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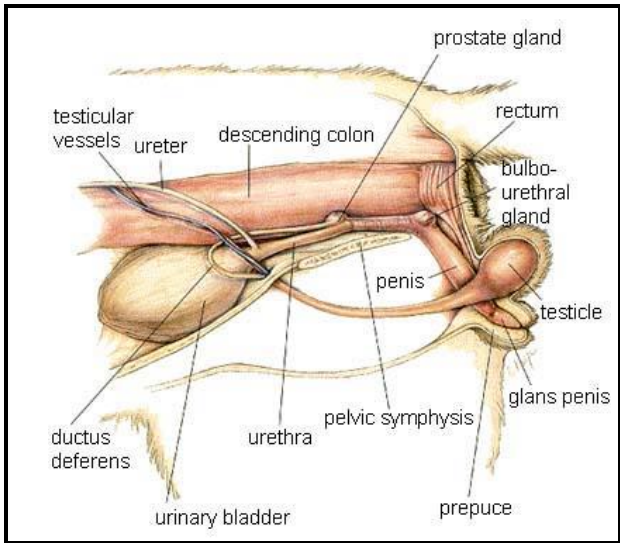
Urinary Problems in Cats:
The Feline Urologic Syndrome (FUS)

Date: _____

For: _____

Cat's Name: _____



The Urinary System

The urinary system serves the vital function of eliminating waste products from the body. The filtering system of the kidneys removes wastes from the blood. Urine is then produced in the kidneys and is drained by two tubes called ureters to the bladder, where it is stored until it is excreted through the urethra. Although problems can develop at any point along the urinary tract, only problems relating to the lower urinary tract (i.e. the bladder and the urethra) will be dealt with here.

Definitions

The Feline Urologic Syndrome (FUS) is one of the most common health problems of cats today. As a syndrome, FUS is characterized by sets of clinical symptoms which appear either singly or in various combinations. The major sets of clinical symptoms associated with FUS include the following:

- Urolithiasis: formation of sandy crystalline debris, uroliths (calculi, stones), or urethral plugs which may result in cystitis or urethral blockage.

- Cystitis: Inflammation of the bladder which may cause blood, mucus and other organic debris to accumulate in the bladder.

Urethral Blockage: obstruction of the urethral passage by uroliths or urethral plugs. Depending on the degree of obstruction, little or no urine is able to pass out of the body.

Uremia: accumulation in the blood of toxic (poisonous) wastes normally eliminated from the body via the urine. This life-threatening condition occurs when a cat suffering from urethral blockage is unable to urinate.

Incidence

Cats are particularly susceptible to urologic problems because they normally have a highly concentrated urine as well as prolonged intervals between urinations. It is not unusual for a cat to urinate only once a day and, in fact, some urinate only once every 2 or 3 days.

While FUS occurs in both male and female cats, it manifests itself differently in the two. While urethral blockage is commonly seen in the male, the female rarely becomes blocked because the wider urethra in the female dilates more readily, permitting outward passage of stones. In the female, FUS is more likely to manifest itself as cystitis.

Cause

The exact cause of FUS in cats is the subject of extensive research and much scientific speculation in veterinary medicine today. It may well be that there is no single cause for FUS in cats. Rather, a combination of factors may be responsible for the occurrence of this syndrome. Certain factors appear to be involved in the formation of stones (calculi) in the cat.

THE ACIDITY OF URINE

The cat's urine is normally acidic (pH less than 7) except for a period of several hours after eating. If the cat eats several times daily or there are bacteria in the urinary tract, the urine stays alkaline (pH greater than 7). Minerals that are soluble in acid urine precipitate out as crystals in an alkaline urine. These crystals may then conglomerate to form stones. Therefore, an alkaline urine in cats fosters mineral crystallization which may lead to calculus formation. Magnesium-ammonium-phosphate calculi, which comprise 90 to 97% or urinary calculi in cats, form more readily in alkaline urine and dissolve more readily in acid urine.

URINE VOLUME/CONCENTRATION AND FREQUENCY OF URINATION

The greater the urine concentration the greater the chances of calculus formation. A decrease in water intake decreases urine volume, leading to infrequent urination and increased urine concentration. Infrequent urination allows more time for calculus

formation to occur and increases urine pH, making a more favorable environment for calculus formation.

INTAKE OF CALCULUS-FORMING CONSTITUENTS

Urinary calculi cannot form without a sufficiently high concentration of the minerals of which they are composed – magnesium and phosphorus. If the level of magnesium consumption is high, calculus formation is possible; conversely, if the level of magnesium consumption is low, calculus formation may be minimized or prevented. The amount of phosphorus consumed is of lesser importance.

NUCLEATION CENTER

The presence of a nucleation center on which minerals are deposited enhances the formation of a stone or calculus. Sloughed epithelial cells, cellular debris resulting from a urinary tract inflammation, viruses. Bacteria, casts and foreign objects such as suture material have been found to provide nucleation centers on which stones have formed.

OTHER PREDISPOSING FACTORS

Certain other conditions or situations may predispose cats to FUS. While these factors *do no cause* FUS, they may encourage its onset or recurrence. Predisposing factors which may play a role include:

- Stress
- Bladder injury
- Lack of exercise
- Small urethra which is subject to blockage
- Heredity
- Low water intake
- Any condition which may promote urine retention (e.g., confinement or a dirty or inaccessible litter box.)

Signs

Cat owners – especially those whose cats have already experienced an episode of FUS – need to be aware of the signs of FUS. Signs listed in order of occurrence and increasing urgency follow:

EARLY SIGNS

1. A housebroken cat that suddenly begins urinating in unusual locations.
2. Frequent voiding of small quantities of urine or attempts to urinate which result in nothing or just a few drops. Cats at this stage squat and strain. Many people mistake this for constipation and administer a laxative. When the urethral passage

is blocked, laxatives can kill a cat by causing spasms, which can burst the distended bladder.
3. Traces of blood in the urine, which may be accompanied by a strong, ammonia-like odor.
4. Listlessness and poor appetite and/or excessive thirst.
5. Excessive licking of the penis.

LATER SIGNS

If the infection is severe or if the urethra is blocked, the cat will become uremic. Signs of uremia include:

1. Vomiting
2. Depression
3. Dehydration
4. A urine-like odor to the breath
5. A hard and distended bladder when the abdomen is palpated (examined by the hand).Pain becomes quite evident from the cat's reaction to abdominal palpation.

DANGER SIGNS

1. Inability to urinate
2. Convulsions
3. Coma

Once the urethra becomes completely blocked and the cat cannot urinate, convulsions, coma and death follow within about 48 hours. Time is critical, and veterinary aid must begin quickly after blockage occurs if the cat is to have a reasonable chance of survival. If treatment is not started until the cat is comatose (unconscious), the chances of saving its life are low, since the damage from uremia and pathologic changes to the kidneys by this stage are usually irreversible. Another potential hazard is rupture of the distended bladder. This is usually fatal as a uremic cat seldom survives surgery to repair the rupture.

Medical Treatment

RELIEF OF BLOCKAGE

Relief of urethral blockage is absolutely essential. Many blockages yield to flushing and catheterization (passing a fine tube) of the urethral passage. The catheter may be sewn in place for a few days and a restraint collar put on the cat to prevent him from removing the catheter.

Surgery may be required if flushing and catheterization fail, if blockage recurs frequently or if stones are unusually large. Surgery may consist of removing part of the urethra (urethrostomy) to increase the size of the urethral opening and/or removing large stones from the bladder.

LABORATORY TESTS

Laboratory analysis of the cat's urine and blood helps Dr. Johnson to determine the severity of the cystitis, the condition of the cat, the extent of the uremia, what – if any – bacteria are present and the drugs to which they are susceptible.

X-rays may be necessary to observe the bladder and determine the location of the obstruction.

FLUID AND NUTRITION THERAPY

Fluid therapy is indicated if severe dehydration is present. This usually consists of intravenous injections of large volumes of special fluids at regular and frequent intervals.

Force-feeding is frequently used once the cat can keep food down. This may be done orally or by a fine tube inserted into the stomach by way of a nostril or the mouth. A diet low in magnesium is called for, and Vitamins A and B are often used to aid restoration of the bladder's damaged lining and to help restore appetite.

DRUGS

Antibiotics are administered to treat any bacteria identified by laboratory tests and other infections that may flare up in the cat's weakened condition. Other drugs may be used, depending on the cat's condition and response to therapy.

SPECIAL TREATMENTS

In rare cases of severe uremia, an artificial kidney technique called peritoneal dialysis may be necessary. This time-consuming, costly technique can be used only in special cases. Dr. Johnson can explain this technique if it is thought to be necessary.

Prognosis

Some cats do not survive the acute phases of urethral obstruction despite all medical efforts. Others respond, with varying degrees of success, to treatment.

If a cat is brought to Dr, Johnson in the early stages of cystitis and if Dr. Johnson is allowed to conduct laboratory tests, the prognosis is usually more favorable. The cat that survives an acute attack of cystitis has a good chance of leading a full-term life with minimal chances of recurrence *if* Dr. Johnson's instructions are followed closely and the cat is observed carefully by the owner.

Cases which are referred later tend to become chronic with recurrences being more likely. Routine checkups, frequent urine tests and medication are usually necessary in such cases.

Management/Prevention

The following are general care instructions to which r. Johnson may add special instructions tailored to your particular cat. Although these measures are not overly time-consuming or expensive, they do require a certain degree of awareness and diligence on your part.

1. Make sure your cat is urinating. Clean the litter box daily to encourage frequency of urination. It is best to provide a litter box for each cat.
2. Provide free-choice, clean, fresh water that is changed daily.
3. Feed a prescription diet such as Purina UR, Purina CDHills C/D-s, Hills C/D-OXL, Hills S/D, Hills W/D or Hills R/D. After examination and treatment Dr. Johnson will instruct you which food will best suit your pet's nutritional needs. When such a diet is the only food consumed, the calculi usually dissolve within 2 to 3 months.
4. Use all medications exactly as prescribed by Dr. Johnson, even if your cat's condition seems to have improved.
5. Encourage the cat to exercise.
6. Minimize stress factors such as sudden changes in environment, exposure to harsh weather conditions, emotional upsets and obesity.

Conclusion

It should be remembered that 90 to 99% of all cats are not affected by FUS. There is no reason to restrict the diet of a cat that has never been affected by FUS. Proper dietary management is, however, extremely important for the cat that has experienced FUS. **Once FUS occurs, the chance of recurrence without proper dietary restrictions may be as high as 50% to 70%**. However, using the management regimen listed above, recurrence is rare.