Dachshund Megaesophagus Research Focuses on Finding Genetic Marker

When her 4-week-old miniature Dachshund puppy “Piper” was diagnosed with megaesophagus, Pam Giles of Des Moines, Iowa, began learning all she could about the potentially fatal congenital condition. Although the miniature Dachshund enthusiast had competed with her dogs in conformation, obedience, rally, agility, earthdog, and field trials for nearly 10 years, she had never heard of the condition.

The first thing Giles did was to wean Piper so the puppy could be fed in an upright position. Veterinarians generally recommend feeding affected dogs small, frequent meals from an elevated or upright position. Feeding them as vertically as possible to the ground allows gravity to pull food down to the stomach.

Megaesophagus is caused when the esophagus, the long tube connecting the pharynx to the stomach, fails to move food into the stomach. When normal dogs eat, their food is pushed into the stomach by a process known as peristalsis. As the muscular walls of their esophagus progressively contract from the upper esophagus, food is worked downward to the stomach. The swallowing sequence is completed when the sphincter muscle relaxes to allow food to enter the stomach.

Dachshunds are among more than 30 breeds genetically predisposed to megaesophagus. No statistics are available on the prevalence of the condition in the breed, so the Dachshund Club of America is planning to conduct a health survey in the near future to gather information from owners and breeders.

Charlotte Borghardt, chair of the parent club’s Health Committee, says, “We have only anecdotal information about megaesophagus in Dachshunds. We need to learn how common it is so breeders can find a solution.”

Inconsistent Mode of Inheritance

Researchers at Clemson University aim to identify a genetic marker for megaesophagus in Dachshunds. Leigh Anne Clark, PhD, assistant professor in the Department of Genetics and Bio-chemistry, is hoping to apply information learned about the disease in German Shepherd Dogs to Dachshunds.

A study of 180 German Shepherd Dogs, which included 18 affected dogs, identified a region likely to contain a gene involved in the disorder. “We found in German Shepherd Dogs that megaesophagus is not a simple autosomal disorder,” Clark says. “There may be multiple genes and environmental factors at play because not all dogs with genetic markers for this disease show clinical signs.”

Study Shows Proper Storage and Shipment of Semen Is Important for AI Breeding

Artificial insemination (AI) gives breeders an opportunity to breed dogs that otherwise might not be possible due to geographical location, behavior incompatibilities or other factors. A recent study examined whether antibiotics added to commercial semen extenders to increase shelf life inhibit the growth of bacteria in semen samples.

“Breeders are not shipping females for natural breeding as much today and thus are turning more to AI,” says Ginny Altman, vice president of the American German Shepherd Dog Charitable Foundation. “Since semen collection introduces bacteria into the semen sample from normal bacterial flora, we wanted to learn whether the antibiotics used in extenders control the growth of bacteria.”

The study,” funded by the AKC Canine Health Foundation with support from the
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The goal is to develop a genetic test that will identify affected dogs and those that carry the gene(s) for megaesophagus. “This will enable breeders to plan matings that will not produce affected dogs,” Clark says.

In future genetic research, Clark plans to study DNA samples from Dachshunds using single nucleotide polymorphism (SNP) chip analysis. Samples from affected and healthy dogs will be used in a genome-wide analysis to help identify candidate genes that may contain the mutation. Comparing the SNP profiles between the two groups of dogs will allow researchers to focus on a small area of the canine genome. The regions of difference help to distinguish the location of disease genes.

“It appears the disease is inherited differently among different breeds, thus it may be caused by mutations in different genes or by different mutations in the same gene,” Clark says. “The mode of inheritance is determined by the mutation and its effect on the gene. Once a marker is known, learning the inheritance pattern should come easily.”

In addition to Dachshund and German Shepherd Dog, other breeds affected by megaesophagus include Great Dane, Miniature Schnauzer, Rhodesian Ridgeback, and Wire Fox Terrier. In Miniature Schnauzers, the disease is believed to have an autosomal dominant mode of inheritance, and in Wire Fox Terriers the inheritance is believed to be autosomal recessive. Although the inheritance pattern is not known in Rhodesian Ridgebacks, the disease was ranked first among gastrointestinal disorders in a 2001 breed healthy survey that indicated an 81 percent mortality rate.

A Primary & Secondary Condition

Megaesophagus is a congenital condition usually diagnosed during weaning, when puppies are 6 to 8 weeks old, as solid food is introduced. Coughing and regurgitation of food and water are common. Since ingested food moves into the stomach only as a result of gravity, it often stays in the esophagus from several minutes to hours. This causes the tube to dilate or stretch, which explains why the condition is named “megaesophagus.”

Megaesophagus also occurs secondary to conditions such as myasthenia gravis, a neuromuscular disease that causes muscle weakness and fatigue, and Addison’s disease, a disorder caused by insufficient production of adrenal hormones. It can be confused with geriatric onset laryngeal paralysis polyneuropathy, a progressive nerve disease that causes regurgitation.

A definitive diagnosis usually is made from radiographs taken after a dog has undergone a barium swallow test containing a contrast agent to help make the abnormality easy to recognize. Radiographs of the esophagus help to distinguish the condition from diseases that mimic megaesophagus and require different therapies.

Mildly affected dogs may not show signs other than occasional regurgitation or coughing. Moderately to severely affected dogs may suffer from repeated regurgitation, malnutrition, excessive salivation, and physical wasting, with frequent coughing or wheezing.

Regurgitation is the most common clinical sign, though owners sometimes mistake regurgitation for vomiting. Regurgitation is a passive expulsion of undigested food, whereas vomiting is the forceful ejection of stomach contents. The primary life-threatening effect of megaesophagus is aspiration pneumonia caused by the leakage of food, water or saliva into the lungs.

Treatment consists of trying to help food reach the dog’s stomach. Owners usually first try small, frequent feedings from an upright position to take advantage of gravity. Moistening kibble or pureeing food to help it pass through the esophagus to the stomach can be helpful. In some cases, a gastrostomy tube can be inserted through the skin and wall of the abdomen directly into the stomach to get nutrition into the stomach.

Practicing Proper Care

Many dogs diagnosed with megaesophagus die or are euthanized within weeks or months. Although Piper wasn’t expected to live a year after being diagnosed, the miniature Dachshund survived and is 9 years old today. Fortunately, her condition was mild.

Giles was determined to provide the best care possible to help the puppy. “As soon as I got home from my veterinarian’s office following Piper’s diagnosis, I joined the Yahoo Megaesophagus Group,” she says. “I spent the entire night researching how to feed and care for her.”

During the first year, Piper suffered from aspiration pneumonia, regurgitating foamy liquid with bits of food. Giles fed the puppy three times a day, propelling her up in a cookie jar to keep her upright for 30 minutes after she ate. Then, she crated Piper for another 30 minutes to rest and let her food settle. She also gave the dog metoclopramide, a medication that promotes motility, 30 minutes before her first and last meals of the day.

When Piper was 8 months old, Giles noticed the dog had not regurgitated in a month. She began feeding her as she would a normal dog. This worked until Piper was 9 months old and again developed aspiration pneumonia. Eventually, Giles resumed feeding Piper normally, but the miniature Dachshund developed aspiration pneumonia two more times. Today, Giles prepares meals for Piper by warming Purina Pro Plan Wet Entrées with water.

“I am so grateful for the help I have received for nearly 10 years from members of the megaesophagus support group,” Giles says. “Without other major health issues, dogs can live long, happy lives, providing their megaesophagus is properly managed.”

Purina appreciates the support of the Dachshund Club of American and particularly Charlotte Borghardt, chair of the DCA Health Committee, in helping to identify topics for the Purina Pro Club Dachshund Update newsletter.
American German Shepherd Dog Charitable Foundation, was led by Carla Barstow, DVM, and Margaret Root Kustritz, DVM, PhD, DACT, professor of small animal reproduction at the University of Minnesota College of Veterinary Medicine. They recruited 14 male dogs from members of all-breed clubs in the Minneapolis area. Included were six Samoyeds, six Malamutes, one English Springer Spaniel, and one Labrador Retriever, ranging from 2 to 9 years of age.

“We hypothesized that the growth of aerobic, anaerobic and Mycoplasma bacteria would be controlled in semen extended with commercial canine extenders when stored at refrigerator or room temperatures for up to 48 hours,” Barstow says.

“Our study was intended to mimic what can happen in the real world. It is important for the receiving veterinarian who will do the AI procedure and the brood bitch owner to know that the semen product they are using is safe. In reality, manufacturers include antibiotics in extenders to prolong shelf life, not inhibit bacterial growth.”

Commercial semen extenders are used with chilled and frozen semen. Extenders are liquid media that support spermatozoa by providing nutrients and a buffering capacity to offset changes in temperature that occur during storing and shipping.7

Chilled semen must be shipped and inseminated in a bitch within 24 hours of collection to retain viability and reduce the risk of disease. In addition to normal bacterial flora from a male dog’s urethra, semen can be infected from urine in the urethra and organisms that are shed from prostatic or testicular fluid caused by systemic infection.

Preventing disease transmission by AI will protect bitches only if an antibiotic is added to the semen. Two commercial canine extenders commonly used by theriogenologists, or reproduction specialists, were tested in the study. One extender contains several antibiotics, and the other has a single antibiotic.

“Semen shipments may have been sitting on a hot truck all day with melted ice packs,” Barstow says. “Worse yet, they may have been left in an uncontrolled environment in which you have no idea whether the box was opened or whether the ice packs were left in place.”

In the study, each semen sample was separated into 11 samples. Three cultures, considered neat samples, had no extender added and were tested for anaerobic, aerobic and Mycoplasma bacteria. The remaining semen was separated into two groups for adding the respective extender products. The individual extender groups were stored at room temperature (20 degrees Celsius) or refrigeration temperature (5 degrees Celsius) and tested for aerobic and Mycoplasma bacteria at collection, 24 hours and 48 hours.

“We noted an expected motility loss in the first 24 hours,” says Barstow. “We also found that the motility of spermatooza was not affected by the presence of bacteria, thus motility is not a measure to determine whether a sample contains bacteria.”

Related to bacterial growth, 35 percent of dogs had significant growth of bacteria in their semen, which is in accord with information from the literature, Barstow says. Bacterial growth was controlled in samples that were held at refrigeration temperature, but not in all the samples that were held at room temperature.

“Importantly, there was no significant growth in any refrigerated sample, which is the protocol for shipping chilled semen samples,” she says. “The question was whether extenders work as we thought they did, and yes, we showed they do.”

Check out upcoming Purina-sponsored show and sporting events at venues across the country. These events are great opportunities to meet dog enthusiasts, canine experts and Purina representatives who can answer questions about Purina Pro Plan dog food and Purina Pro Club.

Follow the Pro Plan Champion Cup Leaders

View the Top 10 dogs leading the 2015 Pro Plan Champions Cup competition. The yearlong Pro Plan Champions Cup award is sponsored by Purina Pro Plan brand dog food and is based on points tabulated from Bests in Show and Group placements at more than 200 Purina-sponsored all-breed dog shows. The winner receives a $10,000 cash prize, an original oil painting by dog portrait artist Linda Draper and a keepsake Pro Plan Champions Cup trophy.

Purina Pro Plan Introduces NATURAL Dog Food

Purina Pro Plan dog food recently launched a new natural line. Purina Pro Plan NATURAL Formulas Plus Essential Vitamins and Minerals offer outstanding nutrition with high-quality natural ingredients. This natural dog food contains no corn, wheat or soy; no added artificial colors, flavors or preservatives; and no poultry by-product meal. Purina Pro Plan NATURAL includes three Adult Grain Free formulas: Chicken & Egg, Lamb & Egg, and Tuna & Egg. There also are two all life-stage formulas, Chicken & Brown Rice and Turkey & Barley, and one adult dog formula, Duck & Rice Formula.

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