Feline Urinary Tract Obstruction: When Cats Can't Pee!

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Typical Presentation

Feline urinary tract obstruction can present in various ways, but the most common signs include straining to urinate, finding urine outside the litter box, hematuria, and depression. The severity of the obstruction can vary, with some cats exhibiting no visible urine production, while others may be seen in the litter box but unable to pass any urine. In other cases, cats may become calm, hide, show signs of abdominal pain, and even vomit. Regardless of the presenting complaint, it is crucial to always consider urinary tract obstruction in male cats as a potential underlying cause for the clinical signs presented.

Underlying Causes

Functional Obstruction : Functional obstructions are caused by spasms in the urinary tract, which can impede urine flow without a physical blockage. These can be challenging to identify but are an important consideration in the overall picture.

Physical Obstruction: Physical obstructions can be caused by a variety of factors, including mucus plugs, uroliths (stones), strictures, or even neoplasia.

Idiopathic Causes: In a significant portion of cases, the underlying cause of the urinary tract obstruction is unknown, or "idiopathic." These cases are thought to be related to feline idiopathic cystitis, a complex condition with unclear pathogenesis.

Feline Idiopathic Cystitis

Feline idiopathic cystitis (FIC), also known as feline interstitial cystitis or simply idiopathic cystitis, is a common underlying cause of urinary tract obstruction in cats. The pathogenesis of this condition is not fully understood, but it is believed to involve inflammation within the bladder without an identifiable infectious cause. Factors such as viral components, bladder abnormalities, and neurohumoral alterations, including imbalances in the hypothalamic-pituitary-adrenal axis and sympathetic nervous system, have been implicated in the development of FIC. Excessive body weight, young to middle-aged cats (2-7 years), purebred and long-haired cats, multi-cat households, conflicts with housemates, inactivity, low water intake, use of litter boxes, and being an indoor-only cat are all recognized risk factors for the development of FIC. Interestingly, some studies have observed an increase in the prevalence of urinary obstructions in cats during the initial months of the COVID-19 pandemic, potentially related to changes in routine and increased stress levels experienced by the cats.

History and Physical Exam

Obtaining a thorough history and performing a comprehensive physical examination are crucial first steps in the diagnosis of feline urinary tract obstruction. Key findings may

include a moderate to large, firm bladder, a painful or protruding penis, and the presence of a "plug" in the urethra.

Diagnostic Tests

Laboratory tests, such as a complete blood count, serum chemistry panel, and urinalysis, are essential to assess the patient's overall health and identify any underlying issues, particularly electrolyte imbalances like hyperkalemia, which can have serious cardiac consequences. At a minimum, PCV/PT, and potassium and creatinine concentration should be assessed. In obese cats, palpation of the bladder can be difficult. In these patients, ultrasound examination (abdominal POCUS) can help confirm the presence of a large bladder and distended proximal urethra. Radiographs are also useful in case of urinary tract obstruction to evaluate for the presence of uroliths.

Management of Hyperkalemia

Because of its effects on the heart resting membrane potential and conduction velocity, hyperkalemia can lead to bradycardia and arrhythmia, as well as various ECG changes such as tented T wave, lack of P wave, large QRS complexes, and sinus wave pattern. Potassium concentration should be evaluated in all cases of urinary tract obstruction and hyperkalemia should be treated. An ECG should also be evaluated when hyperkalemia is present. Treatments options for hyperkalemia are various and are divided into three categories depending on their mechanism of action.

1) Membrane Stabilization: Hyperkalemia can have serious cardiac consequences, so immediate treatment to stabilize the cell membrane is crucial. This can be achieved through the administration of calcium gluconate 10% (0.5-1.5 ml/kg IV, slow IV infusion while monitoring the ECG), which help protect the heart from the toxic effects of elevated potassium levels.
2) Potassium Shifting: Therapies that shift potassium from the extracellular to the intracellular space, such as dextrose 50% (0.5-1.0 ml/kg IV, diluted) with or without regular insulin (0.25-0.5 U/kg IV; supplement IV fluid with dextrose and monitor blood glucose to detect hypoglycemia), or the beta-2 agonist salbutamol (1-2 puffs), can help reduce the dangerously high serum potassium levels.
3) Potassium Excretion: Providing intravenous fluids can help promote the excretion of excess potassium through the kidneys. Ultimately, unblocking the urethra is essential to allow for the proper elimination of potassium.

Close monitoring of the patient's electrolytes, electrocardiogram, and clinical status is crucial, as the treatment approach may need to be adjusted based on the cat's response and evolving clinical picture. After removing the urethral obstruction, cats may develop post-obstructive diuresis. During significant diuresis, cats can develop hypokalemia and it is not uncommon to have to supplement cats with potassium to correct hypokalemia during treatment, even in cats who arrived at the emergency room in a state of hyperkalemia.

Urinary Catheterization and Post-Unblocking Care

Once the urinary obstruction has been confirmed and the patient has been stabilized, the obstruction must be relieved by passing a urinary catheter. It has been suggested that decompressive cystocentesis should be performed in blocked cats to allow immediate

emptying of the urinary bladder to relieve pain, and to facilitate retrohydropulsion of the obstructive material and the passage of the urinary catheter, by decreasing intraluminal pressure. However, it has not been proven that performing decompressive cystocentesis before urinary catheter placement result in easier placement of the urinary catheter, faster catheterization, and faster resolution of metabolic derangements present in cats with urinary tract obstruction. Therefore, the author recommends that decompressive cystocentesis should only be performed if passage of the urinary catheter cannot be done immediately.

Appropriate analgesia and deep sedation, often including a sacrococcygeal nerve block, are essential to facilitate the safe and successful placement of a urinary catheter to relieve the obstruction. The choice of urinary catheter, whether a Tom Cat, red rubber, or a more specialized option like the Mila or Slippery Sam, is important, as is the proper technique for inserting and securing the catheter in place.

After the obstruction has been relieved, ongoing monitoring and management are crucial, including electrolyte and fluid balance, pain control, potential antibiotic therapy, and the timing for removing the urinary catheter. Given the possibility of development of post-obstructive diuresis, the amount of urine produced should be assessed and fluid rates adjusted accordingly to avoid dehydration. The urinary catheter should be handled aseptically to avoid iatrogenic urinary infections. In most cases, cats with urethral obstruction do not have a urinary tract infection (UTI) at the time of diagnosis. However, a UTI may develop during treatment. Routine use of antibiotics to prevent urinary infection is not recommended. Antibiotics should only be used in cases of confirmed UTI. Ideally, a bacterial culture should be performed to dictate the choice of antibiotics. Optimal duration of catheterization is a subject of debate. Some argue that the urinary catheter should be in place for a minimum of 24 hours, to allow resolution of inflammation, as well as clearing of debris, clots, or crystals. However, the very presence of a urinary catheter can cause irritation to urethral epithelium and potentially contribute to lower urinary tract inflammation. The decision of when to remove the urinary catheter should be based on the amount of urine passed (i.e., the presence or absence of post-obstructive diuresis), and on the appearance of the urine.

Prognosis and Prevention

Effective long-term management and prevention of recurrent urinary tract obstructions in cats involves a multifaceted approach, including addressing any underlying factors, promoting increased water intake, providing low-stress environments, and potentially exploring surgical options like perineal urethrostomy for persistent or recurrent cases. The prognosis for cats with urinary tract obstructions can vary, with recurrence rates ranging from 11% to 58%. Factors such as the underlying cause, prompt recognition and treatment, and the owner's commitment to long-term management all play a significant role in the cat's overall outcome and quality of life.

References available upon request.