

# Lower Urinary Tract Diseases of the Senior Dog



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The senior dog with lower urinary tract (LUT) signs presents a unique challenge. As a dog's age, and the number of comorbidities increases, the clinical approach must be adjusted appropriately. This article will focus on how the aging of the LUT impacts function and predisposes to disease. Additionally, it will discuss some of the more common LUT diseases seen in older dogs, and how these diseases can interact to make diagnosis and treatment challenging.

## Aging of the urinary tract

The lower urinary tract consists of three functional components that must work in coordination for appropriate micturition:

1. The detrusor muscle, consisting of smooth muscle and under parasympathetic control
2. The smooth muscle sphincter, under sympathetic control
3. The urethralis muscle, consisting of striated muscle and under somatic control

In order to maintain its function, the LUT relies on a complex system for preventing infection, consisting of a combination of physical, anatomical, and cellular components. The act of voiding, presence of normal urogenital flora, high pressure zone in the urethra, and urine composition all help to prevent bacteria from ascending and infecting the LUT. The urothelium functions as a barrier to infection but also uses pattern recognition receptors to detect bacteria and activate and recruit neutrophils and mast cells. With age, these components of normal micturition and barriers to infection can break down and increase the likelihood of lower urinary tract infection.

## Incontinence

While age is not a cause of incontinence, changes to the function of the urinary tract and comorbidities, especially those causing polyuria, can increase the chances of incontinence in older dogs. In senior dogs, the differentials for incontinence are shifted and it can be helpful to think of the causes of incontinence in these dogs as urethral

sphincter mechanism incompetence (USMI) vs. bladder storage dysfunction. While USMI most commonly occurs in female dogs within 3 years of spaying, it is a complex and incompletely understood disease process that seems to involve hormones, changes to collagen, and patient conformation. It is not unusual for USMI to be revealed in senior dogs, either due to underlying disease or progression of previously mild signs. Bladder storage dysfunction, or detrusor instability, can be either an idiopathic condition or can be “urge incontinence” which implies there is an underlying disease leading to the feeling of urgency.

A thorough physical exam and history will help to determine whether a dog is experiencing USMI or bladder storage dysfunction. The patient work up should include appropriate lab testing to elucidate any comorbidities that are contributing to the incontinence. These cases of incontinence should always have a urine culture and sensitivity performed, as bacterial infection can both contribute to incontinence and can be found more commonly in incontinent dogs.

Treatment of incontinent senior dogs should include treating contributing comorbidities and treating the incontinence. Dogs with USMI may benefit from phenylpropanolamine or estrogen compounds, while those with detrusor instability should be treated with drugs that provide smooth muscle relaxation of the detrusor muscle, such as oxybutynin. Refractory cases of USMI may require further intervention, such as hydraulic urethral occluding devices or urethral bulking agents.

## Urinary tract infections

Bacterial urinary tract infections (UTI) are a common finding in senior dogs. Finding bacteria in the urine of a senior dog can be due to subclinical bacteriuria, uncomplicated UTI, or complicated UTI.

Subclinical bacteriuria (SCB) in humans is defined as the presence of bacteria, with or without pyuria, and lacking clinical signs associated with a UTI. In veterinary medicine, the recommendation is not to treat SCB, but the definition is not as distinct. Given the potential for owners to miss clinical signs of a UTI and the concern that some patients may not have the appropriate neurologic or orthopedic function to display signs, clinical judgement must be made on a case by case basis. Some recommend the presence of pyuria as reason to treat a UTI in veterinary medicine for these reasons. While there are currently no perfect guidelines, it is important to note that there is no evidence that dogs with untreated bacteriuria and pyuria are likely to have worse outcomes even if they have comorbidities present.

Uncomplicated UTIs are those that occur in an otherwise healthy patient with <3 occurrences per year, no recent antibiotic use, and no underlying abnormalities of the lower urinary tract. These should be cultured and treated with amoxicillin or trimethoprim sulfa for 7 days.

Complicated UTIs are those that occur in a patient with an anatomic or functional problem with the lower urinary tract or a comorbidity that increases the risk of a UTI. A cystocentesis urine sample should be obtained and treatment should consist of 4 weeks of an appropriate antibiotic based on a urine culture and sensitivity panel. The urine should ideally be recultured one week after starting the antibiotic and one week after finishing.

Recurrent UTIs are 3 or more UTIs in a 12 month period and can be either due to relapse or reinfection. Relapse is infection with the same organism, as determined on a culture and sensitivity panel, within 6 months. Reinfection is recurrence of a UTI of a different organism. In senior dogs with recurrent UTIs, any predisposing factors should be identified and treated. Therapies to prevent recurrent UTIs are not proven, but include prophylactic antibiotics, cranberry extract, mannose, and probiotics.

## Lower urinary neoplasia

Tumors of the bladder and urethra account for 0.5-1.0% of canine neoplasia. The majority of these tumors are transitional cell carcinoma (TCC). The median age at diagnosis for TCC is 12 years. The bladder tumor antigen test, and more recently BRAF testing, can be helpful screening tools for TCC, but definitive diagnosis through a

combination of imaging, cytology, and cystoscopy is recommended. Staging of TCC can provide valuable information on expected prognosis. The second most commonly diagnosed LUT tumor in senior dogs is prostatic carcinoma. The median age at diagnosis is 10 years, and it occurs more commonly in neutered males compared to intact males. Prostatic carcinoma can often be palpated on rectal exam. Diagnosis should be through a combination of radiographs, ultrasound, and traumatic catheterization for cytology. Polypoid cystitis is a proliferative inflammatory disease, typically associated with chronic UTIs. While rare, polypoid cystitis should remain a differential in cases of suspected neoplasia, as it can be mistaken for TCC.

A COX-2 inhibitor NSAID is the mainstay of treatment for both TCC and prostatic carcinoma, and has been shown to significantly increase survival times for both tumors, even when used as the only therapy. Consultation with a veterinary oncologist is recommended after diagnosis, as there are multiple chemotherapy protocols available for both tumors, and stereotactic radiation therapy has shown promise with prostatic carcinoma. In advanced cases, palliative therapy with tumor laser ablation or urethral stenting may offer relief of clinical signs and improved survival times.

## Conclusion

Lower urinary tract disease in senior dogs is common, but because of the presence of comorbidities, diagnosis and treatment can be a challenge. The approach to these cases requires not only diagnosis and treatment of the primary cause of the LUT signs, but also attention to the underlying diseases that may have predisposed the patient.

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