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Surgical Management of Obstructive Urolithiasis by Perineal Urethrostomy in a Tom Cat

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Abstract: ***A 2 year old intact domestic tom cat weighing 4.75 kg was referred to Small Animal Surgery Out Patient unit of Madras Veterinary College Teaching Hospital with the history of intermittent licking of its genitalia, hematuria and stranguria with progressive reduction in appetite for the past two weeks.Clinical examination revealed a distended, tensed abdomen, which on palpation, depicted bladder involvement that was painful and unresponsive to manual decompression. A distended obstructive bladder was noticed along with dorsal and cranial displacement of adjacent organs on a lateral and ventrodorsal abdominal radiograph, in addition ultrasonography was performed to rule out bladder epithelial health. On ultrasound thickened bladder wall with non shadowing sediments along with a dilated pelvic urethra was noticed in addition to an hyperechoic mass obstructing the distal penile urethra. Based upon the radiograph and ultrasonographic findings the case was tentatively diagnosed as obstructive urolithiasis***

Keywords: obstructive urolithiasis-perineal urethrostomy- cat

1. Case presentation and Diagnosis

A 2-year-old intact domestic tom cat weighing 4.75 kg was referred to Small Animal Surgery Out Patient unit of Madras Veterinary College Teaching Hospital with the history of intermittent licking of its genitalia, hematuria and stranguria with progressive reduction in appetite for the past two weeks.The cat discussed in the case report was mainly kept indoors and its owners described it asa “lazy” and “nervy” pet. Additionally, it exhibited a high body condition score, which may have contributed to the primary episode of urethral obstruction. Clinical examination revealed a distended, tensed abdomen, which on palpation, depicted bladder involvement that was painful and unresponsive to manual decompression. A distended obstructive bladder was noticed along with dorsal and cranial displacement of adjacent organs on a lateral and ventrodorsal abdominal radiograph, in addition ultrasonography was performed to rule out bladder epithelial health. On ultrasound thickened bladder wall with non-shadowing sediments along with a dilated pelvic urethra was noticed in addition to an hyperechoic mass obstructing the distal penile urethra. Based upon the radiograph and ultrasonographic findings the case was tentatively diagnosed as obstructive urolithiasis. The pet was sedated with butorphanol and diazepam @ 0.2 mg/kg and 0.25 mg/kg intravenous respectively following which, conservative management was performed through tom cat catherization to relieve the obstruction, to provide patency and to carry out urinalysis. Urinalysis revealed a less acidic pH (7.3), increased specific gravity and presence of struvite crystals with epithelial cells and RBCS. A routine hematobiochemical profile was taken to rule out organ health which revealed marginal anaemia., thrombocytopaenia, azotaemia and hyperkalemia. Patient was stabilised with intravenous fluid therapy to restore hydration and urine output was quantitated during the first 24 hours.Despite catheterization, pet evinced unsuccessful micturition, subsequently the bladder was periodically distended on following day.The presence of a urethral plug occluding the urethral lumen was considered to be the most likely cause of obstruction based on the information collected from the history, radiograph and urinalysis, although it was not possible to quantify the degree of contribution of urethral spasm and oedema to this problem.

2. Treatment

The cat was premedicated with diazepam @ 0.5 mg/kg body weight and Butorphanol @ 0.2mg/kg body weight intravenously. Anaesthesia was induced with propofol @ 4mg/kg body weight intravenously. The perineal urethra is the location of choice for urethrostomy in cats. It is a convenient location for surgical manipulation, the urethral diameter will accommodate passage of most urethral calculi and there is less urine scald postoperatively. Prior to surgery a urethral catheter is passed, if possible. After a routine castration, an elliptical incision is made around the scrotum and penis. Then the subcutaneous tissues are dissected to expose penile urethra. The penile urethra is dissected free from surrounding connective tissue. The ventral attachment of the pelvic urethral to the pubis (i.e., ishiocavernosus m.) is identified and transected. The penile urethra is freed from its connective tissue attachments to the pelvic floor using blunt digital dissection. The retractor penis muscle is identified on the dorsal aspect of the penis and is dissected from its attachment on the penis. The dissected retractor penis muscle is then used to develop the dorsal plane of dissection to separate the pelvic urethra from its dorsal connective tissue attachments. Once the urethra is dissected enough to visualize the dorsolateral located bulbourethral glands penile dissection was stopped. The penis is catheterized and the urethral orifice identified.

An incision is made from the penile urethra to the pelvic urethral to the level of the bulbourethral glands using an Iris scissor. The urethral orifice at the level of the bulbourethral

glands is generally large enough diameter to accept the flange of a tomcat catheter. After incision of the urethra, the glistening urethral mucosa is identified.

5-0 nonabsorbable monofilament suture with a swaged on cutting or taper-cut needle is recommended by the author. The first urethrostomy suture is placed at the dorsal aspect of the urethrotomy incision on the right or left side at a 45^{o} angle to include urethral mucosa and skin (suture split thickness of skin). The suture is tied and cut leaving the ends 3-4 cm long to act as a stay suture. A mosquito hemostat is placed on this suture to provide traction and countertraction to enhance visualization of the urethral mucosa. The second suture is placed opposite the first suture and tied as described for the first. A stay suture is also placed here. A third urethrostomy suture is placed directly on the dorsal midline to hold the dorsal margin of urethral mucosa to the dorsal margin of the skin incision. Alternating sutures from dorsal to ventral are placed until approximately one half of the penile urethra has been sutured to skin. The remainder of the penis is amputated and the subcutaneous tissue and skin are closed routinely. Fine ophthalmic instruments make tissue handling and suturing easier. Use of a 2X magnifying loupe and headlamp light source enhances visualization of the urethral mucosa and facilitates accurate suturing. It is critical for the surgeon to recognize the glistening urethral mucosa and carefully suture it to skin. This will decrease (or eliminate) the chance of urethral stricture.

3. Discussion

The term FLUTD describes clinical syndrome produced by many conditions that affects the feline lower urinary tract Acar,*et al* (2010). Some risk factors associated with FLUTD have been identified such as excessive body weightIstanbul. Bass *et al* (2005), inactivity and stress. UO can occur in up to 58% of male cats with FLUTD. The cat discussed in the case report was mainly kept indoors and its owners described it asa “lazy” and “nervy” pet. Additionally, it exhibited a high body condition score, which may have contributed to the primary episode of urethral obstruction.Bernard, A. and Viguier, E. (2003)

Clinical signs of UO at presentation can be categorised to local lower urinary tract signs, resulting from the obstruction, and systemicsigns associated with the accumulation of uraemictoxins and with the acid-base and electrolyte imbalances. Hyperkalemia and uraemia are major causes of death in male cats with urethral obstruction; however, some cats with recurrent FLUTD as observed in the present case.

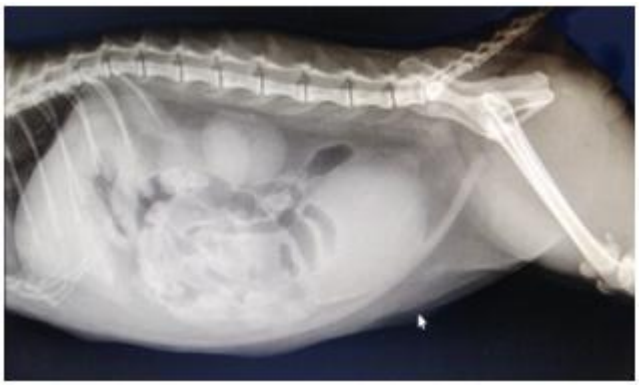
Surgical management of the cat with UO has changed over the years from being a first line of treatment to generally being reservedfor cases where medical management techniques are no longer achieving their aim. Corgozinho *et al*.(2007) Irrespective of the cause of obstruction, medicaltreatment must focus on the restoration of urethral patency and urine flow , reversing life-threatening electrolyte disturbances,maintaining adequate tissue perfusion and minimising visceral pain.Gregory and Vasseur(1983) A longer duration of urinary catheterisation may decrease the risk of short-term recurrent UO in cats treated medically. Furtherstudies may focus on identifying an ideal duration of catheterisation to better clarify the role this variable has on the outcome. The present case observed no improvement when increasing the hospitalisation and urethral catheterisation periods from 24 to 60 hours. Neither the volume of IV fluids delivered nor the continuation of IVFT after removal of the urinary catheterwas associated with the risk of recurrent UO.Griffinand Gregory(1992) Other variables, such as administration of the α1-adrenergic receptor antagonist Prasozininstead of Phenoxybenzamine have been recognised to reduce the risk of reoccurrence.

The cat in this report was advised oral prazosin however the pet did not produce favourable outcome.The implementation of environmental modifications reduced the risk of recurrent UO, but increasing water consumption was the onlyindependent factor associated with a lower reoccurrence rate.(Little.,2007)In the case it seemed likely for the reoccurrence of the obstructive episode to be associated with a urethral stricturecaused by repeated urinary catheterisation. In the absence of reoccurrence, it would have been adequate to maintain the cat on acalculolytic diet to prevent reobstruction by struvite-containing urethral precipitates as demonstrated by (Osborne., *et al.*1991) BacterialUTI is rarely the initial cause of FLUTD, therefore obtaining a urine culture only at the time of catheter removal and dispensingantimicrobials accordingly seems to be appropriate. (MacLoughlin.,2000)

The choice of surgical technique will be determined by the cause of the obstruction and its location in the urinary tract. The PUtechnique used and is reserved to relieve distal urethral obstruction. Modifications to the PUtechnique have been developed although they have not been widely adopted to date. Their common goal is to take advantage of thewider pelvic urethra to produce a widened tube for urine flow.Nelson, R.W. and Couto, C.G. (2003) If a cystotomy is required, PU is performed in dorsal recumbencyallowing simultaneous access to the urinary bladder. In the case the radiograph eliminated the suspicion of urolithiasis thereforesurgical opening of the bladder was unnecessary. It was the author’s preference to perform the procedure positioning the patient inventral recumbency.Short-term complications of the PU include haemorrhage, stricture formation, wound dehiscence, urine extravasation, perineal herniaand urinary incontinence. These can be reduced by using good surgical technique, including appropriate intra-pelvic dissection andcareful apposition of the urethral mucosa to the skin. Saroglu, *et al* (2003)

In the long term, the commonest complication of PU is recurrent UTI as a consequence of urethral shortening and direct exposureof the urethral orifice (Smeak, 2010).

Reoccurrence of UO is uncommon when PU is performed properly and 88% of the owners assessed their cat’s quality of life as good following PU.



Distended Bladder

Dilated Pelvic Urethra with Thickened Bladder Wall

Perineal Urethrostomy- Elevation of the Catheterised Penile Muscle

Catheter In Situ

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