Urolithiasis in Small Ruminants

By Jeffrey Lakritz, DVM, PhD, DACVIM

The Hospital for Farm animals sees approximately 75 male small ruminants per year for urethral obstruction. While these are mainly pet goats, a number of intact males (rams and bucks) and feeders (wethers) are also referred here. A typical presentation is a male goat that has not urinated for a day or more, has not been eating well and has separated himself from the rest of the animals. After a complete physical examination, ultrasound is recommended to assess the size of the urinary bladder, the possible presence of calculi or "sand," bladder wall thickening, bladder rupture or other abnormalities. Radiography is often utilized pre-operatively or post-operatively to determine whether the calculi are radio-dense, whether they are lodged in the distal urethra, and if additional calculi are present in the bladder, which could result in re-obstruction at a later date (Fig. 1).

The procedure providing the greatest likelihood of rapidly returning the animal to normalcy is the tube cystotomy. This procedure allows for continuous drainage of the bladder, rapid reduction of discomfort and return of appetite. If radio-dense calculi are observed, the tube placement is accomplished by removing the end of the Foley catheter to allow for passage of an endoscope. Cystoscopy is often accomplished by laser lithotripsy or basket removal to disrupt calculi causing the obstruction.

"Dickie," a four-year-old Nubian male, was examined by a referring veterinarian who diagnosed a possible urinary tract obstruction and referred him to the Ohio State Hospital for Farm Animals on Christmas Eve. The owner has three goats (Tom, Dick and Harry) that are kept in a small lot with an adjoining barn. These animals were fed alfalfa hay and grain. On palpation of the abdomen, the goat began to strain to urinate. Ultrasound revealed a distended bladder. Postoperative radiographs of Dickie's abdomen revealed one calculus in the bladder and one large calculus in proximal urethra near the ischial arch (Fig. 2). After tube cystotomy placement, urine continuously drained and after two days of recovery, Dickie was sent home with instructions to monitor urine output, attitude and appetite. The owner elected to pursue additional therapy and returned in a week for evaluation and treatment. Dickie was spared a urinary tract infection and the owners are pleased to have their goat at home with instructions to monitor urine output, attitude and appetite.

Innovative Method of Mechanical Lithotripsy for Horses

By Elizabeth Santoci, DVM, DACVS

Urinary bladder stones are a relatively common malady that affects aged horses, usually geldings. The bladder stones are typically rough, and often cause abdominal pain, stranguria and hematuria. Bladder stones can be removed in one piece through an abdominal approach or after disruption through an uretherotomy just under the urethra leaving the bladder. An abdominal approach requires general anesthesia and can be expensive. The more limited urethral approach can be done either under standing or under anesthesia, is relatively inexpensive, and provides an early return to performance. However, stone disruption can be a challenge, so we have developed a new method to break up bladder stones to facilitate their removal via an uretherotomy.

The surgical approach is via a urethral incision about two inches long, positioned just under the rectum. The incision enters the urethra and the surgeon then has a "straight shot" into the bladder. The stone is grasped and manipulated via the rectum and drawn back into the part of the bladder closest to the incision. While manually holding the stone in a stationary position, a stainless steel rod is inserted into the bladder and makes contacts with the stone. The rod, with its end that has been insulated, is fitted into a standard air hammer, which is driven by nitrogen gas. The air hammer is fired, and the stone is rapidly broken up with only a few firings (Fig. 4). The pieces of stone are grasped with forceps and removed or flushed out of the bladder using saline or other similar sterile fluid. Horses recover quickly from the procedure, and the wound heals rapidly without sutures.

In response to client surveys indicating concerns with parking, and at the suggestion of our Small Animal Practice Lead, Donald Mundy was hired as the concierge parking attendant for the Hospital for Companion Animals in the Veterinary Medical Center in July. Donald assists clients with parking, and in response to the VM Center's parking survey, Donald encourages clients to visit our website.

If you have any questions or you have a horse that might benefit from this less invasive approach to treating urinary bladder stones, please contact the Galbreath Equine Center at (614)-292-6661.
Interventional Medicine for Urinary Disease

By Brian A. Scansen, DVM, MS, DACVIM (Cardiology)

Interventional medicine is a branch of medicine that uses imaging guidance (fluoroscopy, ultrasound) to deliver therapies within the body. It can be used to treat a variety of conditions including urinary disease, especially stone disease or obstructions – whether benign or malignant.

Scooter is a five-year-old male mixed breed dog who presented to the Veterinary Medical Center's Interventional Medicine Service for possible urethral intervention. A month previously he had prostatic surgery and developed stranguria with frequent, difficult urinations. A urethrogram was performed (Fig. 1A), which displayed severe narrowing of the prostatic urethra consistent with a urethral stricture at the prior surgical site. Repeat surgery at that site was likely to result in further stricture and poor healing, therefore, urethral stenting was recommended to open the structure and alleviate the obstruction. Under general anesthesia, a soft wire was advanced up the urethra and across the obstruction. Over this wire, a covered stent was placed across the obstruction (Fig. 1B) and expanded. The follow-up urethrogram (Fig. 1C) showed improved urethral diameter and flow across the obstruction. The stent was not expanded further given concerns for development of incontinence, which is a potential concern following urethral stenting in dogs. After stent placement, Scooter was able to urinate comfortably and was discharged the next day. He remains symptom free with no urinary incontinence one year later.

Kissy is a nine-year-old female domestic short hair cat that presented to the Emergency Service for severe azotemia. Ultrasound and abdominal radiographs showed bilateral ureteral obstruction secondary to urolithiasis, bilateral hydronephrosis, and a misshapen and small left kidney. Ureteral stenting of the right kidney was advised to bypass the stones and alleviate the obstruction. Under general anesthesia, a soft wire was advanced up the urethra and across the obstruction. The stent was not expanded further given concerns for development of incontinence, which is a potential concern following urethral stenting in dogs. After stent placement, Scooter was able to urinate comfortably and was discharged the next day. He remains symptom free with no urinary incontinence one year later.

Figure 1. (A) Scooter's urethral stricture (arrow). (B) Location of stent (between arrows). (C) Improved urethral diameter.

Figure 2. Ureteral stenting in Kissy

Cystoscopic-Guided Biopsy of Lesions Optimizes Treatment in a Dog

By Joao Felipe Galvao, DVM and Dennis Chew, DVM, DACVIM

The Small Animal Internal Medicine Service performs cystoscopy in dogs and cats. Cystoscopy is indicated as the definitive imaging method for identifying and locating ectopic ureters. Laser ablation of ectopic ureter(s) can be performed through the cystoscope in some cases. We recommend cystoscopic evaluation for dogs with recurrent urinary tract infections (UTI) to ensure the absence of anatomical defects.

A 13-year-old castrated male Dalmatian presented to the Ohio State Veterinary Medical Center for evaluation of blood dripping from his sheath after urinating. Our main differentials included prostatitis, UTI or bladder/urethral neoplasia. Urinalysis revealed white blood cells and occasional bacteria. Urine culture isolated E. coli.

Ultrasonography showed a thickened bladder (Fig. 1) and a mass lesion in the trigone area (Fig. 2), associated with obstruction of the left ureter, which was compatible with TCC. The dog underwent cystoscopy with a flexible cystoscope. The mass lesions were visualized in the area of the trigone and multiple pinch biopsies were obtained, a method far superior to blind aspiration biopsies.

The biopsy changes were consistent with chronic bacterial infection. Medical treatment for the pyelonephritis and deep-seated bladder infection was instituted. Ultrasonogram of the urinary tract at six weeks showed a normal bladder, loss pyelectasia of the left kidney, and resolution of the left hydroureter.

It would have been easy to assume that the bladder mass was a malignancy causing ureteral obstruction, as is often the case with TCC that develops at the trigone. This may have condemned this dog unnecessarily. Cystoscopy allowed collection of targeted biopsies. Histopathology of the presence of UTI and ascending pyelonephritis in an older animal is always of concern for underlying conditions especially that of neoplasia. Chronic UTI can at times create tissue changes that look similar to those from neoplasia, so a biopsy in these instances is essential.

Figure 1. Longitudinal view of the bladder showing cranioventral bladder wall thickening.

Figure 2. Transverse view of bladder showing mass-lesion at the trigone.

Artificial Urethral Sphincter for Treatment of Urinary Incontinence in a Dog

By Christopher Adin, DVM, DACVS

Sadie, a one-year-old female spayed American Pit Bull Terrier, was presented to the Ohio State Veterinary Medical Center with a history of urinary incontinence. Urine leakage had been noted since she was only six to eight weeks of age, occurring primarily when she was recumbent. After struggling with medical therapy, Sadie’s family had been referred to the Veterinary Medical Center to investigate the possibility of using a surgical implant called an artificial urethral sphincter (or AUS) to provide long-term control of her urine leakage. Imaging studies showed no evidence of ureteral ectopia to explain the condition, and sadie was diagnosed with urethral sphincter mechanism incompetence (USMI).

Although submucosal collagen injections are still considered a viable and useful treatment for USMI, the need for repeated injections every one-and-one-half to two years in most dogs makes this an expensive and frustrating proposition for clients with young dogs like Sadie. The AUS, an inflatable silicone cuff that is placed around the urethra through a small caudal abdominal incision, provides the advantage of being a permanent implant that requires no further treatment costs for maintenance. Efficacy has exceeded 90 percent in the first 25 dogs that have undergone the surgical procedure over the last five years.

Sadie’s surgery went very smoothly. After she has remained completely dry and her owners are ecstatic as evidenced by their comment: “I appreciate your taking care of Sadie and her problem. She is such a loving wonderful dog and I am confident she will have a long life being able to be indoors at night with the rest of the family.”

Artificial urethral sphincter, an inflatable silicone cuff
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Numerous diseases of the urinary tract can be palliated or cured with interventional medicine through the minimally-invasive placement of stents, balloons, catheters or other devices. Scooter and Kissy have benefited from interventional urology. If you have a patient that may benefit from these minimally-invasive alternative treatment options, please contact Dr. Brian Scansen and Dr. Joao Galvao.

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Current Clinical Trials

The Clinical Trials Office (CTO) at The Ohio State University College of Veterinary Medicine helps to coordinate clinical trials involving client-owned animals in the Veterinary Medical Center, including the design, enrollment of patients, execution, assessment, and follow up. Currently, one study is underway to evaluate the safety and effectiveness of an alternative antibiotic treatment protocol for uncomplicated lower urinary tract (bladder) infection in dogs. For details about the study, go to the list of trials currently being recruited, available on the web site: vet.osu.edu/research/recruiting-clinical-trials and look under “Internal Medicine,” Evaluate the Efficacy and Safety of an Alternative Antibiotic Treatment Regimen for Lower Urinary Tract Infection in Dogs.

A general overview of ongoing and completed clinical research is available at: vet.osu.edu/research/clinical-trials-office

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As you will note from the case reports in this issue, our experienced and skilled clinicians are involved in comprehensive urology program, utilizing interventional medicine/radiography, implants such as an artificial urethral sphincter or laser lithotripsy, or other therapeutic approaches for urologic conditions, ranging from routine to complex and elective to emergent. For more information on the following topics, please visit the following pages on our website:

- Laser lithotripsy: vet.osu.edu/vmc/new-technology-means-better-treatment
- Interventional medicine: vet.osu.edu/assets/pdf/about/facultyProfiles/scansen-brian/interventionalMedicine.pdf
- Interventional medicine: vet.osu.edu/vmc/collaboration-nationwide-childrens-hospital-saves-canine-lives
- Feline interstitial cystitis diet management: indoorpet.osu.edu
- Inappropriate elimination: vet.osu.edu/vmc/behavior

We encourage you to learn about our available clinical trials for patients with urologic conditions (vet.osu.edu/research/recruiting-clinical-trials) as well as the many other trials we have available to see if you may have patients that would benefit from these leading-edge therapies and that meet the entry criteria.

The Ohio State University Veterinary Medical Center's three hospitals – Hospital for Companion Animals, Hospital for Farm Animals, and the Galbreath Equine Center – along with the college's research programs are integrally involved in our comprehensive urology program. Clinicians and scientists at the Veterinary Medical Center work collaboratively with others throughout the college and across the university, as well as with colleagues at other institutions. This allows us to continually advance clinical veterinary urology through leading-edge basic and clinical research that has application to clinical patients.

Companion animals, farm animals and horses are afflicted with a variety of disease conditions of the urinary tract, including urolithiasis (with or without obstruction), urinary incontinence, urinary tract rupture leading to urouboundem, cancer and more. We also have substantial experience and expertise in the evaluation and management of cats with lower urinary tract disease, urologic syndrome or idiopathic cystitis as well as evaluating and suggesting treatment for behavioral issues related to inappropriate elimination in dogs and cats.