

Urinary Tract Infections

ABOUT THE DIAGNOSIS

Cause: Urinary tract infections (UTI) occur when bacteria, fungi, or other kinds of pathogenic organism (germs) invade and cause inflammation in any part of the urinary tract. The urinary tract includes the kidneys (which produce urine), ureters (small tubes that carry urine from each kidney to the bladder), urinary bladder (which collects and holds urine until it is voided), and urethra (the tube that carries urine from the bladder and out of the body through the penis or vagina). The kidneys are often called the “upper urinary tract”, while the bladder and urethra are the “lower urinary tract”. Urinary tract infections not only make a pet feel badly, but they can cause serious complications. Kidney damage, infection in other parts of the body, and urinary stones (uroliths) are some of the most important complications.

Dogs and cats can develop infection of either the upper or the lower urinary tract. Upper urinary infection of one or both kidneys is called “pyelonephritis”. Lower urinary tract infection of the bladder is called “cystitis”. Cystitis occurs far more commonly than does pyelonephritis, but pyelonephritis is usually a more serious disease than cystitis. Animals with pyelonephritis often, but not always, act as if they are sick. On the other hand, animals with cystitis often continue to eat and act as if they feel well even though they may show other symptoms of the infection.

Pyelonephritis (kidney infection) can either be a complication of cystitis if the pathogens move up into the kidneys from the bladder, or it can come from pathogens elsewhere in the body that reach the kidneys via the bloodstream. Either way, the pathogens can cause damage to the kidneys that might be permanent, or might be reversible. Infected animals often develop fever, a poor appetite, and act lethargic. They may drink excessively and urinate large volumes of urine more often than normal. The kidneys, which are tucked up under the spine, might hurt; this could cause the pet to cry out if picked up by the belly. In a worst-case scenario, infection can severely damage the kidneys or can spread from the kidneys elsewhere in the body, potentially causing life-threatening consequences.

Cystitis (bladder infection) is far, far more common than pyelonephritis. Bladder infections can be a complication of kidney infection, but more often they are the result of bacteria found lower in the urinary tract making their way up the urethra to the bladder. These infections are much more common in dogs than in cats. They are also much more common in female dogs than in male dogs simply due to the anatomy – a male dog’s penis is far away from the anus, while in the female dog the vulva is just below the anus. The symptoms of cystitis include frequent voiding of small puddles of urine (unlike pyelonephritis, there is usually no increase in thirst), discolored or foul-smelling urine, straining to urinate or acting as if it hurts to urinate, or urinating in inappropriate locations (outside the litter box for a cat, or in the house for a dog).

Urinary tract infections are common in dogs (especially females) but they do also occur in cats (especially older cats). As mentioned, bladder infections are more common than kidney infections, and bacterial infections are more common than infections with other sorts of germs. There are important differences even in the types of cystitis. Simple cystitis occurs in an otherwise healthy dog, and typically responds very quickly and completely to a short course of antibiotics. On the other hand, complicated bladder infections happen for a reason. There may be something wrong with the pet’s urinary anatomy (for instance, malformation of the vagina or

misplacement of the ureters), or something wrong with the urine itself (for instance, diabetes mellitus causes the urine to contain sugar that helps bacteria grow), or the animal may not be able to void urine normally (for instance, dogs that are paralyzed often cannot completely empty their bladders voluntarily). Anything that interferes with the normal protections of the urinary tract can lead to a complicated UTI. While there might well be a response to antibiotic drugs, unless the underlying problem is corrected infections are likely to recur after the treatment is stopped. These kinds of recurrent UTI are extremely frustrating for both the pet owner and the veterinarian.

Diagnosis: Urinary tract infections are identified after the pet demonstrates typical symptoms that prompt laboratory testing, or when bacteria (or less commonly fungi or other kinds of germs) are found in the urine during the investigation of other disease processes. The most basic test for diagnosis of a UTI is called a urinalysis. In this test, a sample of urine is examined under the microscope to look for bacteria, inflammatory white blood cells, and/or red blood cells. The urine is also checked to see how concentrated or dilute it is, and for biochemical changes.

In many cases (including essentially every animal with pyelonephritis or a complicated UTI), a urine culture and susceptibility test is also performed. In this test, a sample of urine is obtained directly from the bladder either with a needle and syringe (cystocentesis), or with a urinary catheter. It is important to avoid contamination of the sample from the penis or vagina, which normally contain high numbers of bacteria, by collecting a sample from the bladder itself rather than just catching the urine in a cup. The urine sample from the bladder is submitted to a laboratory, mixed with growth media, and placed in a warm incubator – this is the “culture” part of the test. After a few days, any bacteria present in the sample should grow. Once the bacteria are grown, they can be identified as to a specific type by name, and they can be tested to see which antibiotics are most likely to kill them – this is the “susceptibility” part of the test. The test is not perfect because sometimes bacteria fail to grow (especially if the sample has to be mailed to a laboratory), or because the test does not always predict how an antibiotic will act in the animal’s body. However, culture and susceptibility is vital in management of serious, recurrent, or complicated UTI.

Other tests may be recommended on a case-by-case basis. For animals with pyelonephritis, abdominal ultrasound allows a look inside the kidneys. These sick patients would also need a complete blood count (CBC) and biochemistry profile to determine the extent of damage to the kidneys and gauge the severity of systemic infection. For animals with cystitis, either x-rays or ultrasound might also be recommended to look for the urinary stones (uroliths) that can complicate infection. If there have been prior infections, blood tests are likely to be suggested to try to find an underlying problem such as diabetes. The more often infections occur, or the more difficult they are to clear up, the more crucial it becomes to try to find an underlying cause of the infections that might be something that can be corrected.

LIVING WITH THE DIAGNOSIS

Pyelonephritis and cystitis are very different types of UTI. Animals with pyelonephritis might require hospitalization for several days for intravenous treatment, and they might be left with some degree of kidney damage even after treatment. Luckily, most animals with cystitis (more common than pyelonephritis) will respond well to

antibiotics given by mouth at home. In most cases, either type of infection can be cleared with a course of the appropriate antibiotic or antifungal medication.

There are some number of animals that prove very difficult to clear of UTI on a permanent basis. Animals with complicated or recurrent infections for whom the underlying cause cannot be corrected often face a long war against UTI with frequent battles. Even if a single battle is won when the infection is cleared, there may be another new battle on the horizon with the next infection. For these animals, it is worth seeking consultation with a veterinary specialist in small animal internal medicine. Your veterinarian can usually refer you to one of these “Diplomates of the American (or European) College of Veterinary Internal Medicine” or you can find a small animal internist by looking at www.acvim.org or www.vetspecialists.com in North America, or www.ecvim-ca.org in Europe.

TREATMENT

Simple, uncomplicated bladder infections are usually treated with oral antibiotics, typically for one week. For these first-time infections, the veterinarian may or may not have performed a urine culture and susceptibility. Often, the veterinarian will simply choose an antibiotic that works in most pets, most of the time. If it does not, then further testing is required.

Animals with complicated or recurrent cystitis usually require more than just antibiotics. The veterinarian is likely to start with an antibiotic based on an educated guess but will adjust the type of drug used based on results of the culture and susceptibility once it comes available after several days. There may be additional treatment necessary to address the underlying cause of infection. For example, a diabetic pet will need to begin insulin therapy, or a pet with an anatomic problem might require surgical correction. If it is impossible to correct the underlying problem, then there might be a need for ongoing therapy of one type or another. Your veterinarian can discuss these options with you based on your pet’s individual needs.

For animals with pyelonephritis, treatment depends on the severity of illness. Although some pets may be able to simply go home and take antibiotics by mouth, many require at least a few days in the hospital. During this time it is likely the pet will receive injectable antibiotics, intravenous fluid therapy, and other treatments to improve overall health. Antibiotics will very likely be continued at home for several weeks after hospital discharge.

DOs

- Give all medications exactly as prescribed. Do not stop just because the pet feels better or the symptoms have resolved. If you notice something that makes you believe that your pet may be having a bad response to the medications, contact your veterinarian.
- Schedule follow-up appointments as suggested. These are often key to be sure the infection has actually resolved.
- Provide plenty of clean, fresh water at all times. Withholding water in an attempt to cut back on urinary accidents in the house can be dangerous, especially in animals with kidney infections.

- Be willing to allow the diagnostic testing required to figure out why infections recur if this is the second, third, or fourth bout with infection. Consider referral to an internal medicine specialist.
- Wash your hands well after cleaning up a urinary accident. Although it is rare, there is some risk that the germs from the urine could cause an infection in a person. For the same reason, it is probably best not to allow a pet with a UTI to sleep in the bed with people until the infection has been resolved.

DON'Ts

- Do not allow your pet to urinate on the way into the veterinary hospital for appointments. It is highly likely that your veterinarian will need a urine sample, and if the pet just emptied their bladder it can make for a long appointment while you wait for it to fill up with urine again.

WHEN TO CALL YOUR VETERINARIAN

- If you notice any of the “signs to watch for” (below)
- If you are having trouble administering medications as directed
- If your pet demonstrates new signs, such as vomiting

SIGNS TO WATCH FOR

- Straining to urinate. Even if this was not part of the original presentation, it can signal an obstruction to urine flow that can quickly become very dangerous.
- Recurrence of the original signs of infection
 - Pyelonephritis: increased thirst and urination, poor appetite, lethargy, abdominal pain
 - Cystitis: frequent urination in small volumes, foul smelling urine, discolored urine, straining to urinate, urinating in inappropriate locations

ROUTINE FOLLOW-UP

- For pyelonephritis, recurrent or complicated UTI follow up urinalysis and culture will be recommended.
- For simple, first-time cystitis, no follow-up is necessary as long as the symptoms resolve



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