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Feline lower urinary tract disease (FLUTD)

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INTRODUCTION

Diseases of the lower urinary tract of cats are summarized under the term “Feline Lower Urinary Tract Disease” FLUTD. FLUTD describes the common clinical presentation of different diseases with a wide variety of causes. The signs of FLUTD are pollakiuria^a, stranguria^b, periuria^c and hematuria.¹ Obstruction of the urethra occurs frequently in this disease complex. FLUTD is a common problem in veterinary medicine. Investigations in the USA revealed, that 8% of the cats presented to teaching hospitals suffered from FLUTD.² Furthermore a survey in private practices showed that in 3% of the examined cats the diagnosis was FLUTD.³

CAUSES

If the cause of FLUTD can not be identified the disease is called idiopathic. Between 55% and 63% of the cats with FLUTD are considered to suffer from the idiopathic form.^{2, 4, 5} In a study at our hospital 58% of the cats with FLUTD suffered from the idiopathic form, 22% had urinary calculi, 10% urethral plugs and 8% urinary tract infections. In 3% of the cats no exact diagnosis was possible.⁶ Further less common causes of FLUTD are neoplasias (e.g. transitional cell carcinoma), acquired or congenital anatomic defects, and central nervous system diseases leading to micturation disturbances. In a recent study from Norway 33% of the cats with FLUTD were diagnosed with urinary tract infection⁷. This rate is considerably higher than reported in other studies (1-12%) and was suspected to be due to the fact that other studies originated from referral institutions while this one did not.^{2, 4-6, 8}

DIAGNOSIS

Because all forms of FLUTD have a very similar clinical presentation, laboratory tests and diagnostic imaging are required in each case to establish a diagnosis. Urinalysis is very important and urine should always be collected before any therapy is instituted. Therapy could potentially change the urinalysis results and lead to the wrong diagnosis. Ideally urine should be collected by cystocentesis, however there is some debate about the danger of cystocentesis in obstructed cats. Urinalysis should include measurement of the specific gravity, a dip-stick analysis, analysis of the urine sediment and a urine culture. In the interpretation of

results of the urinalysis it is important to remember that crystalluria is not a disease. Serum biochemical analysis can provide information about underlying diseases. For example hypercalcemia can lead to the formation of calcium-oxalate stones or cats with diabetes mellitus might be more prone to urinary tract infection.⁹ Furthermore it is important to identify and quantify hyperkalemia or postrenal azotemia in cats with urinary tract obstruction. Postrenal azotemia develops about 24 h after the obstruction of the urethra. Electrolyte disturbances specifically hyperkalemia can be life threatening and should be recognized and treated immediately.

On radiographs radio dense stones can be seen, furthermore size and form of the bladder can be evaluated. It is important to make sure that the distal end of the urethra is on the radiograph. Ultrasound evaluation of the urinary tract provides information about the bladder wall and the content of the bladder. At the authors institution both, ultrasound and radiography are routinely performed in cats with FLUTD as both examinations provide different information. Hyperechogenic floating material is often seen in the ultrasound examination, however similar pictures can be seen in healthy cats. Diseases of the urethra can be seen by contrast urethrography. Urethroscopy and cystoscopy are not routinely performed in cats with FLUTD.

IDIOPATHIC FLUTD

It is still not known what's causing idiopathic FLUTD. A still unproven hypothesis was the involvement of infectious agents since injection of urine from affected cats into the urinary bladders of unaffected cats caused urethral obstruction.¹⁰ Caliciviruses isolated from a cat with urinary tract obstruction caused the same signs in other cats inoculated with this virus. However these experiments were not reproducible leaving the question open if viruses are truly involved in the development of FLUTD.¹¹ Defects in the glycosaminoglycan layer and therefore higher permeability of the bladder epithelium, increased activity of the sympathetic nervous system and neurogenic inflammation seem to be features of the disease.¹

Idiopathic FLUTD is suggested as model for interstitial cystitis in people.¹² Typical glomerulations (small petechial bleedings) in the submucosa of the bladder wall are part of the human disease and are required for the diagnosis. However cystoscopy is not routinely used for the diagnosis of FLUTD and the term interstitial cystitis is only applicable for cats in the few cases where cystoscopy was performed.

Risk factors for idiopathic FLUTD

Risk factors associated with idiopathic FLUTD in a recent study were male gender, overweight, pedigree cat and most importantly living with an other cat with which there was conflict.¹³ This implies that stress might be a trigger for the disease, which is supported by the finding that bladder permeability in cats with idiopathic FLUTD is highest under stress.¹⁴ Earlier, living indoor and eating dry food were also considered risk factors for idiopathic FLUTD.¹⁵ We found that 36% of the cats with idiopathic FLUTD were overweight, 73% lived indoor and 27% were fed dry food only.⁶ However it was suspected that not demographic or environmental factors but rather cat-related factors like for example acting fearful were associated with idiopathic FLUTD.¹⁶

Clinical picture of idiopathic FLUTD

Cats suffering from idiopathic FLUTD show pain, hematuria, pollakiuria, stranguria, periuria or are not able to urinate at all. This picture is not different from other causes of FLUTD. In our patients expression of pain, hematuria, pollakiuria, or stranguria were seen in about 50% of the cases with idiopathic FLUTD while periuria was seen in only 35%. More than half of the cats (55%) were presented with urethral obstruction.⁶

Idiopathic FLUTD is more common in male cats than female cats and occurs rather in young to middle aged cats.¹⁷

Therapy

Cats with urinary tract obstruction are emergency patients. The main goal of the therapy is to re-establish urine flow. Life threatening metabolic derangements like hyperkalemia or severe acidosis have to be corrected immediately. About 12% of cats with urethral obstruction were found to have severe hyperkalemia ($>8\text{mmol/l}$)(18). Possibilities for the therapy of hyperkalemia are: -infusion with NaCl 0.9%; -infusion with glucose 5%; -regular insulin (0.2 IU/kg IV) followed by a glucose bolus (2 g glucose per unite insulin) followed by infusion with glucose 5%; -calcium gluconate 10%, 0.5 – 1.5 ml/kg IV over 10 minutes; -sodium bicarbonate 0.2 – 0.5 mmol/kg with infusion.

If urethral patency can't be re-established, urine can be evacuated by cystocentesis. Possible side effects of decompressive cystocentesis are extravasation of urine into the peritoneal cavity and injury to a pre damaged bladder wall, therefore decompressive cystocentesis is not recommended as routine procedure. Once the urethra is patent we prefer to leave an indwelling catheter in place and connected it to a closed urine collecting system. After severe postrenal azotemia a substantial postobstructive diuresis might occur and should be addressed by adequate infusion.

After the emergency procedure it is very important to perform a thorough work up to get a correct diagnosis.

If other reasons are excluded idiopathic FLUTD can be suspected. Many cats with idiopathic FLUTD recover spontaneously. A specific therapy of idiopathic FLUTD has not

been established so far. Different medications and treatments have been recommended, however they remained tentative and many relapses are seen. Controlled studies proofing the efficacy of treatments are lacking.

Some therapeutic options for idiopathic FLUTD will be discussed below.

Pain medication

In humans idiopathic cystitis is also classified as a chronic pain syndrome, indicating that pain is an important part of the disease. Pain seems to be a common feature of idiopathic FLUTD and should therefore be addressed at least in the acute phase.⁶

Antibiotics

Antibiotic therapy is indicated if the cats were catheterized. By the way of a catheter infectious agents can get into the urinary tract and establish an infection. Specifically if an indwelling catheter is left in place for several days an infection is likely. Therapy should not be started with the catheter in place to avoid the growth of resistant bacteria.

Glycosaminoglycan

Changes of the glycosaminoglycan layer of the bladder seem to be a feature of idiopathic FLUTD. Therefore it seems logic to replace glycosaminoglycans. In humans some success was described, however the success was not consistent. In veterinary medicine only one study about the application of glycosaminoglycans in cats with idiopathic FLUTD was published.¹⁹ In this study no difference was seen between cats treated with N-acetyl glucosamine for six month compared to cats treated with a placebo.

Amitriptyline

Amitriptyline is a tricyclic antidepressant and is used in veterinary medicine for behavioral problems.²⁰ Amitriptyline is thought to have antihistaminic, anticholinergic, anti-alpha-adrenergic, anti inflammatory, analgetic und mild sedative actions. Based on this broad spectrum of action amitriptyline seemed to be ideal for the treatment of all forms of FLUTD. In humans the medication provided some relief in patients with interstitial cystitis. In two veterinary studies amitriptyline was used for a short period of time in cats with idiopathic FLUTD.^{21, 22} In both studies no positive effect of the medication could be demonstrated. In an other unfortunately uncontrolled study amitriptyline lead to a reduction of clinical signs in 9 of 15 cats which were treated for one year.²⁰ Unfortunately the palatability of the medication is not good and it is difficult for cat owners to treat their cat over a long period of time. Therefore other forms of application were tested. In one study the plasma concentration of amitriptyline was measured after transdermal application.²³ In this trial all plasma levels were below the detection limit, however only a low dose of amitriptyline was used.

Reduction of stress

Signs of idiopathic FLUTD may be exacerbated by stress¹⁴ and adaptation of the cats environment and might reduce stress.²⁴ Pheromones are thought to reduce stress in

cats. In a pilot study synthetic feline facial pheromones (Feliway®) were used for the treatment of idiopathic FLUTD.²⁵ No significant difference was seen between treated and untreated cats. However a trend towards fewer days with clinical signs, towards less pronounced clinical signs and towards fewer episodes of clinical signs was seen.

Feeding

The recurrence rate in cats receiving a diet in canned form was lower than in cats receiving the same diet in dry form.²⁶ Furthermore improvement of clinical signs in cats with idiopathic FLUTD was attributed to the change on canned diet in one study.¹⁹ This implies that adding water in the diet might be beneficial for cats with idiopathic FLUTD.

Prognosis

Prognosis in non obstructive FLUTD is not known. In obstructive FLUTD the prognosis is guarded²⁷. Recurrent signs of lower urinary tract disease including obstruction were common in cats with urethral obstruction. About half of the cats had recurrent signs of lower urinary tract disease, about one third obstructed again and about one fifth was euthanatized because of their disease. Prognosis seemed to be independent on the primary cause of the obstruction. Recurrence of signs occurred irrespective of the primary cause of the obstruction. Furthermore frequency of re-obstruction seemed to be the same as almost thirty years ago.

^a pollakiuria: Frequent voiding of small amounts of urine

^b stranguria: Painful, not controllable micturition

^c periuria: Urination in inappropriate places

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