HOW I TREAT ... COMPLICATED URINARY TRACT INFECTIONS

Mª Ángeles Daza González DVM, PhD
Hospitalización y Cuidados Intensivos de Pequeños Animales
Hospital Clínico Veterinario Complutense

The uncomplicated urinary tract infections (UTIs) include those located in the lower urinary tract, which affect individuals with an anatomically normal urinary tract with normal function that respond to short treatments; the complicated ones (ITUc) include those that do not fulfill these criteria.

UTIs associate with an underlying disorder of the urinary tract (functional or anatomical abnormalities) that increases the risk of recurrent infections or treatment failure. UTIs have a higher risk of morbidity and mortality compared to uncomplicated ones.

In human medicine, the factors related to UTIs are pregnancy, diabetes mellitus, kidney failure, conditions that lead to immunocompromise, kidney transplantation, infection with antibiotic-resistant pathogens, hospital-acquired infection, persistent symptoms ≥ 7 days before seeking medical care, obstruction of the urinary tract (benign prostatic hypertrophy, stenosis, stones, tumors and hematoma), dwell urethral catheter, stent, nephrostomy tube or urinary diversion, functional or anatomical anomaly of the urinary tract (such as neurogenic bladder) and recent instrumentation of the tract urinary.

Uncomplicated UTIs generally require less diagnostic testing and can be treated with broad spectrum antimicrobial agents and for shorter periods. However, patients with cUTI always require urine culture to identify the causative pathogen due to the risk of resistance to antimicrobials.

A UTI is recurrent if the patient presents two or more episodes within six months or three or more episodes within one year.

A reinfection consists of an UTI caused by a microorganism that is not the initial one and that can be of different gender and species, or different serotype. The culture performed 5-7 days after treatment is usually negative and a new episode appears within weeks to months after withdrawing the treatment. In this case, it will be indicated to start a new treatment cycle for 10-14 days, but not to apply prolonged treatments as they will not prevent new UTIs.

Recurrences are caused by the same microorganism, which may have the same or different sensitivity pattern. The related clinical signs appear within a few days after withdrawing the treatment, being related to problems regarding the efficacy of the treatment (e.g. the antibiotic does not reach the microorganism because it is protected inside a biofilm, or the antibiotic used is not adequate or the administration has not been correct regarding the dose, frequency or length). In this case it is indicated to administer treatments for 30, 60 or longer, trying to choose a drug with good penetration (fat-soluble, e.g. with low protein binding) and to ensure that adequate concentration is achieved, administer the highest dose within the therapeutic range in case we use fluoroquinolones and with high frequency if enhanced penicillins are chosen (Lulich et al., 2004).

Persistence is recurrence without periods of urinary sterility, not even transiently. It is related to the creation of resistance and alterations in local defense mechanisms (Chew et al., 2011).

Superinfections are UTIs caused by new organisms while an antibiotic is administered to treat a previously diagnosed UTI or other extraurinary disease. The microorganisms involved are usually
multiresistant. These UTIs should be treated by the combination of several antibiotics (Lulich et al., 2004; Chew et al., 2011).

The treatment of a cUTI requires cultures and administration of a broad-spectrum empirical therapy until the result of the culture is received, such as ampicillin or sulfa-trimethoprim. If the clinical condition of the patient allows it, it is possible to wait until the results of the tests are obtained. When choosing empirical therapy, it is important to take into account the isolation of previous pathogens as well as their susceptibility. A few days after the start, the effectiveness of the empirical treatment should be evaluated, with the de-escalation towards the narrow spectrum antimicrobial, as guided by the urine culture results and taking into account that it must be excreted in its active form through urine.

In cases where two pathogens are isolated that cannot be treated with the same antibiotic coverage, a combination therapy can be tried or direct therapy towards the most relevant organism, provided there is no evidence of pyelonephritis or underlying disease that increases the risk of systemic or ascending infection.

In general, it is recommended to administer the treatment for 4 weeks and perform a follow-up culture 5-7 days after the start of therapy and once a week.

The use of critical antibiotics in human medicine (carbapenems or vancomycin) is only indicated in case the need for its use is documented and in case the infection is treatable.

Apart from applying the appropriate pharmacological treatment, it is very important to try to solve the predisposing causes. From the surgical point of view, surgical removal of uroliths, partial cystectomy in the case of urachal diverticulum or thickening of the cranial wall of the bladder due to chronic cystitis, resection of bladder polyps (Chew et al., 2011) and vulvoplasty in patients with excessive vulvar folds (Hammel et al., 2002).

Corynebacterium urealyticum (Bailiff et al., 2005; Cavana et al., 2008) causes the so-called “incisive cystitis” since its high urease activity is associated with precipitation of struvite and calcium phosphate that can adhere to the surface of the mucous membrane. It shows intermediate sensitivity to fluoroquinolones, macrolides, rifampicin and tetracyclines; but sometimes it is necessary to combine the medical treatment with surgical resection of plates.

1.- Diabetes mellitus:

In these patients, the risk of developing UTI due to diabetes is compounded by the autonomic genitourinary neuropathy. This neuropathy can cause problems with urination due to bladder dysfunction characterized by poor emptying, which could increase susceptibility to UTI.

For the treatment of emphysematous pyelonephritis in human medicine, medical treatment is recommended based on the result of the culture and sensitivity, control of urine drainage glycaemia and correction of the obstruction if present and even the nephrectomy of the affected kidney.

Emphysematous cystitis is identified as a radiological finding rather than clinical signs and should be included in the differential diagnosis of recurrent UTI associated with glycosuria (DM and Fanconi syndrome), structural abnormalities, prolonged immunosuppressive treatment with corticosteroids (Lobetti et al., 1998; Almondia et al., 2010) and in case of hematological malignancies (Aizenberg et al., 2003).

2.- Neurogenic bladder:

For the long-term treatment of neurogenic bladder dysfunction, the method for emptying the bladder is the most important problem. In human medicine, it has been proven that intermittent catheterization is the
best evacuation method to reduce bacteriuria and UTI. It also seems that it is better to use a catheter with a hydrophilic or prelubricated coating. Concomitantly, it is recommended to apply effective pharmacological therapy against neurogenic detrusor overactivity, using oral antimuscarinics.

Spinal cord injury can also lead to neurological bowel dysfunction resulting in constipation and fecal incontinence. In these cases, management directed to the regular emptying of the digestive tract often relieves constipation and fecal dirt, thus reducing the risk of UTI.

3. UTI associated with catheters:

This refers to UTI related to the placement of a dwell urinary catheter. We should suspect infection associated with the catheter in patients with fever of unknown origin, bacteremia, hematuria or pyuria. Whenever possible, it is advisable to remove the catheter and collect a urine sample by cystocentesis when the bladder is full. Otherwise, the catheter can be changed and the sample collected through the new one.

It is recommended to administer broad spectrum empirical antibiotic therapy guided by the results of recent cultures, as well as to change the catheter at the beginning of the therapy. In general, it is better to remove the catheter as soon as possible and not to use prophylactic antibiotic therapy during the time it remains in place.

4.- Obstructive pyelonephritis related to uroliths:

In human medicine, decompression of the renal collecting system is performed according to logistic factors, either by retrograde ureteral catheterization or percutaneous nephrostomy, both being equally effective.

In the case of pyonephrosis in veterinary medicine, percutaneous renal drainage has been described (Szatmári et al., 2001) or by stent placement (Kuntz et al., 2015) and renal pelvis flushing with betadine solution or 0.9% SSF.

For pyelonephritis and when ascending infection is suspected, a urine sample will be taken for culture by means of cystocentesis, but in case of hematogenous dissemination, a sample will be taken for blood culture. It is recommended to administer antibiotic treatment for 4-6 weeks.

References:


