

Use of an intravenous catheter to treat urinary distension in cases of feline lower urinary tract disease

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ABSTRACT: Urolithiasis is a disease that commonly affects the urinary organs due to blockage of crystal stones in the urinary tract of male cats. A 3.5-year-old male mixed breed domestic cat was examined at the Royal Purple Vet Clinic with complaints of a lack of appetite, fever, and vomiting. The results of the physical examination showed that the body temperature was 39.6°C, bladder distention occurred, and there was a pain response when palpated. Urinary distension was treated by inserting an intravenous catheter (26G). Supporting examinations included urinalysis and microscopic examination of urine. Urinalysis results showed the presence of red blood cells, white blood cells, and protein in the urine. Meanwhile, the results of the microscopic examination showed that there were deposits of calcium oxalate crystal particles. The cat was diagnosed with urolithiasis with a fausta prognosis. The treatment includes fluid therapy, antibiotics, anti-inflammatories, supplements, and herbal medicine. The cat experienced changes after being treated for four days, characterized by normal urination and no blood found in the urine.

Keywords:

oxalate calcium, male cat, urolithiasis, intravenous catheter, emergency

■ INTRODUCTION

Urolithiasis, also known as Feline Lower Urinary Tract Disease (FLUTD), is a condition in which stones appear in the urinary tract (Nururrozi et al. 2020). Uroliths are formed due to mineral deposits in urine, which can be caused by genetic, environmental, and nutritional factors. Urolith formation begins with microscopic crystalluria, which collects and forms stones (macroscopic) (Callens & Bartges 2016). Urolithiasis in cats can be divided based on the location and type of the urolith (Callens & Bartges 2016; Fielder & Theresa 2010). The cat will experience distention, are at risk of uremia, and can eventually die. Generally, bladder distension due to retained urine is treated with a urinary catheter. However, in emergencies, equipment can be modified. This paper reports the treatment of bladder distension due to retained urine in cases of urolithiasis using a 26G intravenous catheter without a cannulation needle in cats.

■ CASE

Signalement: A domestic mixed-breed male cat, yellow, 3.5 years old, BCS 4 (scale 9), body weight 2.5 kg. **Anamnesis:** One day before the owner took him to the clinic, the cat had no appetite, fever and vomiting. **Physical examination:** a cat's rectal temperature of 39.6 °C, distension of the bladder, and a painful response on palpation. An intravenous urinary catheter (without a cannulation needle) was used to drain urine in an emergency, and flushing was performed using 0.9% NaCl (Figure 1). **Follow-up examination:** urinalysis

and microscopic observation of urine sediment. **Diagnosis:** Feline Lower Urinary Tract Disease (FLUTD). **Prognosis:** fausta. **Therapy:** 100 ml of 0.9% NaCl fluid therapy SC, a urinary catheter, antibiotic enrofloxacin 5 mg/kg SC, tolfenamic acid 4 mg/kg IM, vitamin B12 150 µg SC, outpatient therapy with supplements, and herbal medicine.

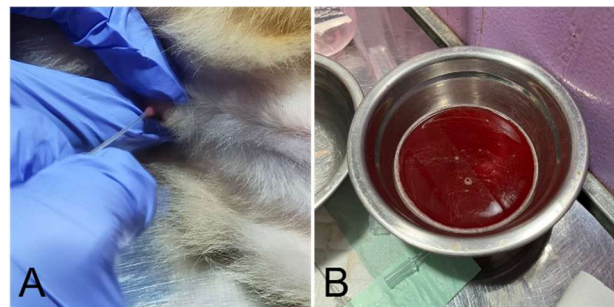


Figure 1. Use of an intravenous catheter number 26G (without cannulation needle) to remove urine in an emergency in cats with urolithiasis. (A) catheter placement and (B) urine excreted is red (bloody).

■ RESULTS AND DISCUSSION

Catheterization was immediately performed using an intravenous catheter (No. 26G) as an emergency treatment. The cannulation needle was removed from the catheter, and a

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plastic catheter tube was inserted into the urinary tract (urethra) in the penis. Catheter placement aims to remove urine and flush the bladder with sterile water (Figure 1). Flushing aims to push and dilate the urethra so that the obstructing urolith can shift (George & Grauer 2016). Urinary catheters for cats generally use a French red rubber catheter size 3.5 (Davidow 2020). The urinary catheter is then attached to the prepuce using a non-absorbable monofilament thread so that the catheter does not easily come off.

Microscopic observation in Figure 2 shows the similarity of the crystal shape on examination with the literature, with the characteristics of colorless boxes with intersecting diagonal lines (prisms), which are classified as calcium oxalate uroliths. Risk factors for urolithiasis due to calcium oxalate include giving excess feed containing oxalate, vitamin D, and vitamin C, and excess calcium increases the risk of calcium oxalate crystal formation (Tilley *et al.* 2021; Callens & Bartges 2016). Stressful conditions can increase urine concentration owing to a lack of drinking intake (Lund & Eggertsdóttir 2019). Based on the examination that had been carried out, the cat was diagnosed with calcium oxalate urolithiasis. Urinalysis results showed the presence of red blood cells, white blood cells, and proteins in the urine. This indicates an infection and injury to the urinary tract (Yadav *et al.* 2020). The urine pH value was 6.5, which is still within the normal range value between 6-7.5 (Yadav *et al.* 2020).

Antibiotics and anti-inflammatory drugs are administered to prevent infections and reduce inflammation. Enrofloxacin is an antibiotic that is excreted through the kidneys and remains active in the urinary system (Olin & Bartges 2015). Tolfenamic acid is administered to relieve pain or as a strong analgesic with a mechanism of action of inhibiting the cyclooxygenase enzyme (Plumb 2011). Patients were also administered fluids to treat dehydration (Davis *et al.* 2013). Patients were also administered vitamin supplements and herbal medicines. Vitamin B12 is used to treat anemia and intestinal malabsorption (Plumb 2011). Giving the herbal medicine *Renola* (*Orthosiphon stamineus*) is a herbal supplement that can inhibit the formation of calcium oxalate crystals (Zhong *et al.* 2012). Cystaid® (N-acetyl-d-glucosamine) was administered as a supplement to the urothelium layer (Panchaphanpong *et al.* 2011).

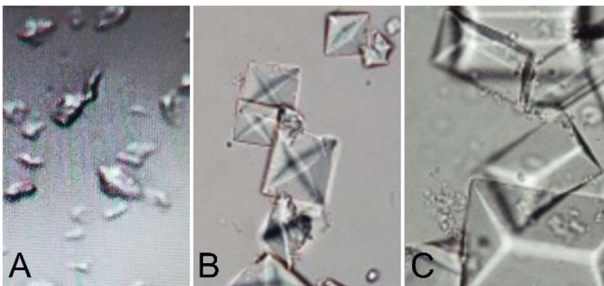


Figure 2. Microscopic observations of the urine sediment. (A) cat urine, (B) calcium oxalate crystals (Fielder & Theresa 2010), and (C) struvite crystals in cat urine (Fielder & Theresa 2010).

CONCLUSION

The use of a 26G intravenous catheter without a cannulated needle to treat urinary retention in cases of urolithiasis can improve urine output and reduce bladder distension. Fluid therapy, antibiotics, anti-inflammatories, supplements, herbal medicines, and installing a urinary catheter in the patient's cat succeeded in returning the urine to normal after four days of treatment.

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REFERENCES

- Callens A, Bartges JW. 2016. Update on Feline Urolithiasis. August's Consultations in Feline Internal Medicine. 7:499–508.
- Davidow EB. 2020. Retrospective evaluation of urinary indwelling catheter type in cats with urethral obstruction (January 2014 to December 2014): 91 cases. *Journal of Veterinary Emergency and Critical Care*. 30(2): 239–242.
- Davis H, Jensen T, Johnson A, Knowles P, Meyer R, Rucinsky R, Shaford H. 2013. 2013 AAHA/AAFP fluid therapy guidelines for dogs and cats. *Journal of the American Animal Hospital Association*. 49(3): 149–59.
- Fielder S, Theresa R. 2010. Urine Crystals in Cats and Dogs. *NAVC Clinician's Brief*.
- Lund HS, Eggertsdóttir AV. 2019. Recurrent episodes of feline lower urinary tract disease with different causes: possible clinical implications. *Journal of Feline Medicine and Surgery*. 21(6): 590–594.
- Nururrozi A, Yanuartono Y, Sivananthan P, Indarjulianto S. 2020. Evaluation of lower urinary tract disease in the Yogyakarta cat population, Indonesia. *Veterinary world*. 13(6): 1182–1186.
- Olin SJ, Bartges JW. 2015. Urinary Tract Infections. *Veterinary Clinics of North America: Small Animal Practice*. 45(4): 721–746.
- Panchaphanpong J, Asawakarn T, Pusoonthornthum R. 2011. Effects of oral administration of N-acetyl-d-glucosamine on plasma and urine concentrations of glycosaminoglycans in cats with idiopathic cystitis. *American Journal of Veterinary Research*. 72(6): 843–850.
- Plumb DC. 2011. *Plumb's Veterinary Drug Handbook*, 7th ed. Pharmavet Inc.
- Tilley LP, Francis WK, Smith Jr, Meg MS, Benjamin MB. 2021. *Blackwell's Five-Minute Veterinary Consult: Canine and Feline*. 7th ed. Hoboken, New Jersey, US: Wiley Blackwell.
- Yadav SN, Ahmed N, Nath AJ, Mahanta D, Kalita MK. 2020. Urinalysis in dog and cat: A review. *Veterinary world*. 13(10): 2133–2141.
- Zhong YS, Yu CH, Ying HZ, Wang ZY, Cai HF. 2012. Prophylactic effects of *Orthosiphon stamineus* Benth. extracts on experimental induction of calcium oxalate nephrolithiasis in rats. *Journal of ethnopharmacology*. 144(3): 761–767.