

Bacterial Cystitis

Basics

OVERVIEW

- “Bacterial” refers to bacteria; “cystitis” is inflammation of the bladder; “bacterial cystitis” is inflammation of the bladder caused by bacterial infection
- Result of bacterial colonization of the urinary bladder and/or upper portion of the urethra (the tube from the bladder to the outside, through which urine flows out of the body); the lower urinary tract includes the urinary bladder and the urethra

SIGNALMENT/DESCRIPTION OF PET

Species

- Dogs
- Cats
- More common in dogs than in cats

Mean Age and Range

- All ages affected, but occurrence increases with age because of a greater frequency of other urinary tract problems (such as urinary stones [known as “uroliths”], prostate disease, and tumors) that increase the likelihood of secondary bacterial infection of the urinary tract
- Male dogs: average age 8 years, females 7.7 years
- Cats 7.7 years old average

Predominant Sex

- More common in female than in male dogs
- Occurrence in male and female cats is similar

SIGNS/OBSERVED CHANGES IN THE PET

- None in some pets
- Frequent voiding of small volumes of urine (known as “pollakiuria”)
- Difficulty or painful urination (known as “dysuria”)
- Urgency to urinate (or an apparent loss of ability to control urination during periods of confinement)
- Urinating in places that are not customary (such as in the house)
- Bloody urine (known as “hematuria”) and cloudy or malodorous urine in some pets
- Sudden (acute) infection—bladder or urethra may seem tender on palpation during physical examination
- Feeling the bladder through the abdomen (known as “palpation”) on physical examination may stimulate urination



- Long-term (chronic) infection—wall of the bladder or urethra may be thickened or abnormally firm
- Excessive licking or discharge from the urinary opening
- Secondary infection—signs related to the underlying problem
- General signs such as reduced appetite, whining, generalized discomfort

CAUSES

- Most common bacteria that cause lower urinary tract infection—*Escherichia coli* (*E. coli*), *Staphylococcus*, and *Proteus* (more than half of all cases)
- Common bacteria that cause lower urinary tract infection—*Streptococcus*, *Klebsiella*, *Enterococcus*, *Pseudomonas*, and *Corynebacterium*

RISK FACTORS

- Conditions that cause the urine to remain in the bladder for prolonged time periods (known as “urine stasis”) or incomplete emptying of the bladder
- Conditions that disrupt normal lower urinary tract lining defenses (those properties that protect the lower urinary tract from bacterial colonization) such as urinary tract stone irritation
- Conditions that reduce or bypass anatomic and functional barriers to bacteria moving up the urinary tract (such as loss of muscle tone or length of the urethra, indwelling catheters)
- Conditions that compromise the antibacterial properties of urine itself (such as changes in urine pH or concentration and low levels of urea and certain organic acids; sugar in the urine from diabetes mellitus)
- Immune system dysfunction; hyperadrenocorticism, or Cushing’s disease

Treatment

HEALTH CARE

- Treat as outpatient, unless another urinary abnormality (such as urinary tract blockage or obstruction; infection of the kidneys) requires inpatient treatment

ACTIVITY

- Unrestricted
- Regulating urination to coordinate with antibacterial drug treatments may improve therapeutic efficacy

DIET

- Restrictions not necessary, but may be indicated for other urinary tract diseases (such as kidney failure or urinary tract stones [urolithiasis])

SURGERY

- Except when a another urinary tract disorder requires surgical intervention, management of bacterial cystitis does not involve surgery

Medications

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive

- Antibiotics—First-line antibiotics are those effective against most isolates, and inexpensive, second-line drugs are reserved for resistant isolates; first-line suggested antibiotics may include penicillin (such as amoxicillin); trimethoprim-sulfadiazine; second-line drugs may include amoxicillin-clavulanate, enrofloxacin/marbofloxacin/orbifloxacin, cefovecin, and third-line drugs are reserved for only culture-proven effectiveness for resistant strains; are amikacin, chloramphenicol, meropenem/imipenem-cilastin, nitrofurantoin
- Bacterial culture and sensitivity testing provides identification of bacteria present in urine and information about antibiotics to which the bacteria is susceptible; the veterinarian will base choice of antibiotics on results of culture and sensitivity test when possible

- For sudden (acute), uncomplicated bacterial infection of the bladder (bacterial cystitis)—treat with antimicrobial drugs for 7–10 days; complicated infections may need treatment for up to 4–6 weeks; duration of treatment for complicated bacterial cystitis depends on the underlying problem

Follow-Up Care

PATIENT MONITORING

- Uncomplicated infections: success can be assumed if there is no recurrence of signs after treatment is completed
- Complicated infections: Continue treating at least 1 week to 10 days after resolution of blood in the urine (hematuria); white blood cells or pus in the urine (known as “pyuria”); and protein in the urine (known as “proteinuria”)—failure of urinalysis findings to return to normal while an episode of urinary tract infection is being treated with an effective antibiotic (that is, as indicated by negative urine culture) generally indicates some other urinary tract abnormality (such as urinary stones [uroliths], tumor)
- Complicated infections: Successful cure of an episode of urinary tract infection is best demonstrated by performing a bacterial culture of the urine 7–10 days after completing antibiotics
- Pets being given low-dose bedtime antibiotics for frequent reinfection (known as “prophylactic antibiotics”) should have repeat bacterial culture of the urine performed; multidrug resistance is more likely in follow-up cultures

PREVENTIONS AND AVOIDANCE

- Additional therapies may be considered with recurrent infections (methenamine +/- vitamin C, cranberry extract)
- Pets with frequent reinfection may be given once-a-day bedtime therapy may lengthen intervals between infections
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POSSIBLE COMPLICATIONS

- Failure to detect or treat effectively may lead to bacterial infection/inflammation of the kidney (known as “pyelonephritis”) or formation of a particular type of urinary tract stone (known as “struvite uroliths”)

EXPECTED COURSE AND PROGNOSIS

- If not treated, expect infection to persist indefinitely
- Prognosis for pets with uncomplicated bacterial infection of the bladder (bacterial cystitis) is good to excellent
- Prognosis for pets with complicated infection is determined by the prognosis for the underlying abnormality

Key Points

- Following recommendations for treatment and follow-up evaluations is crucial for optimum results
- Bacterial culture and sensitivity is a powerful tool to ensure appropriate antibiotic choice