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# Successful surgical treatment of urethral obstruction in an elderly cat

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Summary

**The prevalence of feline lower tract disease, irrespective of cause, has been reported to be approximately 1.5% to 8%. It has been estimated that 10% to 20% of cats with these disorders have urethral plugs or urolithiasis. Most of the small diameter calculi do not produce any problems in animals. However, the larger ones can become lodged in the urethra and obstruction may then ensue. Cats with urethral strictures are more susceptible to becoming obstructed. Abnormalities can develop as a result of repeated past procedures within or around the urethra urinary tract. Subsequently, obstruction can develop in one, two or more segments of the urethra. The occlusions frequently occur in a single segment of the urethra, but sometimes multiple occlusions are present in the same patient. The treatment of elderly cats can be challenging. This article presents the case of a 15-year-old male cat with obstructions in two segments of the urethra successfully treated with surgery. The cat recovered although it required multiple hours of surgery and the post-operative course had been complicated. Surgical treatment of urethral obstruction can be successful even in elderly cats.**

**Keywords: urethral obstruction, cat**

The prevalence of feline lower tract disease, irrespective of cause, has been reported to be approximately 1.5% to 8%. It has been estimated that 10% to 20% of cats with these disorders have urethral plugs or urolithiasis (3). Any crystal type may become trapped in the matrix of uroliths, but in most cases struvite predominates. Struvite uroliths account for approximately 42% to 45% of the calculi analyzed (2, 4).

Most of the small diameter calculi do not produce any problems in animals. However, the bigger ones can become lodged in the urethra. Obstruction may then ensue. The occlusions frequently occur in a single segment of the urethra, but sometimes multiple occlusions are present in the same patient. The diagnosis of urethral obstruction results from a combination of palpation and urinary tract imaging. The treatment of elderly cats can be challenging. Most of the cats with obstruction of the urethra are effectively treated without surgery. However, some cats with this condition require surgery.

It hereby present a case of a 15-year old male cat with obstruction in two segments of the urethra successfully treated with surgery.

## Case report

A 15-year old male non pedigree cat was admitted to a veterinary clinic with symptoms typical of urethral obstruction. Its past medical history was significant in so far as it had undergone four previous instrumental procedures on the urethra as well as cystotomy due to urinary bladder stones. For the last two weeks our patient had suffered urinary urgency and difficulty in urinating. On the day of examination the animal was unable to urinate at all. An abdominal ultrasound revealed an increased size of the urinary bladder with a thickened mucous membrane and a significant amount of „sludge" (fig. 1). The plain abdominal radiogram showed a stone in the penile urethra and a few small calculi in the urinary bladder. The preliminary diagnosis was established as „urethral obstruction in the penile segment of the urethra due to stone and urinary bladder urolithiasis". At the onset of treatment the penis and bladder were gently massaged. Then we catheterized the urethra. Catheters of 1.0 mm, 2.0 mm and 2.6 mm in diameter were used with Xylocain jelly. The obstructed urethra could not be unblocked either via massaging or catheterizing. After multiple unsuccessful attempts a urethrostomy was performed. Monitoring was instituted before induction of anesthesia.

The patient was given premedication of Atropine followed by administration of Xylazine and Ketamine intramuscularly. Anesthesia was achieved with a combination of Xylazine and Ketamine given intravenously and repeated as necessary. The cat was placed in the dorsal recumbent position and a longitudal incision was made in the perineal region. Careful dissection was continued

in the dorsal direction until the urethra was reached. The lumen of the urethra was exposed. A drain was introduced into the penile segment of the urethra thus pushing out the urethral stone. Another drain was inserted into the proximal part of the urethra but met resistance. Multiple dislocation attempts of the urethral deposits into the bladder were unsuccessful. Then it was decided to perform a cystotomy. A ventral midline incision was made from the umbilicus to the pubis. The bladder was reached. Then the lumen of the bladder was exposed. A significant amount of small mineral deposits mixed with mucous and blood clots were removed from the urinary bladder. The drain was inserted through the urinary bladder into the urethra. Numerous attempts to overcome the obstruction by pushing and flushing were carried out from both sides until the urethral flow was restored. The bladder was checked for further calculi. During the withdrawal of the catheter from the bladder the urethra was continually flushed until an acceptable flow was achieved. A schematic diagram illustrates the procedures performed (fig. 2). The bladder was closed with 4-0 absorbable suture material. The surgery lasted 7 hours. A post-operative radiograph indicated that all stones had been removed. The patient was treated with balanced electrolyte solutions and a broad spectrum antibiotic (Cephalexin). After surgery the cat wore an Elisabethan collar for 10 days. The skin sutures were removed on postoperative Day 10. All calculi were analyzed and identified as struvite uroliths. The postsurgical course was complicated by a subsequent periurethral abscess. Thereupon the patient was re-operated 30 days after the initial procedure. The abscess was drained. The flow of the urethra was restored. The cat then recovered without further complications. A year after the surgery the cat seems well. The site of the urethrostomy has an excellent appearance. One can say that the cat now has a good prognosis and quality of life.

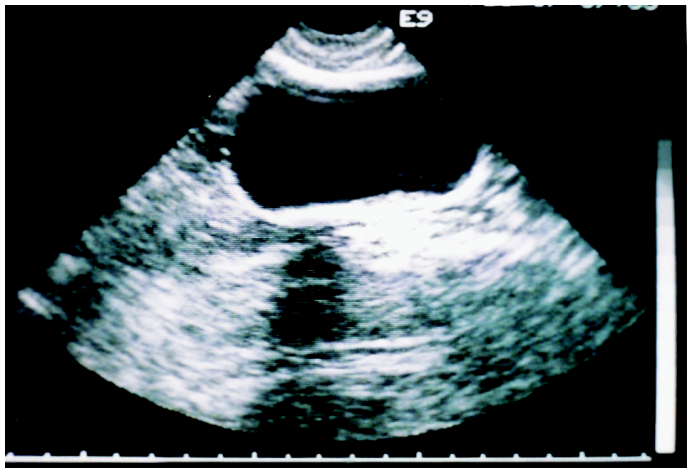

**Fig. 1. Sonographic imaging of urinal bladder in transverse plane**

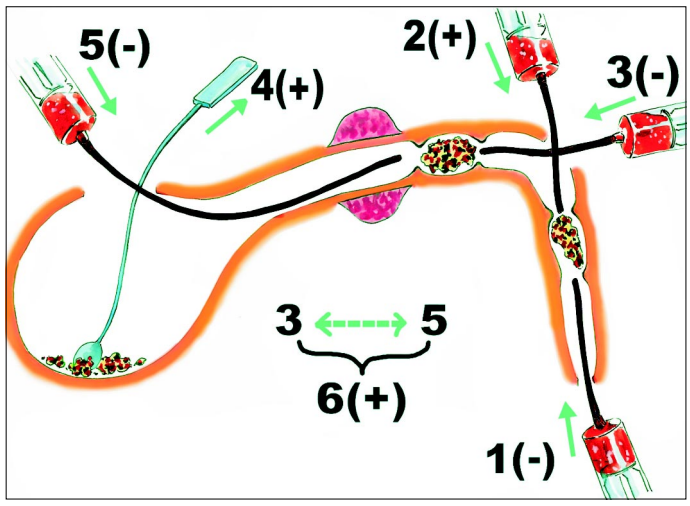


**Fig. 2. Schematic diagnosis of the procedures performed**
Explanations: the numbers indicate the sequence of procedures; (+) indicates a positive, and (–) a negative outcome

## Discussion

The urethra is the normal conduit for the evacuation of urine from the bladder to the exterior of the body. The urethra of the male cat is divided into 4 segments: the pre-prostatic urethra, the prostatic urethra, the post-prostatic urethra and the penile urethra. Uroliths and urethral plugs are the most commonly identified causes of lower urinary tract disorders in cats. Calculi, urinary gravel, and mucous plugs can be lodged in the urethra. Urinary tract abnormalities can develop as a result of repeated past procedures within or around the urethra. Subsequently, obstruction can develop in one, two or more segments of the urethra. Cats with urethral strictures are more susceptible to becoming obstructed.

Urethral obstruction in a male cat is diagnosed by the presence of an enlarged bladder with symptoms of urinary urgency, as well as difficulty in manually expressing urine, and by resistance encountered during the passage of a urethral catheter. Accurate and quick diagnosis is possible due to imaging techniques. The mode chosen may include: a combination of plain abdominal radiography, contrast radiography, ultrasonography and uroendoscopy. Radiographic evaluation is required to detect feline uroliths. A useful tool in evaluating urinary tract diseases is ultrasonography. Small calculi, radiolucent calculi, bladder distention and bladder wall thickness may thereby be assessed. Abdominal ultrasonography is not precise enough for evaluation of the entire length of the urethra. Applying high-resolution transducers (8-15 MHz) can improve visualization of urethra details, but the equipment is costly and not easily available. In cats that have recurrent obstructions uroendoscopy is a valuable tool. This method allows visualization of the urethral and bladder mucosa in addition to detection of small calculi not seen on abdominal ultrasonography and radiography. In male cats one uses a 1.1 mm diameter flexible fiberoptic uretheroscope. In cats that have had perineal urethrostomy the 3.0 mm rigid cystoscope can be used. When evaluated with fiberoptic urethroscopy, plugs were identified in approximately 30% of obstructed cats (2). Uroendoscopy seems to be a very good technique, but requires costly apparatus. In spite of the use of modern diagnostic procedures

the final diagnosis may sometimes be obtained only during surgery. This was so in our case. During surgery we found that the urethra was obstructed also on the second, post-prostatic level. The final diagnosis could have been obtained earlier thanks to uroendoscopy, but in the presented case this diagnostic method was not available at that time.

The goal of the treatment is to remove urethral obstruction. A step-by-step priority of procedures is recommended when attempting to restore urethral flow (5). In order of priority they would be as follows: (1) massage of the urethra, (2) induce urination by palpation of the urinary bladder, (3) cystocentesis, (4) retrograde urethral flushing, (5) a combination of 1 to 4. Small calculi and urethral plugs may be expelled after these procedures. In cases where there is no response to catheterization or medical intervention urethrostomy is needed to ensure urination. This surgery is used only in severely affected animals.

Before surgery the surgeon must assess the cat's condition. Pulmonary and cardiac function should be analyzed. Detection of early signs of organ dysfunction allows initiation therapy before irreversible tissue damage. Monitoring before the induction of anesthesia is vital. Establishment of urethral flow is obtained after the patient is stabilized, properly sedated and anesthetized. Many different methods of anesthesia have been used successfully. Strict monitoring of the respective vital signs of the cat, and the combination of drugs used in our practice over the years ensured that the anesthesia was safe and sufficed for the entire operative procedure.

Urethrostomy is indicated in patients who are likely to be recurrent stone formers, in cases of urethral strictures, and in cases where the obstructed urethra can not be unblocked. Urethrostomy should be performed proximal to an area that has been damaged by catheterization, proximal to a stricture, or proximal to calculi that can not be retropulsed into the bladder. Several surgical techniques and their modifications have been described. Penile urethrostomy, perineal urethrostomy, prepubic urethrostomy and transpelvic urethrostomy are techniques which have been used since the 1950's (1, 7). Selection of the procedures depends on the local situation, as well as the particular surgeon's preferences and skills in different techniques. With experience perineal urethrostomy can be performed successfully and with minimal complications. Such a technique was used in this case. However, the urethrostomy did not resolve the problem of deposits remaining in the urinary bladder nor the secondary obstruction which had been undetected before surgery.

To remove calculi present in the bladder or that have been pushed from the urethra into the bladder a cystotomy is recommended. In the operated cat there were two indications for cystotomy: (1) the presence of „sludge" in the bladder and (2) difficulty in unblocking the post-prostatic segment of the urethra. The cystostomy carried out on the cat resulted in removing the debris from the bladder and restoration of the urethral flow. Successful treatment, especially in elderly cats, can be challenging. During and after operation complications can appear. Death due to anesthesia, hemorrhage, subcutaneous urine accumulation, strictures, abscesses, and urinary tract infections are some of them (6). Although the age and previously performed operations predisposed this cat to complications none of them occurred during the surgery. However, the postsurgical course was complicated by the periurethral abscess.

After a successful surgery medical calculolysis is indicated. The objectives of medical management of uroliths are to arrest growth and to promote urolith dissolution. Definitive long-term prognosis depends on the type of calculus present. Several commercially available diets have been developed that are designed to prevent recurrence of struvite calculi. These diets are based on assumptions that urinary acidification of less than 6.3 pH and the presence of urine specific gravity of less than 1.030 are beneficial (2, 4). This type of diet was prescribed for this cat. One year later the cat seems well.

In conclusion, the diagnosis of urethral obstruction is sometimes difficult to achieve. Urethrostomy facilitates the unblocking of multisegmental obstruction of the urethra. Successful treatment, especially in elderly cats, can be challenging. The cat recovered although it had required multiple hours of surgery and the postoperative course had been complicated. Finally, surgical treatment of urethral obstruction can be successful even in elderly cats.

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