The Dalmatian Club of America
DCA Teaching Seminar by Joseph Bartges, DVM, PhD

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Important Note!
The following summary is just the "tip of the iceberg" from his thoroughly complete up-to-the-minute status of urinary stone-forming in dogs including Dalmatians.

Obstruction of urine flow by stones or by other causes, left untreated, is an emergency situation and can quickly become a life-threatening condition. The most desirable goals when confronted with a stone-forming Dalmatian is to relieve and remove the obstruction if present, either dissolve the stones or remove them by surgery and to put the Dal then on a preventative treatment program to minimize further stone-forming problems. In order to do this, some concepts of urinary crystals and stones must be understood.

The vast majority of canine stones, including those occurring in Dalmatians, are found in the lower urinary system (bladder, urethra). Unlike other breeds, the liver and kidney of Dalmatians appear to process certain substances called "purines" in a unique fashion, setting the stage for possible crystal and stone formation in the urine. In some Dalmatians, this defect and their diet cumulatively result in what is termed "unstable urine." Unstable urine occurs when many factors exist including but not limited to: abnormal pH of the urine, super-saturation of the urine, presence in the urine of crystal-forming compounds, abnormal urinary temperature, etc.

Crystals and stones will form in supersaturated urine and should be identified as to their mineral content to determine specific preventative protocols which are different mineral-to-mineral. Of 11,269 stones (all breeds) sent to the Minnesota Urolith Center for assay, the predominate mineral was struvite, followed by calcium oxalate and purines which include urates (uric acid or sodium urate or ammonium acid urate). The most common Dalmatian stones were urates and, of those, the most common form was ammonium acid urate.

Urinary infections can cause stone formation, most frequently struvite stones, when the pH generally is alkaline (above 7.0). Two to three percent of all dogs develop urinary infections, and the three bacterial species most commonly causing them are E. coli, ***Staphylococcus*** and ***Proteus***. Of the three species, ***E. coli*** is found most often

but does not predispose to stone formation. However, urinary infections with ***Staph***. or ***Proteus*** are stone-forming when Dr. Bartges cited the urinary pH can alkalinize up to 7.8 or 7.9.

Urinary infections do not create urate stones (the most common Dalmatian ones) but conversely **URATE STONES ONCE PRESENT CAN CAUSE "SECONDARY" URINARY INFECTIONS** where none existed before and the infection, in turn, can then complicate the diagnosis.

Non-surgical treatment of stone-forming Dalmatians involves:

1. locating the site of stones and their number by direct or indirect x-ray or ultrasound. (Urate stones, the most common in Dalmatians, do not show up under standard x-rays. Their visualization requires other x-ray techniques or ultrasound),
2. removal of existing stones from where they are blocking urine flow,
3. identifying their mineral content,
4. antibiotics for prevention or treatment of urinary infection,
5. anti-stone-forming diet, and
6. anti-stone-forming drugs.

If the Dalmatian's urine flow is blocked by stones and the bladder has not been able to be emptied but instead has filled to the point of causing pressure and pain by being dammed up, Dr. Bartges recommended "urinary cystocentesis" whereby a needle is inserted through the abdomen into the bladder and the urine is withdrawn by a syringe. This tapping of urine from within the bladder "buys time" while the dog's condition is evaluated and attempts to succeed with non-surgical treatment proceed. Some small stones can be flushed out by use of a catheter whose end has been cut and smoothed. A final method of immediately reopening the urine flow is "urinary hydro propulsion" whereby saline is forced under pressure through a catheter into the urinary pathway and the fluid back-flushes the stones up into the bladder. The hydro propulsion may have to be repeated more than once and most dogs tolerate the procedure well, Dr. Bartges added.

Assay of the crystal or stone mineral content, he explained, can be done by two methods: qualitative and quantitative. Qualitative assay has been shown to have as many as 60 percent errors and additionally does not identify xanthine, one of the purines which can form Dalmatian stones. Dr. Bartges urges assay of crystals or stones only by quantitative methods. His Minnesota Urolith Center does not charge for this type of identification.

For Dalmatians whose crystals or stones have been assayed to be purines and in particular ammonium acid urate (the most common Dalmatian one), a preventative program can be started including:

1. Hill's u/d, a milk protein-based prescription diet which has been shown to be effective against urate stone-forming,
2. the drug, allopurinol, which is effective in dissolving of urate stones, and

3. changing the acidic urine associated with urate stone-forming by giving the Dal an alkalinizing agent like potassium citrate although, Dr. Bartges added, the u/d diet alone should suffice to alkalinize the urine.

Dr. Bartges noted that current food labeling does not list which ingredients are high in purines but in general, **"HIGH PROTEIN" FOODS SUCH AS MEAT AND BEEF CONTAIN A GREAT DEAL OF PURINES** and are foods to be avoided for purine stone-forming dogs like Dalmatians and Bulldogs.

Dr. Bartges cautioned that recent studies have shown the amount of dosage of the drug allopurinol should be carefully prescribed because it can paradoxically cause the formation of xanthine, another purine stone. This side effect has been prevalent when allopurinol is given to dogs also receiving a high protein diet but is much less frequent when the diet is low in protein and, in particular, low in those proteins containing purines. When allopurinol is given the same time as the antibiotic, Ampicillin, another side effect of drug treatment may be dermatitis. Dr. Bartges concluded by emphasizing that if the stones causing urine blockage can be removed by passing or by catheterization or by hydro propulsion, bladder surgery can be avoided in many instances. If non-surgical treatment is successful, stones maybe passed or dissolved within an average of three months. If stones are still creating problems after that time, one or all of four explanations may explain the disappointing results:

1. the wrong mineral was identified and accordingly the wrong treatment to dissolve stones containing it was used,
2. the original mineral content was correct but subsequently other and different minerals were created,
3. stone-forming drugs were given,
4. either or both owner and dog were not strictly and conscientiously following the treatment procedures.

The most important key to successful non-surgical treatment of urinary stones, Dr. Bartges stressed, is frequent, periodic monitoring of the stone-forming Dalmatian.

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