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GERMAN SHEPHERD DOG Update

A NESTLÉ PURINA PUBLICATION DEDICATED TO GERMAN SHEPHERD DOG ENTHUSIASTS

VOLUME 17 | FALL 2019

SURVIVING BLOAT

New Treatment
May Improve Outcomes

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NEW DECOMPRESSION TECHNIQUE MAY SAVE LIVES OF GERMAN SHEPHERD DOGS WITH BLOAT

“Usually there is no rhyme or reason for why a dog bloats. The outcome depends on how quickly you can decompress the gas in the stomach before it cuts off the blood supply to vital organs and tissues.”

Carla Griffith, breeder of vom Spezialblut German Shepherd Dogs

When her 9-year-old black and red female German Shepherd Dog, “Winnie” (Winnie vom Spezialblut SchH3 FH CD TT JH), came back from a routine bathroom break before bedtime with a life-or-death case of gastric dilatation-volvulus (GDV), MelloDee Middleton went into survival mode.



“Winnie” survived an episode of bloat at age 9 and lived to be 14 years old.

“I called my friend and Winnie’s breeder, Carla Griffith, and said, ‘I think Winnie is bloating,’” says Middleton, of Princeton, Texas. “Winnie was screaming. It was a sound I had never heard before. I could see her stomach swelling.”

A veterinary technician, Griffith, of Statesville, North Carolina, formerly of Princeton, Texas, drove to Middleton’s home, about 20 minutes from where

she lived. When she arrived, Winnie’s gums were blue, and her eyes were dilated.

Middleton, who breeds under the Gernelhaus prefix, bought Winnie to segue to German-bred working dogs after 17 years in the breed. She and Winnie had earned several titles. Griffith had imported Winnie’s dam, Isar vom Steinaeker SchH3 CDX JH, from West Germany, and the sire, Garner vom Kirschtal, was an imported West German herding champion.

The owner and breeder drove 45 minutes to transport Winnie to the closest emergency clinic in Dallas. “They took a radiograph and saw that her stomach was twisted,” says Griffith, of vom Spezialblut German Shepherd Dogs. “Fortunately, they had an experienced surgeon who performed the bloat surgery and a gastropexy to prevent the stomach from twisting in the future.”

Winnie is an example of how quickly GDV, more commonly known as bloat, happens with little forewarning in large- and giant-sized, deep-chested dogs. German Shepherd Dogs are the most commonly reported breed to get GDV. Thus, a minimally invasive gastropexy procedure



is recommended to be done prophylactically at a young age, particularly in dogs in which a direct relative such as a parent, littermate or half-littermate, has bloated, to prevent it from occurring, says William A. Fox-Alvarez, DVM, MS, DACVS, assistant professor of small animal surgery at the University of Florida.

At many clinics today, a veterinarian performs gastropexy laparoscopically using two to three incisions and cameras to help guide the procedure. Minimally invasive surgeries have been shown to decrease pain, shorten recovery time and minimize scarring of the skin, says Dr. Fox-Alvarez.

"Usually there is no rhyme or reason for why a dog bloats," Griffith says. "I consider myself lucky to have only had four dogs bloat over the past 30-plus years in German Shepherd Dogs. The outcome depends on how quickly you can decompress

the gas in the stomach before it cuts off the blood supply to vital organs and tissues."

GDV PROGRESSES FAST

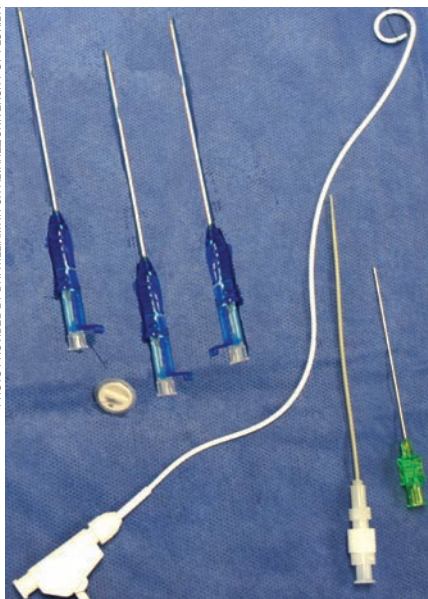
Gastric dilatation occurs when the stomach fills like a balloon with gas. As bloat progresses, the gas-filled stomach twists 180 degrees clockwise on its side, cutting off an escape for the gas through the esophagus or duodenum. This is known as gastric dilatation with volvulus. GDV results in a profound distension of the stomach that compresses vital blood vessels and organs in the abdomen and reduces oxygen to those organs. Eventually tissue death occurs, and toxins are released into the bloodstream.

Bloat happens so fast that dogs can die within two hours of the first signs. As the gas builds up in the stomach, a dog becomes increasingly uncomfortable. Owners may notice their dog pacing, panting, retching unsuccessfully,

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PHOTO PROVIDED BY DR. WILLIAM A. FOX, ALABAMA UNIVERSITY OF FLORIDA



Supplies used for the G-cath decompression technique will soon be available in a kit for veterinarians.

and standing with a hunched back. Clinical signs include a distended abdomen, pale gums, and a weak, rapid pulse. Shock may occur when the vena cava, the large vein carrying deoxygenated blood back into the heart, becomes blocked from the stomach's twisting and distention.

Among the theories about what causes bloat, owners historically have suspected their dogs gulp atmospheric air when eating. A [study published in 2013 in the *Journal of Veterinary Internal Medicine*](#) found otherwise. The researchers examined the stomach gas of 10 dogs admitted to an emergency clinic for GDV surgery and concluded that the gas is due to bacterial fermentation similar to the fermentative bloat that occurs in cattle. In an earlier study, these researchers showed that the stomach contents of a dog with GDV continue to

expand and bubble in a plastic container until the top pops off.

"Bloat is a complex inherited disorder in which multiple environmental factors also come into play in predisposing a dog to GDV," says Jerold Bell, DVM, adjunct professor of genetics at the Cummings School of Veterinary Medicine at Tufts University and a genetics advisor to national parent breed clubs. "Unfortunately, there is no complete picture of the pathogenic mechanisms involved in causing bloat."

Reviewing published articles and breed health surveys, Dr. Bell compiled [a report on bloat that was published in 2014 in *Topics in Companion Animal Medicine*](#). "About 46 breeds of dog are susceptible to bloat," he says. "These articles show that the German Shepherd Dog is presented most frequently for GDV, followed by the Great Dane, mixed breeds, Standard Poodle, Labrador Retriever, Akita, Golden Retriever, Saint Bernard, Doberman Pinscher, and Chow Chow. There are many other breeds susceptible to GDV, but their smaller populations do not register in these incidence studies."

The risk of developing GDV increases with age, Dr. Bell says. "Dogs having a large body size and deep chest structure essentially provide a large abdominal body cavity in which a stomach heavily laden with food can stretch the hepatogastric ligament, a ligament that holds the stomach in place, and allow for increased motion and volvulus, or twisting, of the stomach. The fact that the

risk increases with age may relate to the progressive stretching of the hepatogastric ligament.”

Emergency surgery to untwist the stomach and check for dead tissue provides the best outcome for dogs with GDV. Prior to surgery a dog must be stabilized. This involves relieving pressure from the gas in the stomach and treating a dog for shock. As with Winnie, a gastropexy is performed during emergency surgery. This procedure, which is recommended prophylactically in at-risk breeds to prevent GDV from recurring, involves tacking the stomach to the right side of the abdominal wall to prevent future shifting or twisting of the stomach.

Time is of the essence when a dog bloats, yet sometimes a surgical delay is unavoidable. For example, a dog may need to be transported to an emergency facility equipped for performing bloat surgery, or owners may need time to consider the emotional and financial costs involved.

“Mortality from bloat ranges from 10 to 50 percent, depending on the severity and duration of gastric dilatation,” says Dr. Fox-Alvarez. “For this reason, rapid and effective decompression of the stomach is critical for successful treatment of dogs with GDV.”

“As decompression releases built-up toxins into the bloodstream, concurrent treatment for shock is important for survival,” adds Dr. Bell.

A new decompressive gastrostomy catheter (G-cath) technique adapted from human medicine may help stabilize

dogs and keep their stomachs decompressed while awaiting surgery. As the lead investigator of a study to evaluate the technique, Dr. Fox-Alvarez worked with his surgical residency mentor, Brad Case, MS, DVM,

SIGNS OF GASTRIC DILATATION-VOLVULUS

- Dry heaving
- White foam and yellow stringy mucus
- Tight, hard abdomen
- Pale gums
- Weak, rapid pulse
- Pacing
- Panting
- Standing with a hunched back

If your dog exhibits signs of bloat, it is important to go immediately to an emergency veterinary clinic, as a dog’s condition can become critical within two hours of showing signs.

DACVS, associate professor of small animal surgery at the University of Florida, whose idea it was to explore a sustained decompression method for dogs with GDV.

The two-year study, completed in October 2017, was funded by the AKC Canine Health Foundation and sponsored by the American German Shepherd Dog Charitable Foundation (AGSDCF). An article of the research detailing the first time this device was used to treat dogs with GDV will be published later in 2019 in the *Journal of the American Veterinary Medical Association*.

“We wanted to examine the minimally invasive G-cath for its ability to immediately and continuously alleviate gas distention in the stomach of bloat patients,” Dr. Fox-Alvarez says. “Going into the study, we knew it was quick to perform — under 4 minutes. We also knew from a pilot study that it proved successful at effectively providing continuous gastric decompression. For dogs in which surgical delays are unavoidable, this potentially would be ideal to sustain their decompression.”

The two most common methods currently used by veterinarians to decompress the stomach of a dog with GDV are: 1) to pass an orogastric tube, essentially a feeding tube, from the mouth to the stomach, or 2) to percutaneously trocar, or penetrate the stomach through the skin, using a large needle. A negative aspect of both procedures is that they only temporarily decompress the stomach.

“In time, the stomach fills back up with gas and begins to compress critical abdominal blood vessels,” explains Dr. Fox-Alvarez. “We observed in a hospital how doctors gain access to the stomach of humans in a minimally invasive manner. We borrowed from them and applied their techniques.”

The G-cath method involves creating a temporary gastropexy by attaching the stomach wall to the body wall so it doesn’t move or fall away as the stomach decompresses and shrinks. A veterinarian uses T-fasteners to secure the gastropexy and then inserts a decompressive G-cath, essentially a pigtail decompressive catheter, in which the tip stays in the stomach



“I am hopeful that insights about what occurs in the genetics and gut microbiome of German Shepherd Dogs with bloat will be coming.”

Michael A. Harkey, PhD, of the Fred Hutchinson Cancer Research Center

to continue decompressing the gas until it is removed at the time of surgery.

Sixteen dogs, including seven German Shepherd Dogs, more than any other breed, were part of the study, as well as three Great Danes and one dog of these breeds: Doberman Pinscher, Giant Schnauzer, Golden Retriever, Greyhound, Standard Poodle, and Weimaraner. The overall median age was 8 years old. The purpose was to compare the newly adapted G-cath technique and the standard trocarization procedure by measuring gas pressure in the dogs' stomachs.

The dogs, which were treated at the emergency and critical care service at the University of Florida, were diagnosed with GDV based on their clinical signs and abdominal radiography. Eight dogs were randomly assigned to the “trocar group” in which the standard trocarization procedure was used to decompress the gas in their stomachs and eight dogs were randomly assigned to the “G-cath group.”

The good news is that all dogs in the study survived, says Dr. Fox-Alvarez. “There were not a large number of dogs in this study, which makes it challenging to determine if survival would be affected. The next step is a larger study with more dogs with GDV.

“The ability to keep the stomach decompressed means we are able to eliminate the most damaging component of GDV and truly stabilize a dog before surgery,” he says. “We believe that this

procedure will prevent the gas buildup from returning and has the potential to improve how stable a dog is before being put under anesthesia. We expect it will help improve outcomes for GDV patients.”

GENETICS & GUT BACTERIA

Meanwhile, a genetics study to identify the role of immune system genes and the gut microbiome in German Shepherd Dogs with GDV is soon to be completed at the Fred Hutchinson Cancer Research Center. This two-and-a-half-year study, also supported through a grant by the AKC Canine Health Foundation and sponsored by AGSDCF, aims to identify mutations in genes containing risk alleles associated with bloat.

Lead investigator Michael A. Harkey, PhD, says, “We are investigating whether bloat in German Shepherd Dogs is associated with the same risk alleles and the same microbiome profiles as we saw previously in Great Danes, where we identified a single major risk allele in each of three genes. The study in Danes provided insights indicating that an altered bacterial population, an imbalance or dysbiosis, in the gut microbiome of dogs that have bloated is associated with specific genes in the major histocompatibility complex, a group of genes that code for proteins found on the surface of cells and that help the immune system recognize foreign substances.

“In this study, we are analyzing two groups of German Shepherd Dogs — those that had at least one episode of GDV requiring emer-

gency surgery and a control group that had never experienced severe gastric dilatation or torsion or any other major gut-related problem.”

The research team collected stool samples from which they extracted bacterial DNA and used rapid sequencing to identify and quantify the thousands of bacteria in the gut. The goal is to identify bacterial species that may be unusually high or low in dogs that bloated compared to those that did not.

“Unfortunately, we have not found the same variations in the same genes of the immune system as we saw in Great Danes,” Dr. Harkey says. “While the DLA-88 gene and its risk allele 05101 occurred three times more frequently in Danes that bloated than in those that did not, we never found this risk allele in German Shepherd Dogs. The DRB-1 gene and its 01201 variant, which showed up in Danes with bloat two times more than in control dogs, was not significant in German Shepherd Dogs. The third gene we found in Great Danes, TLR-5 and its D risk allele, also did not occur in German Shepherd Dogs.”

Although the genetic work in German Shepherd Dogs has not identified gene mutations that would help identify dogs at risk for bloat as occurred in the Great Dane study, the work continues. “I am hopeful that insights about what occurs in the genetics and gut microbiome of German Shepherd Dogs with bloat will be coming,” Dr. Harkey says.

Reflecting on the complexity of breed genetics and bloat,

AKC CANINE HEALTH FOUNDATION SUPPORTS BLOAT RESEARCH

A longtime supporter of studies investigating gastric dilatation-volvulus (GDV), commonly known

as bloat, the AKC (American Kennel Club) Canine Health Foundation remains committed to ongoing and future research into GDV, says Diane Brown, DVM, PhD, CEO of the AKC Canine Health Foundation.



Dr. Bell says, “More research is needed to evaluate factors related to body size, conformation, temperament, gastric mobility and contraction, and the microscopic anatomy of the stomach and the hepatogastric ligament. Studies should be performed on the gut microbiome of GDV-affected dogs that embrace all facets of a dog’s genetic makeup.”

Meanwhile, Winnie went on to live a healthy life. “She was my foundation bitch for German working dogs,” Middleton says. “Winnie lived to be 14 years old. Catching her bloat in time was the biggest thing that saved her. It’s always the hardest part.” ■

Purina appreciates the support of the American German Shepherd Dog Charitable Foundation (AGSDCF), particularly Ginny Altman, current vice president of the Foundation and past president of the German Shepherd Dog Club of America, in helping to identify topics for the *German Shepherd Dog Update*. The AGSDCF board of directors also helps to identify topics.

Purina and the AKC Canine Health Foundation have worked together since 1997 to support canine health research to benefit all dogs.

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*Data was collected by Relevation Research via an online survey from August 15-19, 2018. A total of 826 nationally-representative dog owners qualified and completed the survey. Qualified participants were men and women age 18 and older, owned one or more adult dogs, were household members most responsible for taking the dog(s) to a veterinarian, and had taken the dog(s) to a veterinarian in the past 12 months.

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