Urolithiasis in Small Ruminants
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Urolithiasis, commonly called urinary calculi, is a condition familiar to most small ruminant producers. Urolithiasis is the formation of calculi or stones in the urinary tract. The urinary tract includes the kidneys, ureters, bladder, and urethra. Many factors can be causes of stone formation. It is unlikely that one single factor causes urolithiasis. Formation is more likely the result of several factors occurring at the same time. Urinary stones may form in any part of the urinary tract, but most problems seen by producers involve stones that lodge in the urethra and prevent the animal from urinating. Urinary stone formation occurs with equal frequency in male and female animals; however, the clinical signs are most often seen in castrated males. The obstruction in males is most often found in the urethra process at the end of the penis or in the sigmoid flexure.

Several factors can cause stone formation. Stones can form when damage occurs to the epithelial tissue. The epithelium is tissue that lines the urinary tract and provides a physical barrier to foreign invaders such as bacteria. When the epithelial tissue is damaged, cells slough and may form a nidus. This provides a place for crystals to form a stone. Urinary tract infections are one of the major factors that damaged the epithelial tissue. Vitamin A deficiency may also play a contributing role in stone formation since Vitamin A is important in maintaining healthy epithelial tissue.

Another cause leading to stone formation is diets high in protein. Feeding excess protein or grazing legumes high in estrogenic compounds result in increase sediment in the urine. Sediment known as mucoprotein provides the building blocks for stones to form. Estrogenic compounds may be high in legumes such as clovers and alfalfa.

Another factor contributing to stone formation is high concentrations of substances in the urine. In concentrated urine substances such as calcium, phosphorus, or magnesium can precipitate or settle out. If a nidus exist, stones may form. Things that can cause urine to be highly concentrated include decrease water intake, and diets high in grain and low in roughages. Also, the pH of urine affects the solubility of substances with stones more likely to form in alkaline urine. Many of these conditions can be controlled.

All clinical signs associated with urolithiasis are caused by damage to the urethra and increased pressure from the expanding urinary bladder. These signs may include abdominal pain. Animals may be found stretching, rocking back and forth, kicking at their abdomen, or looking at their sides. Most animals appear to strain to urinate. The animal may dribble urine that may contain blood. Tail flagging is common sign in goats. Some animals grind their teeth. Goats tend to be vocal. If the urethra ruptures urine will leak under the skin along the prepuce. Owners may be able to see small “sand-like” material which are crystals on the hairs at the end of the prepuce. In the later stages of the disease animals will lose their appetite and lay around. If the bladder ruptures, animals may show rapid improvement, but the improvement does not last long once the abdomen begins to fill with urine and the animal becomes toxic.

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Treating urolithiasis begins with reestablishing urine flow. Sometimes this can be accomplished medically by passing a catheter. However, most animals will require some type of surgical intervention to reestablish urine flow. Several techniques are used and producers should consult with their veterinarian for what is best for their situation. Reestablishing urine flow should be followed by administering antibiotics to treat infection. Urinary acidifiers should be added to the diet since stones are not as likely to form in acidic urine.

Treatment outcomes often end poorly. For this reason producers should embrace preventive measures. One of the best ways to prevent stone formation is to maintain water consumption. Multiple clean fresh water sites are essential for guaranteeing that all animals have access to drinking water. Making sure that the water is above freezing temperature in cold weather and cool in hot weather will encourage animals to drink. The addition of salt in the diet may be needed to stimulate water consumption. Producers should not rely on salt blocks or loose salt to accomplish this. The salt should be slowly blended into the ration up to 4% of the diet. In show animals the addition of some type of flavoring agent may encourage water consumption. As stated above, high grain and low roughage diets which are typical for feedlot and show animals are associated with urolithiasis. If a producer feeds this type of diet, additional calcium is needed to bind the phosphorus to reduce the amount that is excreted by the urinary system. Calcium should be added to the ration to maintain a calcium/phosphorus ratio of 2 to 1. Producers should also make sure that the diet is not too high in magnesium. Another preventative measure is the addition of ammonium chloride. Ammonium chloride will acidify the urine which reduces chance of stone formation. Producers should avoid feeding too much protein and be careful when feeding or grazing legumes with wether lambs and goats.

Most sheep and goat producers will encounter urolithiasis at some point, but by employing preventative measures stone formation should be kept to a minimum. For more information on prevention and treatment of urinary calculi in small ruminants, producers should contact their local County Extension Educator or veterinarian.