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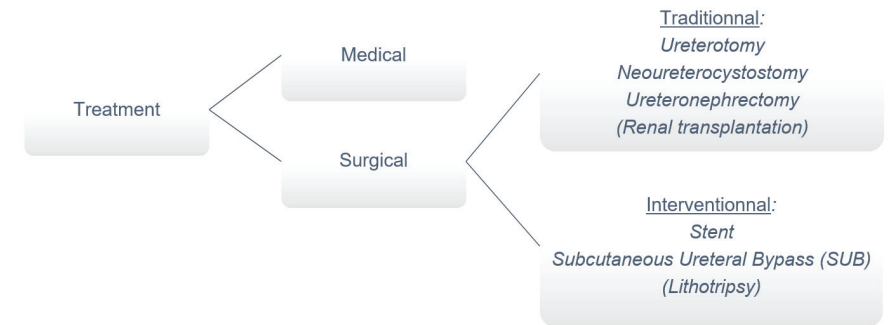
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FELINE URETERAL OBSTRUCTION (BIG KIDNEY - LITTLE KIDNEY)

Because of their small ureteral (0,4mm) diameter, cats are predisposed to ureteral obstructions by stones, plugs, strictures and neoplasia. Calciumoxalate uroliths cause the majority of cases. The symptomatology of ureteral obstruction unfortunately is very vague, provoking vomiting, lethargy, anoraxia and weight loss, and only rarely signs of dysuria or periuria. However, on physical examination renal asymmetry or pain can often be identified, which should set off the alarm bells. The ureteral obstruction will also cause backleak on the nephrons, and can result in a hydronephrosis and thus a 'big kidney'. The glomerular filtration rate of this kidney will dramatically decrease, but this is at first compensated by the contralateral kidney. In chronic cases, the end result will be a fibrotic change of the kidney causing it to shrink and become a 'little kidney'. Despite its 'unilateral' nature, 83% of cats is azotemic at presentation. Often this azotemia is the consequence of the patient only being presented when the second kidney is suffering from ureteral obstruction, whilst the first obstruction went by unnoticed. The degree of azotemia is however not linked with prognosis if the obstruction is rapidly removed, as the acutely affected kidney can properly recover from the obstruction. Roughly 35% of cats will also be hyperkalemic at presentation, and this may require aggressive therapy before further diagnostic or therapeutic interventions can be planned.

Calcium oxalate and amorphous crystals are only observed in the urine of 29% of cases, however 33% of cats suffers from a concomittant urinary tract infection. Combined radiography and ultrasound has a sensitivity of 90% for the diagnosis of ureteral obstruction. Radiographs will allow to determine the size, location and numbers of ureteroliths. Ultrasound on the contrary allows to identify a hydroureter, hydronephrosis and exact location of the obstruction. This combination renders CT-scans rarely necessary.

Several therapeutic options exist:



Medical treatment solely is succesfull in a minority of cases (8-17%), and this mostly in cases of a single, small (2-3mm), distal calculus. It consists of aggressive intravenous fluid administration, combined with a diuretic such as mannitol via a constant rate infusion. The addition of an α -blocker, such as prazosine or tamsulosine, is recommended as they may cause the ureter to relax, allowing for easier passage of the calculus. As the success rate is so low, surgical intervention should always be recommended, and the medical treatment should rather be suggested as a weaker, conservative, less expensive plan B. If such a medical therapy does not work within 2 to 3 days, surgical intervention is required to avoid significant functional renal damage. The degree of renal damage indeed depends on the duration and severity of the obstruction. A full obstruction, even during four days, still allows the kidney to fully receive. However, after a complete obstruction that lasts for 2 weeks, only 46% of functional recovery of the kidney is expected, and after a full obstruction of 40 days the kidney is totally 'lost'.

Typical surgical techniques are a ureterotomy, ureteroneocystostomy, technically complicated procedures requiring a surgical microscope. Complication rates of such procedures are up to 30%, with a mortality rate described from 18 to 30%. The most common complications are post-operative obstruction secondary to edema, or stenosis and a ureteral leak after ureterotomy (6-15%). Moreover, 40% of cats may re-obstruct in

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UROLOGY & NEPHROLOGY

the longterm. Because of these numbers, the possibility to alleviate the obstruction via a stent has been developed. Double pigtails can remain in place during several months, even years if necessary. Despite good immediate results, chronic hematuria (18-52%), dysuria (38-48%), urinary tract infection (30%) and reobstruction (19-26%) are common complications in the longterm. Subcutaneous ureteral bypasses (SUB) are easier to place than stents, and are therefore preferred by many surgeons. They are placed by conventional laparotomy, after which a nephrostomy tube and cystostomy tube are connected to a small subcutaneous port. Due to its easier technique, the immediate complication rate is lower than with all other procedures. The major long term complications are pain in the flank, urinary tract obstruction (9-15%) or obstruction of the SUB (10%). However, thanks to the SQ port, an obstructed SUB can easily be flushed (or part even easily replaced). Due to the devastating effects of infection of an implant such as a SUB, antibiotics are typically prescribed for 2 weeks after SUB placement. The SUB is afterwards flushed at least every 3 months to avoid obstruction. It is recommended to submit a sample of urine at each visit to screen for bacterial infection. The life expectancy of cats with a stent or SUB roughly is 500 versus 750-1000 days respectively.

Whatever the surgical procedure, cats should always be monitored for the development of new stones, and appropriate long term medical and nutritional therapies are warranted to minimize the likelihood. The kidneys can functionally recover for up to 4 months after resolution of the obstruction. Unfortunately, preoperative parameters cannot predict the response to decompression. However, the IRIS stage 3 to 6 months after treatment are correlated with survival, with cats in lower IRIS scores having a more favorable outcome. If cats indeed develop a chronic renal disease, medical and nutritional management is mandatory and moist pet foods are recommended to ensure proper hydration of the cat.