

## **Lessons Learned from Cystoscopy: Tips for Management of Lower Urinary Tract Diseases**

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### **Overview**

Diseases of the lower urinary tract are commonly encountered in small animal medicine. A complete history, physical exam, minimum data-base (CBC, chemistry profile and urinalysis), urine culture ± abdominal radiographs are usually adequate to diagnose and manage most lower urinary tract disorders. However, when faced with lower urinary tract diseases that are difficult to diagnose, or refractory to treatment, additional diagnostic testing is warranted. Urethrocystoscopy enables direct examination of the vestibule, vagina, urethra and bladder, often providing the diagnosis. In addition to direct visualization of the lower urinary tract, uroendoscopy may also be used for more advanced diagnostic and therapeutic procedures. Some diagnostic and therapeutic indications for uroendoscopy are outlined in table 1.

**Table 1: Diagnostic and therapeutic indications for uroendoscopy**

#### **Diagnostic indications**

- Urinary incontinence
- Recurrent/Relapsing urinary tract infections
- Dysuria / stranguria / pollakiuria
- Mass lesions of the urethra/bladder, biopsies
- Cystic and urethral calculi
- Urogenital bleeding
- Chronic cystitis
- Trauma

#### **Therapeutic indications**

- Periurethral collagen injections for incontinence
- Urolith removal
- Mass/polyp resection
- Urethral stricture dilation
- Urethral catheter/stent placement
- Ablation of intramural ectopic ureters

### **Urinary Incontinence**

Urinary incontinence has been reported to occur in up to 30% of spayed female dogs. While primary urethral sphincter mechanism incompetence (USMI) is the most common cause of urinary incontinence, other anatomic disorders such as ectopic ureters may also be at fault. Uroendoscopy should be considered in patients with a life-long history of urinary incontinence, and in those patients with suspected USMI that do not respond readily to medical management. Therapeutically, uroendoscopy may also be used to facilitate the injection of submucosal collagen in patients that do not respond to/or cannot tolerate traditional medical management. . The most recent data suggest that approximately 68% of treated dogs will regain continence, with an additional 25% of dogs showing significant improvement. It should be noted that most patients still require medical therapy as well. As the collagen tends to “flatten” with time,

the injections may need to be repeated. The average duration of continence following collagen injections is reported to be 17 months with a range of 1-64 months.

### **Ectopic Ureters**

Uroendoscopy is more sensitive than excretory radiography in the diagnosis of ectopic ureters, particularly when there is submucosal tunneling and/or multiple ureteral openings. Definitive knowledge of the extent of ectopia and number of ureteral openings is critical to surgical planning and optimizing patient outcome. Patients with ureteral tunneling and/or multiple openings may remain incontinent unless all tracts are removed. Even ureteral segments that are not patent may provide locations for urine pooling contributing to incontinence and predisposing to urinary tract infections. Often the location, extent and lack of patency of these abnormalities preclude a diagnosis without the use of uroendoscopy. Recently, the use of uroendoscopy to successfully treat intramural ectopic ureters with laser ablation has been reported.

### **Recurrent/ Relapsing Urinary Tract Infections**

Recurrent or relapsing urinary tract infections (UTI) are, by definition, complicated infections and warrant an aggressive diagnostic approach. Recurrent infections are those that recur following withdrawal of therapy, while relapsing infections refer to recurrence of the same species (and serologic strain) of microorganisms. Relapsing infections imply that the infection was not eradicated by antimicrobial therapy. They may result from: inappropriate use of antimicrobial drugs (e.g., wrong dosing schedule, duration of therapy, poor owner compliance, etc.); failure to eliminate predisposing causes (e.g. uroliths); deep-seated infections inaccessible to the action of antimicrobial drugs and/or the emergence of drug-resistant pathogens.

Patients with repeated episodes of UTI require additional diagnostic efforts because of the probability of predisposing complications or therapeutic errors. Recurrent UTI should *never* be treated simply by serially changing antibiotics without considering the cause of treatment failure. Uroendoscopy is helpful in the evaluation of patients with recurrent urinary tract infection. Direct examination of the lower urinary tract often reveals anatomic abnormalities that may contribute to infections. It also facilitates collection of mucosal biopsies for histopathology and culture. A recent study demonstrated that culture of mucosal biopsies was more sensitive for detection of bacteria and mycoplasma compared to culture of urine obtained by cystocentesis.

### **Table 2: Factors predisposing to urinary tract infections**

1. Interference with normal micturition
2. Mechanical obstruction
3. Urinary incontinence
4. Urine pooling or retention
  - a. Anatomic defects (vesicoureteral reflux, diverticulum, etc.)
  - b. Neurogenic micturition disorders (e.g. reflex dyssynergia)
5. Altered urothelium:
  - a. Trauma (e.g., catheters, uroliths, external trauma, etc.).
  - b. Neoplasia
6. Altered urine volume, frequency, or composition:
  - a. Decreased urine production
  - b. Formation of dilute urine (e.g., polyuric renal failure, Cushing's syndrome, fluid therapy)
  - c. Glucosuria
  - d. Voluntary or involuntary urine retention
7. Impaired immunocompetence
  - a. Acquired or inherited (e.g., Cushing's syndrome, uremia)
  - b. Immunosuppressive drugs
8. Anatomic defects
  - a. Congenital or inherited (e.g., urethral abnormalities, urachal diverticulum, ectopic ureters)
  - b. Acquired (e.g., urethrostomies)

**Table 3: Recommended protocol for the management of recurrent bacterial urinary tract infections.**

1. Identify and correct, if possible, any predisposing factors (see table 2).
2. Collect a urine sample, by cystocentesis, for urinalysis and quantitative urine culture.
3. Select an antibiotic based on culture and sensitivity results.
4. Culture a urine sample collected *by cystocentesis* three to five days following initiation of therapy.
  - Therapy is considered to be successful only if urine does not contain any pathogenic organisms.
  - If bacterial growth is detected 3 to 5 days after initiating therapy, treatment has failed and another antimicrobial agent must be selected for use based on results of bacterial culture and susceptibility tests.
  - If urine is sterile after 3 to 5 days, treatment should be continued.
5. Culture a urine sample obtained by cystocentesis 7 to 10 days after completion of therapy to detect relapses.
6. Reinfection caused by a different organism usually occurs later than a relapse; therefore urinalysis and culture should be done approximately 4 weeks after cessation of antimicrobial therapy.
7. Consider cultures after 2,3,6, and 12 months to screen for infections.

#### **Urolith Diagnosis and Removal**

Uroendoscopy may also be used to both diagnose and treat uroliths. In conjunction with voiding urohydropulsion, uroendoscopy may be used to confirm the removal of all stones. Stone baskets passed via the channel on the cystoscope may be used to remove uroliths so long as the uroliths are smaller than the dilated urethra. Stone baskets are particularly useful for irregularly shaped stones that do not readily pass during voiding urohydropulsion. For larger stones, uroendoscopy may be used to facilitate stone fragmentation using laser lithotripsy.

#### **Mass lesions**

Transitional cell carcinomas are the most commonly diagnosed tumor of the lower urinary tract in both dogs and cats. Uroendoscopy allows direct visualization of the extent of the lesion and also dramatically improves the quality of biopsy specimens. Bladder polyps may be removed using snares, biopsy forceps, or lasers.

#### **Summary**

Patients with lower urinary tract disease displaying unusual, prolonged or refractory clinical signs, should be further evaluated with urethrocystoscopy. Uroendoscopy is a very useful, minimally invasive technique for diagnosis and often management, of lower urinary tract diseases in dogs and cats.