, for many owners this nightmare has become a traumatic reality.

Dogs that succumb to the condition suffer immense pain and an obscenely distended abdomen that can grow to as large as a beach ball. They exit this world too early and too jarringly, and they leave their owners feeling helpless and confused. As new research emerges, however, owners may be able to fend off the fatal grasp of bloat and torsion and take steps to minimize the risks to their dogs.



Bloat is a condition in which there is a rapid accumulation of air in the stomach causing dilatation. Volvulus, or torsion, occurs when the dilated stomach twists, cutting off contact with the esophagus at one end and the small intestine at the other. This effectively isolates the stomach and traps the air.

The very enlarged, twisted stomach puts pressure on the blood vessels, often twisting them in the abdominal cavity and thus impairing blood flow back to the heart. Because the heart receives an insufficient amount of blood to pump, blood flow decreases to the rest of the body. With this, there is the fairly acute onset of death of the tissues that are deprived of oxygen, including the stomach wall itself, which rapidly undergoes necrosis.

The early signs of bloat include discomfort. The dog paces or repeatedly gets up and then lies back down. There also is excessive salivation, panting and unsuccessful

attempts to vomit. As the condition worsens, the abdomen distends in most, but not all, dogs and feels taut like a drum. Shock follows (i.e., pale gums, weakness, shallow pulse, cool extremities, etc.). Often, dogs then go into a coma, and death is the ultimate outcome if they are untreated.

### **Uncovering Etiologies**

Given that GDV is one of the leading causes of death in giant and large breeds, one would expect that much research into the cause of this pervasive killer would be under way. Yet, Larry Glickman, V.M.D., Dr.PH., a veterinary researcher at Purdue University's School of Veterinary Medicine, presently is one of the only researchers pursuing this area of study. According to him, other groups currently researching the condition typically focus on its treatment, not its cause.

Before beginning a career in teaching and research at Purdue, Glickman held faculty appointments at the Cornell and University of Pennsylvania schools of veterinary medicine. He is a pioneer in the application of epidemiologic methods to the study of pet dogs (e.g., he was the first to demonstrate that certain breeds are more susceptible to parvovirus infection; that high-fat, high-protein, low-carbohydrate diets are associated with significantly improved survival rates in dogs with breast cancer; and that exposure to asbestos and insecticides increases the 5Q risk of lung and bladder cancers, respectively, in dogs). He received the Pfizer Research Award for Research Excellence and the Ralston Purina® Small Animal Research Award, and he has authored more than 175 scientific articles, book chapters and monographs on canine health. Glickman presented some of the findings from his most recent "Five-Year Purdue University Prospective Study of Gastric Dilatation-Volvulus" at the Canine Health Conference held in St. Louis in October 1999 and sponsored by the American Kennel Club Canine Health Foundation. The purpose of the study was to isolate risk factors in order to identify the environmental situations and characteristics of dogs that make them more susceptible to the condition.

"We followed nearly 2,000 dogs belonging to 11 breeds for up to five years to determine which ones would develop bloat and which ones would not. Then, we related that data back to things like their breed, size, shape, personality, age, genetics, diet and how they were managed," he explains. The study was a two-part risk analysis performed at the breed and individual dog levels. At the conference, Glickman reported on the first part, the breed analysis findings, which are complete, but reported only the preliminary findings of the second part, the individual dog risk factors, which still are being analyzed at the time of this writing.

### **Analysis At The Breed Level**

"In the first part, we tried to look at breed-related risk factors," Glickman explains. "That is, characteristics that would put a breed per se at higher risk than any other breed in the study." The large-breed dogs in his research were characterized as weighing between 50 pounds and 99 pounds at adult weight, and the giant-breed dogs were

characterized as weighing greater than 99 pounds at adult weight. (Smaller breeds were not studied because, for the most part, they are not largely affected by bloat.) The 11 breeds included in the study - chosen because they were known to be at high risk - were the Akita, Bloodhound, Collie, Great Dane, Irish Setter, Irish Wolfhound, Newfoundland, Poodle (Standard), Rottweiler, Saint Bernard and Weimaraner. Dogs were measured at AKC shows. On the breed level, the following characteristics were analyzed:

## **BREED SIZE**

In terms of breed risk factors, Glickman found the incidence of bloat was high and almost identical in both the giant and large breed dogs in the study. The actual incidences of bloat in both the large and giant breeds were 23 and 26 cases, respectively, per 1,000 “dog years” at risk. (Each dog followed for one year represented one “dog year” at risk. Thus incidence rates were expressed in terms of 1,000 “dog years” at risk.) Out of the more than 1,900 dogs in the study, a total of 105 developed bloat. Their fatality rate was 29 percent. The breeds at highest risk in the study were the Great Dane (a giant breed), with a cumulative incidence rate of 15.7 percent, and the Bloodhound (a large breed), with a cumulative incidence rate of 8.7 percent. To figure lifetime rate of incidence, Glickman took observed incidence rates for the different breeds and made the assumptions that the average life span is 10 years for the large breeds and 8 years for the giant breeds. He then calculated what the lifetime risk of bloat would be for these breeds. For the large breeds, it was 23 percent; for the giant breeds, 26 percent. In the case of the Great Dane specifically, it was 42 percent! That means more than four out of 10 Great Danes will bloat in their lifetimes. Of those that do, about one-third will die.

## **BREED SHAPE**

According to Glickman, it's not just a breed's size that influences the rate of bloat, however. As the breed analysis also revealed, “Breeds that have a deeper and narrower abdomen are at greater risk, with the abdomen depth/width ratio being a much stronger predictor than the chest depth/width ratio for breeds. We think that the deeper and the narrower the abdomen, the greater the room for the stomach ligaments to stretch down or lengthen as part of the aging process. The deeper abdomen provides more room for the stomach to actually descend with age. The combination of stretched ligaments and greater room allows the stomach to twist.” (See the section below on aging.) Glickman says the fact that smaller breeds with deep, narrow abdomens have a higher incidence rate of bloat further supports the correlation of the abdomen depth/ratio and increased risk. “The only breeds of lesser size with a fairly high incidence of bloat are Basset Hounds and Basset Hound shaped breeds [including Dachshunds]. Compared to the size of the dog, they have a very deep, narrow abdomen.” Study findings also revealed the risk of bloat sometimes markedly differs between two breeds of roughly the same size. Glickman believes this is due to the difference in their shape. “Compare the setters—Irish and English—to the retrievers—Golden and

Labrador. Here are two breed types that are roughly the same size, yet, the setters have a much higher incidence. Setters have a very deep, narrow abdomen, while retrievers have a shallower, wider abdomen.”

## **TEMPERAMENT**

Interestingly, personality also turned out to be a major predictor of bloat at the breed level. Glickman explains, “We asked each individual in the study to rate their dog on a scale of 1 to 10 for things like aggressive to people, aggressive to dogs, submissive to people, submissive to dogs, excitability, fearfulness, happiness, trainability and whether the dogs are easily upset by strangers or new situations. We took the average score for each of these characteristics. Then, we looked at the relationship between the scores and the risk of bloat for the breed as a whole. Two clear trends emerged. First, the more fearful the breed, the higher the risk of bloat, and second, the more happy and easygoing the breed, the lower the risk.”

According to Glickman, it's not the amount of stress per se in a dog's life that is significant, but the way in which the animal's body reacts to it. That reaction is mediated by personality. “This is an important distinction because clearly there is nothing we can do about stress,” Glickman says. “All animals are stressed at times just as people. What is significant, though, is that a happy individual, whether a person or a dog, is less influenced by stressful situations than a highly anxious, fearful one.”

Differing responses to stress might influence the risk of bloat for the following reason. “When animals are placed under stress, there are certain stress hormonal and neural responses. Some of these responses clearly affect gastric motility. A fearful dog may have a very different response physiologically to stress than a happy, easygoing dog. We think those physiological responses may contribute to the rotation of the stomach because of the motility. This is the second or third time we have demonstrated temperament—particularly easygoingness or fearfulness—is related to the risk of bloat,” Glickman reports.

(Note: There were significant differences among the breeds in the study in terms of how the owners scored them for happiness/fearfulness. In addition, Glickman reports that even within breeds, there was variance of owner response; the scores represent averages. See the sidebar “The ‘Happiness’ Score” for specific rankings.)

## **AGING**

Although dogs of all ages were included in the study, in general, Glickman found the incidence of bloat increased with advancing age. “Bloat is like many other diseases seen in dogs,” he explains. “While it can occur at any age, generally, it is a disease of aging most commonly seen in older animals. That means we have to think about how bloat ties into the aging process (i.e., the aforementioned stretching or lengthening of the stomach ligaments).”

Breed-level analysis revealed the incidence of bloat in large-breed dogs started to increase dramatically at 3 years of age. In giant-breed dogs, that increase with age started much sooner—as early as 6 months of age. Given that bloat is a disease of aging, Glickman says these findings were predictable because giant-breed dogs age faster than do large-breed dogs and, therefore, don't live as long.

## **GENETICS**

Given the findings of this and previous studies, Glickman does not believe bloat is genetically based in the sense that one gene is responsible for causing it. “We're dealing with a complex condition where several genes interact to produce bloat. For example, things like size, shape and personality have a genetic basis. After all, what is conformation but genetics? What is personality but genetics? My own overview of what's happening and where I think all of this is leading in both this study and in other studies is that, rather than a particular gene causing the condition, certain inherited characteristics predispose breeds or individual dogs to bloat.”

### **Individual Dog Analysis**

At the breed level, Glickman compared factors that differed among the 11 breeds in the study. “In the second part, we looked at individual dogs to see why those dogs were at increased risk compared to other dogs in the study,” he says.

A lot more data were collected at the individual dog level because, as mentioned earlier, there was a total of more than 1,900 dogs in the study. Eighty-seven percent of their owners completed questionnaires, so detailed information was obtained on more than 1,600 dogs.

Risk factors analyzed in the individual dog level portion of the study included characteristics such as gender, neutering and spaying, weight, belching and flatulence, speed of eating and genetics; and environmental factors such as housing, travel, vaccination, restriction of water and exercise around mealtime, use of elevated food bowls, moistening food, giving preventive medications and number of meals fed. The following outlines some of the results:

## **GENDER**

Individual dog level analysis confirmed there is only a minimal difference in the risk of bloat between males and females. Males in the study had only a 14 percent higher incidence than did females.

## **NEUTERING AND SPAYING**

Likewise, neutering did not emerge as an important factor influencing the risk of bloat in the study.

## **WEIGHT**

Weight, on the other hand, did prove to be significant. “We have consistently found, and have been able to replicate it In this study, that dogs characterized by their owners as chronically under- weight are at higher risk than dogs characterized as average weight or even overweight,” Glickman notes. “This is a very important finding now that we've seen It for the third or fourth time. It suggests that, while bloat occurs acutely in dogs that show no previous indications they will bloat, these dogs may, in fact, have problems with their gastrointestinal tract long before they bloat, which may explain why they're chronically thin. A lot of factors point to the fact that there may be related, underlying problems within the GI tract that are manifested as doing poorly in terms of weight gain. Or it may simply be because they're fearful. It's hard to put weight on fearful dogs.”

## **DIET**

The Individual dog analysis also looked at the different types of food (e.g., canned, dry, semimoist and table scraps) fed to the Individual dogs In terms of the amount, brand, specific ingredients, fat preservatives used, fat sources used, kibble size, etc. Study participants reported more than 150 types of food being fed. Due to the magnitude of collecting information on such a large number of foods, the diet analysis is not complete at present but will be forthcoming shortly.

## **SPEED OF EATING**

Although specifics about the contents of diets still are being considered, Glickman did find in this study, as he had in previous studies, that the faster the dog ate, the greater the risk of bloat. He believes the increased risk may be related to gulping air while eating, which is one theory as to bloat's cause. The fact that many dogs that bloat do not do so immediately after eating seemingly contradicts this, however.

“One of the most confusing things in studying bloat is trying to determine why the stomach fills and distends so rapidly,” Glickman elaborates. “We used to think food was the cause. Now we know most bloat does not occur immediately after eating. In another study, we found that 70 percent of bloat cases occur late at night or early in the morning.

“We also now know that what's in the stomach is air, which can only come from one place. It has to be ingested or gulped. So, the issue becomes what causes some dogs to ingest large amounts of air and others not to. This suggests there is some underlying problem that does not just occur during an acute episode, but that happens repeatedly and that may be exacerbated by temperament. That is, dogs that don't cope well gulp air.”

Glickman's next study, which he already has begun and is funded by the Collie Club of America, will be a replication of a study done in Europe five years ago (F.J. Van Sluijs and W.T.C. Wolvekamp, "Abnormal Esophageal Motility in Dogs with Recurrent Gastric Dilatation-Volvulus," abstract, *Vet Surgery*, Vol. 22, No. 252, 1993). The European study found that the vast majority of dogs that have repeated episodes of bloat have defects in their swallowing mechanism. That is, when they swallow food, it doesn't flow as it should from the mouth to the stomach. In order to get the food to flow, the dogs have to gulp air to force it down.

"So far, we've only tested two dogs," he notes. "Both already had an episode of bloat and, it turned out, both had swallowing defects. For the first time, we may have some clues as to what the primary physical defect may be in terms of allowing this rapid intake of air. What we hope to do in the near future is offer owners of dogs at high risk a test to determine if their swallowing mechanism is defective. The test would be done by giving the dog a bowl of barium-coated food and following the progression of the food through the esophageal tract with a procedure called fluoroscopy. This will allow us to determine if the dog needs to swallow air in order to get the food down. If we can demonstrate this in the study, then we should be able to identify the dogs at highest risk."

## **GAS**

Tangent to the risk associated with eating rapidly and gulping air is the influence of gas in the gastrointestinal tract. "We also asked owners to characterize their dogs in terms of flatulence and belching to see if they were associated with increased risk of bloat," Glickman explains. "In fact, both were. In dogs that belch often, there was about a 60 percent increased risk of bloat. In dogs that had flatulence often vs. rarely, there was about a 20 percent increased risk. Dogs that had abdominal distention after eating regularly had about an 80 percent increased risk"

Glickman explains that if bloat/torsion is caused by the excessive swallowing of air, which he believes it is, then what is being passed orally (belching) or per rectum (flatulence) may be air and not gas. The fact that belching and flatulence may be more common in dogs that had bloat/torsion is perhaps because the same mechanism that leads to GDV also leads to belching and flatulence. In this case, he explains, there would be an association between belching/flatulence and GDV, but no causal relationship.

## **GENETICS**

In the individual dog analysis, having a first-degree relative that bloated turned out to be one of the strongest predictors. In fact, dogs with such relatives had a three- and four-fold increased risk of developing bloat. A first-degree relative was defined as either a parent, sibling or offspring. In other words, dogs that shared 50 percent of the gene pool.

Glickman believes grandparents that bloated also indicate risk. Pedigree analysis is difficult, however, because bloat is a disease of aging that may not manifest until a dog is 7 or 8 years old. Because of this, animals have to live almost their whole lives before bloat in the pedigree could be known. By that time, people often have lost track not only of grandparents, but parents and siblings as well.

Although getting complete family pedigrees with respect to bloat would be a difficult undertaking, Glickman believes doing so would be of great value. "Pedigree analysis would give us tremendous information about the specific mode of inheritance that we can't get just by asking about first-degree relatives," he says.

## **MANAGEMENT**

In terms of environmental risk factors, which included management, the individual dog analysis looked at things such as how the animals were housed, if they traveled, the frequency of vaccination, etc. None of these appeared to be associated with an altered risk of bloat. However, the study did reveal an increased risk of bloat associated with things such as restricting exercise before and after eating, restricting water before and after eating, giving preventive medications, moistening the food and raising the bowl's height. These findings were of great interest to Glickman because, until now, these measures commonly were thought to be preventive.

To further clarify these seemingly contradictory findings, Glickman compared the rate of use of these preventive measures in dogs that had a first-degree relative that bloated and in those that did not. He found that these practices more commonly were used by owners with dogs at high risk. Glickman then further analyzed the data to determine whether these practices are associated with bloat simply because the owners accurately had identified the high-risk dogs ahead of time, or if they actually were harmful or had no effect.

Prior to this last step in his analysis, his gut feeling was that all these practices probably would prove to have no effect. Indeed, his "final analysis shows that this is correct - except for raising the food bowl, which does appear to increase the risk of bloat; the higher the bowl, the higher the risk." Glickman says the elevation may be causing an increased incidence of aerophagia (excessive swallowing of air), which could account for the higher risk.

## **MEAL FREQUENCY**

Another commonly recommended measure for preventing bloat is feeding smaller, multiple meals. This procedure's effectiveness was horn out by the individual analysis part of the study. "in previous studies, we showed that as the number of meals fed per day increases, the risk of bloat decreases. We found the same thing in this study. If you take that to the fullest, then free-feeding should be best. We don't have the data to support that conclusion, however, because we don't have enough data on free-feeding in any of these studies to look at it by itself, since free-feeding is not commonly done



with large- and giant-breed dogs.” Glickman believes the link between feeding multiple meals and a lower incidence of bloat may be related to less distension of the stomach with smaller meals.

### **Lowering The Risks**

After reviewing the results of Glickman's study, if you believe your dog may be in the high-risk category, there are steps you can take to actively reduce the chances of bloat/torsion. Glickman makes the following preliminary recommendations based on what already is known:

1. Don't breed a dog if a first-degree relative has suffered an episode of bloat.
2. Consider a prophylactic gastropexy for dogs that fit the high-risk profile. (Note: Prophylactic gastropexy should be performed only if the dog already is neutered or will be neutered at the time of gastropexy. Breeders who prevent high-risk dogs from bloating by opting for this surgery, but then continue to breed the dogs mask the problem and destroy their selection criteria in a breeding context. For more information on this procedure, see the sidebar, “Emergency Treatment And Prevention.”)
3. Owners who have dogs that eat rapidly should do anything they can to slow the speed of eating. Owners in the study suggested all sorts of methods, some of which were quite effective. The most common and most effective strategy was to place a large object that the dog had to eat around in the food bowl. The object that worked best, although it sounds a little unusual, was a heavy chain with big links. Unlike a rock, which the dog can push out of the way, a heavy link chain forces the dog to eat under and around it.
4. Owners of anxious or fearful dogs should consider behavior modification. A growing number of animal behaviorists and veterinarians know how to intervene with these dogs. In some instances, drug therapy also may be warranted.
5. Feed smaller, multiple meals instead of one large meal per day.
6. Do not elevate the food bowl.

After his analysis of the study's results is complete, Glickman will make dietary recommendations based on types of feed if they are indicated.

Glickman believes the greatest value of this study is that it is prospective. “That means we collected all the information on the animals before we or the owners ever knew which ones would develop bloat and which would not,” he explains. “Thus we and the owners were totally unbiased in the way in which the information was collected.

“This is very different from all the other studies that have been done up until now. They took dogs that had already bloated and dogs that had not bloated and then went back and asked owners how they managed the dogs. Of course, owners of dogs that bloated remembered things much differently than owners of dogs that did not.”

The initial study findings will be published shortly in the Journal of American Veterinary Medicine. It is hoped that this and future research in this area finally will begin to offer owners definitive preventive powers against this horrific condition.

Editor's note: The results of the dietary analysis component of Glickman's research will be featured in a future DOG WORLD article.

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## **PLANNING AHEAD**

The following steps may help improve your dog's chances of survival should it suffer from bloat and torsion.

The signs of bloat and torsion should be memorized or posted in the kitchen or kennel. Because survival of this life-threatening condition depends on prompt treatment, owners of high-risk dogs exhibiting one or more signs of bloat and torsion never should take a "wait and see how the dog is in the morning" approach to veterinary intervention. Veterinary treatment should be sought immediately.

The nearest veterinary clinic offering 24-hour emergency service and having staff capable of performing gastropexy should be identified ahead of time. When a dog is fighting for its life, you won't have time to call around to find a clinic that is open, much less capable of performing gastropexy. The fastest route to the facility also should be determined and, because most bloat episodes occur after-hours, driven at least once in the dark. Owners always should be sure they have enough gas to drive to the emergency facility when they park their car every night as well.

The telephone numbers of the 24-hour facility and the dog's regular veterinarian should be posted by or on the phone. Whether a dog is being taken to its regular veterinarian for emergency first aid or directly to a 24-hour emergency facility, owners should phone ahead. Advance notice allows veterinary staff to be prepared to treat the dog immediately upon its arrival.

If owners live alone and own a dog that weighs more than they can lift, they should ask two neighbors in advance if they would be willing to assist in getting the dog into the car in an emergency situation. (As bloat and torsion advance, dogs become weaker and weaker. Eventually they are unable to walk.) Two people can carry a dog by using a blanket as a stretcher.

Perhaps most important of all, owners should learn from their veterinarians how to pass a stomach tube and insert a trocar. This especially is important if owners live a long distance from an emergency clinic.

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Editor's note: The following describes emergency procedures for treating bloat/torsion in the life-threatening stages; however owners should consult their veterinarian for advice and instruction on administering any type of first aid and recognizing when intervention is necessary. This is not meant as a replacement for such veterinary consultation.

### **EMERGENCY TREATMENT AND PREVENTION**

Bloat can occur at any time—not just after eating—and when it does, it can happen very swiftly. If it is not treated quickly, the dog will die. Because it can have a rapid onset, owners may not have time to get their dog to a veterinarian. When dogs are down and in shock, the only way to save them may be to perform emergency first aid. In this regard, the first thing to do is attempt to pass a stomach tube down into the dog's stomach to relieve the air. This is effective if the stomach has not already twisted. If it has twisted, however, the tube won't pass into the stomach. In that event, a large-gauge needle called a trocar, which is much larger than one used for giving vaccines, should be inserted into the side of the huge, distended abdomen to allow the air to escape. There is a hissing sound as the air is released. (To be prepared, owners of high-risk dogs should have their veterinarians train them to do these procedures in advance and provide them with the necessary equipment.)

Note: Owners who fear they will injure their dog seriously or cause it to bleed to death by inserting the needle into its abdomen need not worry. A dog with a dilated abdomen will not bleed to death after the abdomen has been punctured with the needle. But, even if an owner did do damage, the dog almost certainly would die anyway without emergency first-aid treatment so the owner has little choice.

Whether emergency first aid is performed by the owner or veterinarian it buys time to transport the dog to a facility capable of performing the necessary surgery

## **DIAGNOSIS AND TREATMENT**

A high percentage of bloat cases can be confirmed clinically. When the dog has a huge, distended stomach and is in shock, there is little question that bloat is the cause. When bloat occurs without the gross, abdominal distention, however diagnosis is somewhat trickier. In these cases it must be confirmed by X-ray. Although every veterinarian should be equipped to diagnose the condition, not all are capable of performing the surgery needed which involves opening up the abdomen, emptying the stomach contents, repositioning the stomach in its normal position and fixing it permanently in place so it cannot rotate.

The stomach permanently is fixed in place with a procedure called gastropexy. This prevents the stomach from twisting again in the future by attaching it to some fixed structure in the abdominal cavity such as a rib or the body wall. This may be done in several ways all work well. Gastropexy will not prevent dilatation from recurring, but it effectively prevents volvulus. Thus if dilatation recurs, it is not life-threatening because the stomach cannot twist.

It is important to note that if first aid is performed but not followed by gastropexy on a dog that has had a bloat episode, bloat likely will occur again. (Gastropexy commonly is performed after a bloat episode, even if torsion has not occurred.) In dogs that had acute bloat episodes, the one-year recurrence rate in those that had only first aid was more than 90 percent, while the recurrence rates in those that had gastropexy were about 2 percent to 4 percent in the following year. If gastropexy is performed prophylactically, the one-year risk of bloat may be even lower.

## **PROPHYLACTIC GASTROPEXY**

Because many people are concerned their dogs are at high risk for bloat and worried they may not be there when it happens, prophylactic (preventive) gastropexy is becoming more common. It is best to have it performed by a veterinary surgeon who has done it before, however, just as the surgery for bloat itself should be performed by an experienced surgeon.

The ideal time to perform gastropexy is when the animal is being neutered. When done in this context postoperative care for prophylactic gastropexy is no different than for a normal spay. When gastropexy is performed on a dog with an acute episode of bloat, however it is more involved and delicate and has high mortality rates. It also requires very intensive therapy for several days afterward, often has complications and is very expensive. Gastropexy performed following an episode of bloat may cost \$3,000 or more while prophylactic gastropexy may cost as little as \$200.

Prophylactic gastropexy is recommended in some instances if a dog fits the high risk profile (e.g., belongs to a breed known to be at high risk, has a first degree relative with

a history of bloat, etc.). Animals that undergo prophylactic gastropexy because of their high-risk status should not be used for breeding. Information in this sidebar was provided by Larry Glickman, V.M.D., Dr. Ph.D.