

Dalmatian Update

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Urine Concentration Is Key Indicator of Bladder Stones

Dalmatian breeder Donna Truitt could not believe that her 4-week-old male puppies were experiencing urinary stones. In fact, when the litter was born in 2003, the diagnosis for the first puppy was intestinal blockage.

The dam had been nursing the litter of eight puppies until she came down with mastitis, a painful condition in which the breasts become infected, making it impossible to nurse. "The puppies weren't even close to being weaned, and they weren't good water drinkers yet," recalls Truitt who had never experienced stone problems after a decade of breeding Dalmatians.

When the first male puppy stopped eating and was diagnosed with intestinal blockage, Truitt followed the recommendation of her veterinarian and had the puppy euthanized. A second, and then a third puppy showed the same signs. Truitt, who lives in Powell, Tenn., took the puppies to an emergency veterinary clinic where they were diagnosed with urethral obstruction.

"When the second male blocked, I knew I had a serious problem," Truitt says. "I also noticed that stones would come out even when the females squatted. My veterinarian wanted me

to put down the whole litter. I couldn't do it."

The emergency veterinarian inserted a catheter into the male puppies that had urinary blockage. Truitt called a friend, and the next morning, the two women and the seven surviving puppies drove 286 miles to Durham, N.C., to see Susanne Hughes, D.V.M., who practices at Colony Park Animal Hospital. "Mike," one of the puppies with urinary obstruction, rode the whole way in Truitt's arms.

"The first thing Dr. Hughes said to me was, 'This isn't the first time I've seen young dogs with this problem,'" recalls Truitt.

Hughes is not only a veterinarian. She also is a Dalmatian owner and breeder impassioned about reducing health problems in the breed. At the 2006 and 2005 Dalmatian Club of America (DCA) National Specialties, Hughes conducted ultrasound testing for bladder stones and oversaw the collection of urine samples that would be analyzed for concentration and acidity. The testing was part of health clinics subsidized by the DCA Foundation.

Her efforts have led to the first large-scale study of its kind, utilizing

ultrasound bladder tests in Dalmatians. Importantly, the study emphasizes that urine concentration is a key indicator whether a dog may potentially develop stones. The finding challenges the

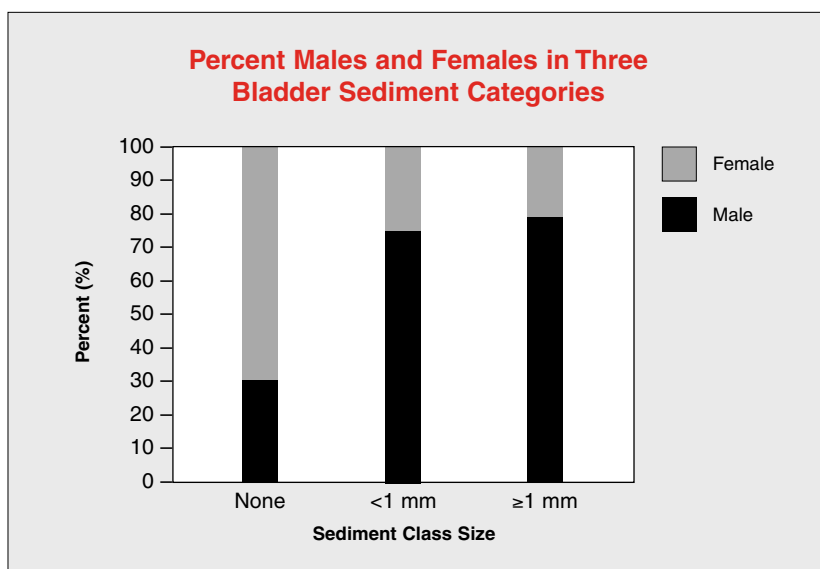
THE STUDY FOUND THAT URINE CONCENTRATION WAS THE GREATEST INDICATOR WHETHER A DOG WOULD HAVE SEDIMENT OR STONES IN HIS BLADDER. DOGS WITH DILUTE URINE HAD MINIMAL OR NO STONES, WHILE DOGS WITH A HIGHER URINE CONCENTRATION WERE MORE LIKELY TO BE STONE POSITIVE.

long-held belief that pH level is the best indicator of those most prone to develop stones.

Cynthia Wilson, Ph.D., of Duke University, provided statistical analyses for the 377 dogs participating in the health clinics. Hughes and Wilson's large-scale ultrasound evaluation of Dalmatian bladders documented the first report into this serious health condition in Dalmatians.

A Genetic Condition

The propensity to form bladder stones, as most Dalmatian owners already know, is a genetic problem common to all Dalmatians. Purebred Dalmatians have an anomaly of the liver — a membrane transport defect — that prevents uric acid from changing into water-soluble allantoin. The defect causes Dalmatians to have levels of uric acid 10 times higher than other breeds. The condition has a non-sex linked recessive mode of inheritance, making all Dalmatians



Percentage of male and female dogs with no sediment, sediment less than 1 millimeter, and sediment equal to or greater than 1 millimeter, based on findings from ultrasound bladder tests performed at the 2006 and 2005 DCA National Specialties. Source: Susanne Hughes, D.V.M.

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Urine Concentration

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potentially susceptible to urinary stone formation.

Since uric acid does not easily dissolve, uric acid salts can crystallize and form sediment or bladder stones. These stones can obstruct in male dogs, and if not treated immediately, can cause death. Because of physical differences in the urethra of male and female dogs, females rarely, if ever, obstruct. In males, the urinary pathway passes through the os penis where stones can get lodged and cause obstruction. Females rarely obstruct as there is no narrowing of the urinary pathway. In the ultrasound study, only 25 percent of females had any measurable sediment in their bladders, compared with 71 percent of males.

The first recorded mention of urethral blockage in Dalmatians dates to the early 1800s. Today, veterinarians still have difficulty identifying which dogs will form stones. Traditionally, Dalmatians have been categorized as potential stone formers based on a history of urethral obstruction.

The study conducted by Hughes and Wilson documented the prevalence of urinary bladder sediment and stones, and specifically looked at the influence of sex, urine pH and urine concentration. The health clinics, and thus the study, were open to any Dalmatian owner attending the National Specialties. The urinary bladder ultrasound examinations were free.

As part of the health clinics, owners completed questionnaires with information about their dogs' age, sex, diet, supplements, medication, and urinary disease history. In collecting urine samples, technicians took the first urine of the morning from 313 of the 377 dogs that participated.

The study found that urine concentration was the greatest indicator whether a dog would have sediment or stones in his bladder. Dogs with dilute urine had minimal or no stones, while dogs with a higher urine concentration were more likely to be stone positive.

Of the 377 Dalmatians in the study that received ultrasound testing, 189 showed no sediment while 188 had sediment. The findings indicate that more dogs had sediment and/or stones than even owners realized.

Surprisingly, no significant differences in urine pH were determined for dogs with stones or those without stones. "The once tried-and-true method for monitoring dogs for stone disease — a dog's urinary pH level — suddenly seemed to not be the gold standard after all," Hughes says.

Hydrating with Fluids

Truitt participated in the ultrasound testing at the 2005 health clinic with four of her male show dogs. Two tested positive for stones. "I began to watch

Steps to Help Avoid Stone Formation in Dalmatians

Dalmatians are prone to developing urinary stones due to an inability to convert uric acid to allantoin, a urinary excretion product of purine metabolism. Here are steps that Susanne Hughes, D.V.M., who practices at Colony Park Animal Hospital in Durham, N.C., recommends to help reduce stone formation:

- Be sure to provide plenty of water. Try adding water to your dog's food at least one part food to two parts water. Make sure that each dog has a separate water bowl so you can monitor water intake. You also may want to keep water bowls in several locations and be sure to change the water often.
- To encourage hydration, teach puppies to enjoy ice cubes. You also may add a couple of spoonfuls of broth, fruit or vegetable juice to food. Some reluctant drinkers may enjoy gelatin wigglers or fruit smoothies. Importantly, fluids help to flush out stones.
- Be sure to provide ample opportunities for your dog to urinate. Having acidic urine sitting in the bladder encourages the formation of urinary stones. Allow dogs outside regularly and exercise them often.
- Because Dalmatians are unique in the way in which they metabolize purine-yielding foods, a low purine-yielding diet is the healthiest for Dalmatians.
- Be sure to have dogs tested regularly for urinary crystal or stone formation. Annual trips to the veterinarian for urine concentration analysis and bladder ultrasounds can help Dalmatians live free of obstructions.

their water bowls and noticed that the level of water didn't go down as much with these stone formers as with my other dogs," she says. "Dr. Hughes recommended that I put water in their kibble. They started getting a quart of water for each cup and a half of kibble, twice a day."

The following year, the dogs were tested again. The stones were gone. Since then, Truitt, like many other Dalmatian owners, has made sure that her dogs, male and female, young and old, get plenty of water each day.

When Truitt brought her seven sick puppies to Hughes' veterinary clinic, the primary treatment was to force fluids. The puppies were given food soaked in water as well as subcutaneous water treatments. A meal was created by adding small amounts of milk replacement to bowls of water. The puppies also were given allopurinol for a short time. Allopurinol is a medication that inhibits the conversion of xanthine to uric acid, thereby reducing urine uric acid and subsequent stone formation.

Mike, the puppy who had urinary obstruction, was put on steroids to reduce the swelling. All the puppies except Mike went home the first day. Truitt picked him up one week later.

"Once the puppies were back on a regular kibble diet, they gained weight," Truitt says. "As adults, they are all fine. We ended up keeping Mike because we got so attached to him we couldn't bear to sell him. He is a great dog, very sweet with big brown eyes. He's earned an American Kennel Club champion title."

Dalmatian owners do not have to wait until dogs suffer a life-threatening urinary obstruction before having them tested for stones, Hughes says. "Bladder ultrasound tests are easy to administer and accurate in showing the presence of stones or sediment. The knowledge

gained allows owners to keep an eye on their dog and treat them if necessary.

"Assuming they are asymptomatic, male dogs should have their first ultrasound at the first annual examination after puppyhood or earlier if there are problems, and then every year thereafter," Hughes says. "We can't predict which dogs will have stones and we can't assume that only a few dogs form stones when we really don't know. Any Dalmatian can have stones."

Ultrasound testing uses high-frequency sound waves to look at organs and structures inside the body. The procedure is easy and painless, Hughes says. "Most dogs aren't bothered by it. A gel is applied to the abdomen and an ultrasound probe is moved around the dog's belly. The test takes about 15 minutes. If there are stones in the bladder, they show up white against the dark background of urine."

Males should have their urine concentration tested frequently, Hughes advises. "Highly concentrated urine is easy to treat by introducing more water into a dog's diet. All Dalmatians, stone formers or not, should be fed large amounts of water to help keep the urine dilute and to prevent the formation of stones. It's a simple way to help keep them healthy. It's the most important thing you can do for your Dalmatian." ■

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