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A REVIEW ON URINARY TRACT DISORDERS IN CATS

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ABSTRACT

Cats are considered one of the major pets in Egypt. Urinary tract disorders are common in cats, such as urolithiasis, feline idiopathic cystitis, bacterial urinary tract infections, urethral plugs, and neoplasia. Cats' urinary tract infections and other disorders can be complicated and serious, necessitating immediate medical attention. Therefore, the treatment for a cat's urinary symptoms will depend on the underlying cause. Some possible options include raising the amount of water. A change in food, antibiotics, or symptom treatment, and the passage of tiny stones out of the body via the urethra. Urinary acidifiers with fluid treatment. To eliminate urethral blockages in male cats, a urinary catheter or surgery may be necessary. In this review, the most common causes of urinary tract disorders in cats with the most appropriate approach for treatment are discussed.

Keywords: Cats, urinary tract disorders, treatment, FLUTD

INTRODUCTION

Feline lower urinary tract disease (FLUTD) encompasses conditions in cats characterized by clinical symptoms such as stranguria, pollakiuria, haematuria, and periuria. Research indicates that 55.0–69.0% of cats diagnosed with FLUTD are affected by feline idiopathic cystitis (FIC), while urolithiasis is present in 12.0–22.0% of these cases (Gerber *et al.,* 2006; Lew-Kojrys *et al.,* 2017). Additionally, bacterial urinary tract infections (UTIs) account for 1.5–20.0% of FLUTD instances (Eggertsdóttir *et al.,* 2007).

Bladder wall neoplasia is identified in 0.3–3.6% of cases, while neurological disorders occur in 0.2–3.0% of instances (Dorsch *et al.,* 2014). Furthermore, feline lower urinary tract disease (FLUTD) may be exacerbated by urethral obstruction (UO) in male cats, which is observed in 15.0–57.1% of cats suffering from feline idiopathic cystitis (FIC) and in 20.0–66.7% of those with urolithiasis (Lulich *et al.,* 2010).

The course of FLUTD is complicated by recurrent episodes. Owners may elect to euthanize their cats or donate them to animal shelters as a result of inappropriate

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elimination (Patronek *et al.,* 1996; Delille *et al.,* 2016). 17.1–65.0% of cats with FIC have recurring episodes (Bradley and Lappin, 2014; Delille *et al.,* 2016). In felines diagnosed with FIC, recurrent episodes occur in 17.1–65.0% of cases (Bradley and Lappin, 2014; Delille *et al.,* 2016). As cats age, the frequency of recurrence tends to decrease (Kruger *et al.,* 2003). For cats suffering from urolithiasis, recurrence rates vary from 5.5% to 38.5% (Albasan *et al.,* 2009; Gerber *et al.,* 2008). Multiple episodes are infrequent in cats with UTI, with a prevalence of 14.7% reported in one study (Davidson *et al.,* 1992; Jody *et al.,* 1996). In cases of UO attributed to FIC, recurrence rates have been documented at 17.0–58.0% (Zezza *et al.,* 2012).

Despite FLUTD being a prevalent condition, there is limited information regarding the long-term outlook for cats diagnosed with it. A particular study indicated a cautious prognosis for cats experiencing urinary obstruction (UO), with 21.0% ultimately being euthanized due to recurring UO. Among these, 50% were diagnosed with feline idiopathic cystitis (FIC) (Gerber *et al.,* 2008).

Common causes of urinary tract diseases:

1. **Feline idiopathic cystitis:**

Feline Idiopathic Cystitis (FIC) is the predominant cause of Lower Urinary Tract Symptoms (LUTS) in cats (Buffington and Delgado, 2024). This condition shares characteristics with interstitial cystitis in humans, also known as bladder pain syndrome, particularly regarding bladder abnormalities, the presence of comorbidities, and the impact of stress (Westropp *et al.,* 2024). It is essential to recognize FIC as a systemic disorder that may involve organs beyond the bladder, with affected felines often exhibiting concurrent health issues, such as sickness behaviors and 'Pandora' syndrome (Tony Buffington *et al.,* 2014). In cats suffering from FIC, the symptoms can be interpreted as the bladder's reaction to ongoing activation of the central threat response system, which is shaped by genetic, epigenetic, and environmental influences (Buffington and Delgado, 2024). Consequently, the assessment and treatment of cats with FIC should extend beyond the bladder itself (Buffington, 2011). FIC arises from a multitude of complicated and variable nervous, endocrine, and immune dysfunctions that impact not only the cat's bladder but also their behavior and the functioning of other organs, including the skin and gastrointestinal tract (Westropp *et al.,* 2019).

The diagnosis of Feline Idiopathic Cystitis (FIC) relies on exclusion, considering the frequency and nature of episodes, the intensity of clinical symptoms (including any comorbid conditions), and the financial capabilities of the caregiver. Currently, there is no sensitive, specific, and clinically accessible diagnostic test available to definitively confirm FIC; therefore, the diagnosis is determined through signalment, medical history, risk factors, the exclusion of alternative causes of lower urinary tract signs and the response to treatment (Buffington and Delgado, 2024).

2. **Urolithiasis:**

Urolithiasis is a significant contributor to lower urinary tract symptoms (LUTS) in felines, representing 10–23% of cases (Kopecny *et al.,* 2021). It is also a notable cause of urinary obstruction (UO) (Jody and Cari, 1996). The clinical manifestations of urolithiasis can differ based on the stone's location and characteristics, with cystoliths sometimes being discovered incidentally, while in other instances, they may lead to hematuria and dysuria. The predominant types of uroliths are calcium oxalate and struvite (magnesium ammonium phosphate), which are generally sterile. Collectively, these two types account for approximately 90% of feline uroliths (Osborne *et al.,* 2009). The relative prevalence of these uroliths has evolved over time, likely influenced by changes in diet, with recent research indicating that struvite has become more prevalent than calcium oxalate (Kopecny *et al.,* 2021). Other, less frequently encountered types of uroliths include urate, cystine, calcium phosphate as well as compound and mixed forms (Houston *et al.,* 2016). Occasionally, solidified blood uroliths have been reported, typically located in the bladder and urethra (Westropp *et al.,* 2006). A recent case study documented the presence of uroliths made from the antiviral nucleoside analogue GS-441524, which is utilized in the treatment of feline infectious peritonitis, in two cats (Allinder *et al.,* 2024).

When uroliths are detected, it is advisable to conduct a complete blood count and biochemical analysis to identify potential contributing factors to their development, such as hypercalcemia, which is found in approximately 35% of cats with calcium oxalate uroliths, liver diseases like portosystemic shunt (urate), or conditions linked to urinary tract infections (UTIs) including chronic kidney disease (CKD), hyperthyroidism, or diabetes mellitus (struvite) (Bartges, 2016). Additionally, urinalysis is essential in the assessment of urolithiasis, involving the measurement of urine specific gravity (USG) and pH, along with sediment analysis. Care must be taken when interpreting results, as the type of urolith does not always correspond with the type of crystals present, and uroliths may form in the absence of crystalluria. Furthermore, urine pH can be influenced by factors such as the stress of visiting the clinic, delays in sample analysis, dietary influences, and the timing of feeding (Reppas and Foster, 2016).

3. Urinary tract infections and subclinical bacteriuria:

Urinary tract infections (UTIs) are relatively rare as a cause of lower urinary tract symptoms (LUTS) in otherwise healthy adult cats, occurring in less than 3% of cases. However, the incidence is elevated in specific populations, such as cats with chronic kidney disease (CKD) and those aged over 10 years, where infection should be considered a possible underlying factor (Dorsch *et al.,* 2014; Kruger *et al.,* 1991). The prevalence of subclinical bacteriuria tends to increase with age and the presence of comorbid conditions, with one study reporting a prevalence of 6.1% in cats older than 6 years (Moberg *et al.,* 2020).

The majority of urinary tract infections (UTIs) in felines are attributed to a single bacterial species, predominantly from the animal's own urogenital or fecal microflora, such as *Escherichia coli, Streptococcus species, Enterococcus faecalis*, and *Staphylococcus felis* (Fonseca *et al.,* 2021). In contrast, polymicrobial infections are more frequently observed in cats with indwelling urinary catheters or other underlying health issues (Dorsch *et al.,* 2019). Enterococcus faecalis is more commonly found in cats exhibiting subclinical bacteriuria or as part of a polymicrobial infection (Seidel *et al.,* 2022). Although *Corynebacterium urea-lyticum* is an uncommon cause of UTIs, it is more prevalent in cats that have undergone urethral catheterization or urological procedures (Maurey *et al.,* 2019). Fungal UTIs, such as those caused by Candida species or Cryptococcus species, have been reported; affected cats often have comorbidities like diabetes mellitus or chronic kidney disease (CKD), are undergoing immunosuppressive treatments (such as corticosteroids), or have a recent history of antibacterial therapy (Jin and Lin, 2005).

4. Urethral obstruction:

The majority of urinary tract infections (UTIs) in felines are attributed to a single bacterial species, predominantly from the animal's own urogenital or fecal microflora, such as *Escherichia coli, Streptococcus species, Enterococcus faecalis*, and *Staphylococcus felis* (Fonseca *et al.,* 2021). In contrast, poly-microbial infections are more commonly observed in cats with indwelling urinary catheters or other underlying health issues (Dorsch *et al.,* 2019). Urethral obstruction (UO) poses a significant risk and can arise from any form of lower urinary tract (LUT) disease. Feline idiopathic cystitis (FIC) is the leading cause of such obstructions, although urolithiasis must also be ruled out (Gerber *et al.,* 2008). Urethral plugs, which consist of a mixture of proteinaceous substances, inflammatory cells, and crystals, may develop as a result of underlying LUT conditions like FIC, and less frequently from UTIs or urolithiasis, or a combination thereof. Additional factors contributing to UO include anatomical irregularities (such as strictures, spasms, and congenital defects) and, on rare occasions, neoplasia (Cooper, 2015).

Complete urinary obstruction results in elevated intravesicular pressure, which can cause necrosis of the bladder wall and damage to the mucosa. The increased hydrostatic pressure due to downstream obstruction may also affect the ureters and kidneys; when renal pressure surpasses glomerular filtration pressure, both renal blood flow and glomerular filtration rate decline. This impairment subsequently affects the tubular concentrating ability, leading to reduced reabsorption of sodium and water, as well as hindered excretion of phosphorus, potassium, blood urea nitrogen, creatinine, and hydrogen ions (Segev *et al.,* 2011). Severe metabolic disturbances, including hyperkalemia, metabolic acidosis, and hypocalcemia, may arise. Hyperkalemia is the most prevalent life-threatening complication, potentially resulting in bradycardia and cardiac arrhythmias, which can be worsened by hypocalcemia. Uremia typically manifests within 24 to 48 hours following complete and acute urinary obstruction. Additionally, ongoing gastrointestinal losses and reduced fluid intake (due to vomiting and anorexia) can lead to significant dehydration, azotemia, and hypovolemia. If not addressed, complete urinary obstruction may culminate in severe bradycardia, bladder rupture, uroabdomen, concurrent shock, and ultimately death (Segev *et al.,* 2011).

5. Lower urinary tract neoplasia:

Tumors located anywhere within the urinary tract may manifest clinical symptoms such as hematuria, stranguria, and dysuria, with the bladder being the most commonly affected site. Additional clinical manifestations of lower urinary tract neoplasia may include lethargy, abdominal discomfort, and vomiting (Griffin *et al.,* 2020). In general, bladder tumors are uncommon in felines, with the most prevalent type being invasive urothelial carcinoma (formerly known as transitional cell carcinoma) (Meuten and Meuten, 2016). Mesenchymal tumors, lymphoma, and other neoplasms are diagnosed less frequently, either as primary tumors or as components of a multicentric disease process (Fulkerson and Knapp, 2020).

6. Lower urinary tract trauma :

Injury to the urinary tract can result from external trauma, primarily due to road traffic accidents, but may also occur iatrogenically during the placement of urinary catheters (Robakiewicz and Halfacree, 2023). Symptoms may include hematuria and stranguria, and additional injuries might be present. The ability to palpate the urinary bladder does not exclude the possibility of urinary tract trauma (Meeson and Corr, 2011). Furthermore, abdominal effusions may not be readily apparent in cases of intrapelvic urethral rupture, as urine can accumulate in the subcutaneous tissue (Addison *et al.,* 2014). Common serum biochemical changes include azotemia and hyperkalemia, and the analysis of any abdominal effusion may show a creatinine ratio of abdominal fluid to peripheral blood of $\geq 2:1$, which is indicative of uroabdomen (Stafford, J.R. and Bartges, J.W., 2013).

7. Congenital lower urinary tract diseases

Congenital anomalies of the urinary tract are uncommon in felines, yet they can arise in any part of the urinary system. Typically, these conditions present during early life, accompanied by lower urinary tract symptoms (LUTS) and incontinence. Such anomalies may involve the bladder (agenesis, hypoplasia, herniation), urethra (ectopic ureters, aplasia, hypoplasia, duplication, prolapse), as well as the urachus and genitalia (fistulas, hypospadias) (Bartges and Callens, 2015; King and Johnson, 2000). Diagnostic imaging techniques, including contrast radiography and advanced imaging, can be beneficial, while the treatment and prognosis are contingent upon the specific abnormality (Bartges and Callens, 2015).

The incidence of FLUTD in Egypt:
Elkewahy *et al.* (2023) reported that urolithiasis was the most common condition in cats, accounting for 34.00% of cases, followed by chronic cystitis at 30.70%. Other conditions, such as renal mass, renal abscess, and urinary bladder mass, were less common, each representing 1.09% of cases during the period from 2021 to 2023 in Qalubia, Egypt. Furthermore, Ayoub et al. (2024) identified urolithiasis as the leading diagnosis of feline lower urinary tract disease (FLUTD) in Egypt, with a prevalence of 37.5%, followed by feline idiopathic cystitis (FIC) at 33.9%, bacterial urinary tract infection (UTI) at 14.2%, urethral plugs at 10.7%, and neoplasia at 3.5% and urethral obstruction was notably more prevalent in cats diagnosed with urolithiasis, urethral plugs, and FIC, occurring in 42.8% of cases. Additionally, Abdel-Saeed *et al.* (2021) documented an 82% occurrence of obstructive FLUTD in tomcats across Egypt. The incidence of urolithiasis has markedly risen, from 1.5%-8% between 1998 and 2003 (Houston *et al.,* 2003) to 15%-20% from 1998 to 2014 (Houston *et al.,* 2016).

The incidence of FLUTD worldwide:
Feline lower urinary tract disease (FLUTD) encompasses disorders of the urethra and/or bladder (Saevik *et al.,* 2011). Its prevalence has been documented at 1.5% in the United States (Lund *et al.,* 1999), 4.4% in Britain (O'Neill *et al.,* 2014), 2.67% in Korea (Kim *et al.,* 2018), and 2.2% in Thailand (Piyarungsri *et al.,* 2020). According to Sparkes (2018), FLUTD is a common condition, representing approximately 1.5–4.5% of the total feline cases seen in veterinary practices. The prevalence of cats diagnosed with feline idiopathic cystitis (FIC) among those with FLUTD was reported to be 55% in 1991 (Kruger *et al.,* 1991) and 63% in 2001 in the United States (Lekcharoensuk *et al.,* 2001). `XC Further estimates indicate a prevalence of 57% in Switzerland (Gerber *et al.,* 2005), 55% in Germany (Dorsch *et al.,* 2014), 55.5% in Norway (Sævik *et al.,* 2011), 60.7% in Poland (Lew-Kojrys *et al.,* 2017), 66.4% in Korea (Kim *et al.,* 2018), 57.7% in Thailand (Piyarungsri *et al.,* 2020), and 56% in Indonesia (Nururrozi *et al.,* 2020). Consequently, it can be inferred that the prevalence of FIC among cats suffering from FLUTD ranges from 55% to approximately 67%, establishing FIC as the predominant cause of FLUTD (He *et al.,* 2022).

The prevalence of feline lower urinary tract disease (FLUTD) was reported to be between 3% and 8% in Canadian veterinary practices (Lund *et al.,* 2012) and between 2% and 13% in the United States (Lekcharoensuk *et al.,* 2001). In Thailand, the primary causes of FLUTD included feline idiopathic cystitis (FIC), accounting for 55% to 57%, and urolithiasis, which comprised 12% to 23% (Hunprasit *et al.,* 2019). Additionally, urethral obstruction was observed in 18% to 58% of Norwegian cats (Sævik *et al.,* 2011). Other identified causes of FLUTD included urinary calculi, urethral plugs, and urinary tract infections (UTIs). Neoplasia was noted as a less frequent cause of FLUTD, while UTIs were reported to account for 8% to 20% in European countries, a figure that is significantly higher than the 1% to 3% reported in the United States (Nururrozi *et al.,* 2020).

Treatment approach for urinary diseases in cats:
FIC:

In most instances, LUTS typically resolve within 2 to 7 days, regardless of treatment; however, recurrence is frequent. Implementing appropriate multimodal environmental modification (MEMO) has proven effective in minimizing the recurrence of all disease signs in cats suffering from FIC, and it has become the standard practice in veterinary medicine for managing this condition (Buffington and Delgado, 2024). Although various medications have been utilized to treat FIC, few have undergone thorough investigation or comparison with MEMO regarding their effectiveness. The stress associated with administering oral medications to cats should be taken into account when prescribing, as it may complicate the evaluation of treatment response. Prednisolone, pentosan polysulfate sodium, and glycosaminoglycans have not demonstrated significant benefits in cats with FIC, although improvements have been noted in both placebo and treatment groups, potentially due to the administration of medication in treats, which may alleviate perceived threats and foster positive emotions (Osborne *et al.,* 1996; Wallius and Tidholm, 2009; Bradley and Lappin, 2014). Amitriptyline may be an option for cases that do not respond to other treatments, while fluoxetine has been found to reduce urine spraying (Chew *et al.,* 1998; Hart *et al.,* 2005). However, urinary retention has been associated with fluoxetine use (DiCiccio and McClosky, 2022).

Urolithiasis:

The management approach will be influenced by factors such as the location, suspected composition, size, and quantity of uroliths, in addition to the characteristics of both the caregiver and the cat. Possible treatment options encompass medical dissolution, surgical extraction through cystotomy, voiding urohydropropulsion, or more advanced methods, including cystolithotomy, lithotripsy, cystoscopy, or basket retrieval.

Type of urolith:

1. Struvite (magnesium ammonium phosphate):
   The medical management involves a diet low in phosphorus and magnesium to encourage acidic urine, with dissolution potentially requiring 2 to 3 weeks, which can be monitored through imaging every 2 to 3 weeks (Lulich *et al.,* 2013).
   Following surgical removal or non-invasive techniques, it is essential to implement preventive measures such as dietary adjustments, increased water consumption, and urinary acidification (Cruciani *et al.,* 2020).
2. Calcium oxalate:
   It cannot be dissolved through medical means and must be excised either surgically or through non-invasive methods (Cruciani *et al.,* 2020).
3. Urate:
   The removal can be achieved through surgical or non-invasive methods; medical dissolution has been documented using allopurinol and dietary adjustments (Osborne *et al.,* 1996).

Urinary tract infections and subclinical bacteriuria:

The use of antimicrobial therapy for subclinical bacteriuria is typically discouraged, and the mere presence of a multidrug-resistant bacterial species does not warrant treatment (Weese *et al.,* 2021). In cases involving cats with diabetes mellitus, treatment may be considered if the bacteriuria is believed to adversely affect diabetic management, or in instances of suspected pyelonephritis, or when the cat is scheduled for urinary tract surgery or endoscopy (Weese *et al.,* 2021). For cats exhibiting clinical signs of urinary tract infection (UTI), treatment should be guided by bacterial culture and sensitivity testing, and analgesics should be administered as necessary (for example, a non-steroidal anti-inflammatory drug, provided there are no contraindications, or an opioid). Enterococcus species are inherently resistant to beta-lactams, cephalosporins, trimethoprim-sulfonamide, and fluoroquinolones (Hollenbeck and Rice, 2012). If treatment is required while awaiting results, a first-line antimicrobial such as amoxicillin or trimethoprim-sulfonamide (noting that the latter may be challenging to administer to cats) should be chosen (Weese *et al.,* 2021). A treatment duration of 3 to 5 days may suffice for uncomplicated UTIs (i.e., in an otherwise healthy individual), although such cases are rare in cats. A lack of response should trigger further investigation, and empirical alterations to antibiotic therapy should be avoided. Cats are more likely to experience complicated UTIs (i.e., with comorbidities), and treatment should be informed by culture and sensitivity findings, with a suggested treatment duration of 3 to 5 days for a first infection or reinfection, and 7 to 14 days for persistent or relapsing infections (Weese *et al.,* 2021).

Third- and fourth-generation cephalosporins, such as cefovecin, are utilized for cats exhibiting lower urinary tract symptoms (LUTS) (Hardefeldt *et al.,* 2020). However, in conjunction with fluoroquinolones, these antibiotics should be reserved for instances where clinical signs of urinary tract infections (UTIs), pyelonephritis, or bacterial strains resistant to first-line antibiotics are present. Long-acting cefovecin injections should not be administered empirically without prior urine culture, and critically important antibiotics for human use, such as carbapenems, should not be employed in the treatment of feline patients (Weese *et al.,* 2021)..

URETHRAL OBSTRUCTION

Fluid therapy

Intravenous (IV) fluid therapy is essential for treating dehydration and hypovolemia, restoring renal perfusion, and correcting hyperkalemia. The initiation of fluid therapy should not be postponed until a urinary catheter is inserted, as it aids in restoring renal perfusion and lowering serum potassium levels. Crystalloid fluid options include 0.9% saline or balanced isotonic fluids containing 4–5 mmol/l potassium. Research indicates that balanced isotonic crystalloids may be more effective in rapidly correcting acidosis, although the type of fluid (0.9% saline or balanced isotonic) does not significantly affect the normalization of serum potassium levels (Cunha *et al.,* 2010). It is crucial to closely monitor cats using point-of-care ultrasound for signs of volume overload. Factors that increase the risk of fluid overload include the administration of fluid boluses or the emergence of a heart murmur or gallop rhythm (Ostroski *et al.,* 2017). Volume overload during treatment for urinary obstruction (UO) is linked to higher costs and extended hospital stays (Ostroski *et al.,* 2017). Post-obstructive diuresis is a frequent complication associated with UO (Fröhlich *et al.,* 2016).

In cases where bolus fluid therapy is required, such as in patients experiencing shock, it is essential to adopt a goal-oriented strategy. This may involve the administration of a customized intravenous isotonic crystalloid bolus of 10 ml/kg over a period of 10 minutes, followed by a reassessment of the patient's mentation, heart rate, pulse quality, mucous membrane color, capillary refill time, blood pressure, and point-of-care ultrasound findings until the resuscitation endpoints are met. It is important to note that previously recommended high fluid 'shock rates' are no longer advised due to the potential risk of fluid overload (Pardo *et al.,* 2024).

CONCLUSION

This review summarizes the most common urinary tract disorders in cats with highlighting the most appropriate treatment approaches. According to the findings, only a small percentage of the management strategies that were discussed had sufficient evidence to back up their implementation (or, more accurately, sufficient evidence to suggest that they should not be implemented). It is currently the case that multimodal environmental management to reduce stress and conflict, as well as therapeutic urinary foods (especially when combined with an increase in the amount of moisture content in the diet), have the best evidence for use and should be considered the primary treatment method. Other modalities, particularly oral medicines like nonsteroidal anti-inflammatory drugs (NSAIDs), antidepressants, glycosamino-glycans, and sprays containing pheromones, do not have sufficient evidence to support their use. However, larger-scale studies are still required to better characterize the benefits of these modalities and to determine whether there are sub-populations of cats with urinary tract disorders that may benefit from their use. Even for treatments that are widely used, such as specialized urinary diets, there is a general lack of high-quality demonstrations of effective treatments. This highlights the necessity for clinicians to be critical in their evaluation of the published literature on urinary tract disorders management and to ensure that they are up-to-date with the most recent research on these perplexing and difficult-to-manage conditions.

Conflict of interest: None

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مقالة مرجعية حول اضطرابات المسالك البولية في القطط

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تُعتبر القطط واحدة من الحيوانات الأليفة الرئيسية في مصر وحول العالم. ومع ذلك، فإن القطط عرضة بشكل كبير لاضطرابات المسالك البولية. تشمل هذه الاضطرابات حصوات المسالك البولية، التهاب المثانة الخلالي مجهول السبب في القطط، التهابات المسالك البولية البكتيرية، انسدادات الإحليل، والأورام. تشمل أمراض الجهاز البولي السفلي لدى القطط (FLUTD) الاضطرابات التي تؤثر على كل من الإحليل والمثانة. يمكن أن تكون التهابات المسالك البولية لدى القطط وغيرها من الاضطرابات معقدة وخطيرة، مما يستدعي اهتمامًا طبيًا فوريًا. لذلك، يعتمد علاج الأعراض البولية لدى القطط على السبب الأساسي. في هذا الاستعراض، سنسلط الضوء على الأسباب الأكثر شيوعًا لاضطرابات المسالك البولية في القطط مع النهج الأكثر ملاءمة للعلاج.

الكلمات المفتاحية: القطط ، اضطرابات المسالك البولية، العلاج ، FLUTD