A Successful Recovery of a Cat Affected with Bacterial Cystitis at TTPHRC, Purbachal, Dhaka : A Case Report

Clinical Report Submitted

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List of Abbreviation

BCS: Body Condition Score

B. wt: Body Weight

FLUTD: Feline lower urinary tract disease

UTI: Urinary tract infections

FHV: Feline herpes virus

FCV: Feline calici virus

°F: degree Fahrenheit

ALP: Alkaline Phosphatase

ALT: Alanine Aminotransferase

Ca: Calcium

PHOS: Phosphorus

u/l: unit per litre

HPF: High-power field

Abstract

Luchi, a female crossbred short-hair cat with age is 6 year old, weighted about 5.1 kg came to Teaching And Training Pet Hospital And Research Center, Purbachal, Dhaka. She had an ideal body condition whose BCS is 3 out of 5. She came with complaints of dysuria, hematuria, periuria, pollakiuria and lameness. She had also weakness, loss of appetite and abnormal body posture. Vaccination and Deworming was done regularly. She had been fed ad lib. with a widely-used supermarket brand of dry cat food. It had access to outdoors. Physical exam revealed that body temperature was 102.2°F with mild dehydration. Distention on urinary bladder was seen by abdominal palpation. Macroscopic exam of urine showed red color urine. Ultrasound revealed the thickness of the wall of urinary bladder. In X-ray it was seen distended urinary bladder. After tentative confirmation of Haemorrhagic Cystitis, further bateriological test following giemsa staining where bacilli-shaped bacteria were found along with pus cell. The most common causative organisms include: *Escherichia coli* – the most often in 95% of cases the bacteria *E. coli* is the cause and *Proteus spp., Staphylococcus spp., Enterococcus spp., Klebsiella spp., Pseudomonas spp*. were also isolated. So the confirmatory diagnosis was Bacterial Cystitis in the lower urinary tract. Fluid therapy used as DNS 5% for maintenance of fluid volume of the body, antibiotic Amoxicillin @ 22mg/kg Bwt, steroidal anti-inflammatory drugs Dexamethasone @ 0.4mg/kg Bwt, Potassium citrate and Citric acid in liquid form as systemic alkaliser, Vitamin A capsule and Vitamin B complex tablet was given orally. Drinking of adequate water , stoppage of dry food and offer chicken stock, these advice were given. After 7 days of treatment showed significant changes that was normal urinary and didn't have haematuria.

Keywords: Haematuria, Dysuria, Periuria, Pollakiuria, BCS, Cystitis.

Introduction

Feline lower urinary tract (FLUTD) symptoms are rarely caused by bacterial urinary tract infections (UTIs) in young to middle-aged cats, but the prevalence rises sharply in older cats. In numerous research, female gender and advanced age have been identified as risk factors. Most UTIs in dogs are categorised as uncomplicated UTIs, which describe a bladder infection that occurs occasionally in a healthy person with normal urinary tract anatomy and function. Due to the fact that 80–83% of cats have coexisting conditions including diabetes mellitus, hyperthyroidism, chronic kidney disease, or neurological disorders, a significant percentage of UTIs in cats must be categorised as difficult UTIs. A higher incidence of UTI is also linked to urolithiasis, urethrostomy, and gastrointestinal disorders such megacolon and constipation (Kruger et al.,2009). Cats are more susceptible to bacterial UTIs due to these illnesses, which also impair the body's defences more severely or permanently. Significantly more cats develop asymptomatic or subclinical bacteriuria than cats with the typical clinical indications of LUTD. According to positive bacterial cultures, subclinical bacteriuria occurs when there is no cytological or clinical indication of a urinary tract infection (Weese et al,. 2011).

An inflammation of the bladder is called cystitis. A bladder infection known as bacterial cystitis is brought on by bacteria that enter the bladder through urethra and multiply there. Among the signs of bacterial cystitis are the following: Haematuria (blood in the urine, with or without visible blood in a litter pan), Straining or discomfort when urinating is known as Stranguria. Pollakiuria, which is characterised by increased frequency of urination and excursions to the litter pan or outside, usually with lower quantities. Incontinence (urinating in improper places) and Discomfort seen by crying, excessive grooming, restlessness, or stomach ache. Some of these indicators will be simple to spot in an indoor cat that uses a litter pan, but they will be more difficult to spot in an outdoor cat because we don't often walk our cats outside and aren't usually standing on top of them when they urinate.

Urinary bladder of dogs or cats with bacterial cystitis, and abdominal or flank pain may be noted in animals with acute pyelonephritis (Sykes et al.,2014). Haemorrhagic cystitis can develop in a matter of hours or weeks. Haemorrhagic cystitis in cat can be caused by various factors. Infection like bacterial, viral, or fungal infections of the urinary tract can lead to inflammation and bleeding in the bladder. Common viral causes include feline herpesvirus (FHV-1) and feline calici virus (FCV). Recurrent hydronephrosis and spontaneous renal rupture also caused by lymphoplasmacytic inflammation in a cat (Kim et al., 2021).

Cystitis causes thickening of urinary bladder wall (Widmer et al., 2004). The main problems of the urinary tract disease are found feline interstitial cystitis (FIC) of 55-69 % and urolithiasis of 13-28 % (Hostutler et al., 2005).In some cases Feline idiopathic cystitis also known as idiopathic feline lower urinary tract disease is the most common medical cause of abnormal urination in cat and hence it is an important differential diagnosis when investigating cats presenting with inappropriate elimination (Kruger et al., 2009). Diagnosis of cystitis through anamnesis, abdominal palpation, physical examination, clinical signs ,urinalysis, haematology, ultrasonography (USG) and radiography (Widmer et al., 2004).

Materials and Methods

2.1 Study Area: Activities for Teaching Chattogram Veterinary and Animal Sciences University (CVASU) currently operates the nation's first hospital devoted to treating companion animals, the Teaching and Training Pet Hospital and Research Centre (TTPHRC), in the Purbachal (Fig. 1) neighborhood of Dhaka. To provide graduate students and veterinary interns with hands-on experience, the veterinary teaching hospital was constructed. It has an operational OT, lab, X-ray, and US. Services including treatment, immunization, deworming, health examinations, and surgery are offered to both birds and the animals who live with us. Apart from household pets, this establishment also cares for and inspects exotic and zoo animals. It is a valuable resource for a variety of therapeutic circumstances pertaining to animals.

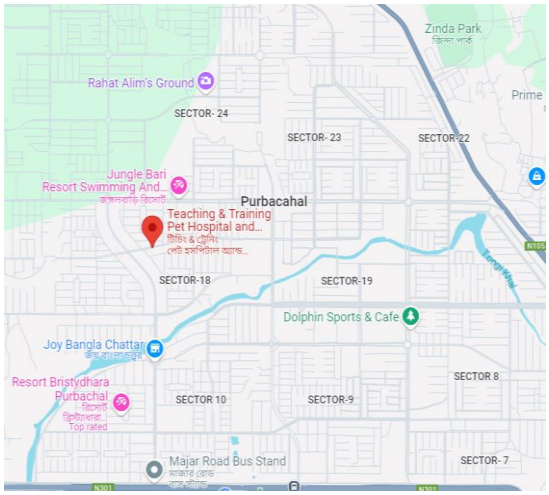

Figure-1: Map of study area (Purbachal, Dhaka)

2.2 Case Description

A six year old female crossbred short hair cat weighted 5.1kg attended at Teaching And Training Pet Hospital And Research Center, Purbachal, Dhaka with the history of weakness, loss of appetite, lameness , blood mixed urine for last 2 days on 29 July, 2024. Vaccination and Deworming are done regularly. Diet includes boiled chicken, boiled fish, pumpkin, egg, milk as well as dry canned food. No history of previous disease.

2.3 Clinical Examination

Luchi had a normal Rectal temperature which was 102.2°F. She was mild dehydrated with pinkish mucous membrane. Respiration rate was 24 per min and heart rate was 160 bpm which is normal.

Figure-2: Clinical examination of the patient

The examination (Fig. 2) of the ear/nose/throat region, including the buccal cavity and the peripheral lymph nodes were normal and hair coat was shiny. Abdominal palpation showed distended abdomen with a degree of discomfort in the caudal region. Blood containing urine were found and had mild discomfort during urination.

2.4 Laboratory Examination:

2.4.1 Blood tests

Basic biochemical tests (ALP, ALT, TP, Albumin, Glucose, Ca, PHOS, Urea, creatinine) were revealed with no major abnormalities but a haematological examination revealed that an increased level of total leukocyte count performed via Hematology Analyzer.

2.4.2 Urinalysis

The urinalysis revealed a urinary specific gravity of 1.030, a pH of 6 and a positive peroxidase activity; the findings for the other reagents on the urine test strip (Fig. 3) were normal e.g Protein value 1 u/l (+).

Figure-3: Urine strip test

An examination of the urine sediment revealed haematuria (>20 RBC/HPF) without crystalluria. Pyouria was found (Pus cell >5 HPF). Bacteriological examination following Giemsa staining procedure of the urine gave a positive result presence of bacilli shaped organisms which was slightly high (+++) in number. Most causative organisms *Escherichia coli, Proteus spp., Enterococcus spp*., etc were isolated.

2.4.3 Radiology and ultrasound report

Urinary tract radiographs (Fig. 4) showed tiny, circular, marginally radiopaque patches in the bladder that were only a few millimetres in diameter. The kidneys appeared to be in normal radiological condition.

Figure 5: Ultrasound scan of patient's Urinary bladder

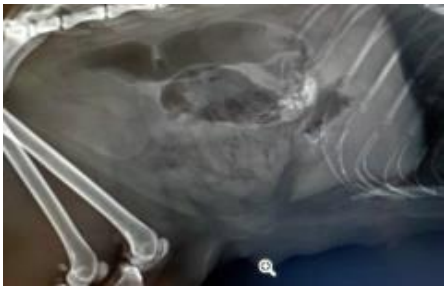

Figure 4: Radiology of patient's Urinary bladder

A fairly uneven and significantly thicker bladder wall was seen on the ultrasound scan (Fig. 5), indicating the existence of a significant, widespread inflammatory disease. The

presence of hyperechogenic components in suspension and in the area distal to the bladder neck was discovered during an examination of the bladder's contents.

2.5 Diagnosis

Luchi presented clinical signs of feline lower urinary tract disease (FLUTD). The clinical, radiological and ultrasonographic findings were suggestive of haemorrhagic cystitis. The images of hyperechogenic elements associated with an ultrasound attenuation distally may be attributable to the presence of blood clots and uroliths. In fact, the lack of crystalluria is not sufficient to rule out the presence of uroliths as crystalluria is not systematically present in cases of urolithiasis (Sturgess et al., 2001).

On the epidemiological level, cystitis is the first cause of FLUTD before urolithiasis; then urolithiasis is the second cause with struvite and calcium oxalate uroliths accounting for the majority of calculi in France (Vedrenne et al., 2003). The urine test strip does not measure the pH with a high degree of precision but rather gives a variation of 1 unit more or less with respect to the value measured using a pH meter (Wamsley and Alleman, 2007). It is therefore difficult to determine the potential nature of the mineralized elements.

Lastly, the bacteriological examinations (Fig. 6) of urine revealed that presence of bacterial bacilli along with pus cell in the microscopic observation.

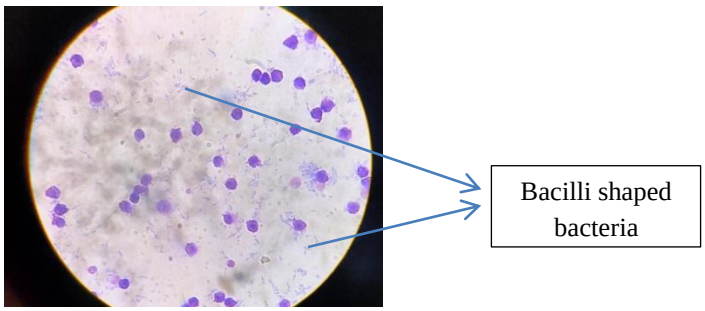

Figure-6: Bacilli shaped bacteria in the Giemsa staining of urine

So, the clinical signs associated with the ultrasound and radiograph and bacteriological reports suggest the presence of Bacterial Cystitis that is known as lower urinary tract disease (LUTD).

2.6 Treatment

A broad spectrum semisynthetic antimicrobial drug Amoxicillin (Inj. Moxin 500, Opsonin Pharmaceuticals PLC) administered at a dosage of 22 mg/kg Bwt was infused subcutaneously, twice daily over the course of 1 weeks due to its effacy againgst both Gram positive and Gram negative bacteria. Fluid therapy for regulation of blood volume and maintainence of the dehydration, used Sodium chloride 0.9gm and Dextrose anhydrous 5gm (Inj. DNS 5%, 500ml, Opsonin Pharmaceuticals PLC) administered at 16ml/kg Bwt was infused intravenously, once daily for 1 weeks. To mitigate the inflammatory reaction and alleviate the swelling, corticosteroid Dexamethasone Na P (Inj. Roxadex ,1ml ampule, Nuvista Pharmaceuticals PLC) at 0.4 mg/kg Bwt was given intramuscularly once daily for 3 days. Then to regulate the systemic acid-base balance , Potassium citrate 1.5gm and Citric Acid 0.25g act as systemic alkalizer (Syp. Urokit plus, 200ml, Eskayf Pharmaceuticals PLC) , preparation of 1 ml syrup mix with ½ cup water was fed orally, twice daily for 1 weeks. Vitamin supplementation likes Vitamin A (Cap. A Forte, 50000 IU, Globe Pharmaceuticals PLC) was prescribed at ½ capsule daily for 10 days to recover the affected epithelia at the urinary system. Addtionally, Vitamin B Complex e.g Vitamin B1, B6 & B12 enriched (Tab. Neuro B, Square Pharmaceuticals) was given at ½ tablet daily for 10 days to promote nerve health and homeostasis.

Results and Discussion

Feline lower urinary tract disease (FLUTD) covers a range of illnesses commonly affecting the bladder and urethra, one of which is haemorrhagic cystitis (Buffington et al., 1997). In this case, Luchi exhibited classic clinical signs related to the condition that included haematuria, discomfort during urination, and abdominal pain.High leukocyte count in the bacteriological examination and imaging of the affected area supported the diagnosis of bacterial cystitis, which forms one of the causes of FLUTD.

Bacillus-shaped bacteria (+++ on Giemsa staining) in urine sediment indicate bacterial origin; *Escherichia coli, Proteus spp. and Enterococcus spp*. are the most frequent culprits (Bartges et al., 2005). Pyuria and strong peroxidase activity further demonstrate bladder inflammation. A broad inflammatory condition, maybe brought on by blood clots or tiny uroliths, is suggested by hyperechogenic components in ultrasound imaging with a dilated bladder wall. Since crystalluria is not always seen, it is crucial to remember that urolithiasis is not excluded by the absence of crystalluria (Sturgess et al., 2001). The thicker bladder wall and the observed hemorrhagic cystitis are signs of hemorrhagic cystitis, which can be brought on by an infection, chemotherapy, anatomical anomalies, or a diet.

The medications that were given to Luchi comprised fluids, vitamins, minerals, anti-inflammatory medicines, systemic alkalisers, and broad-spectrum antibiotics (amoxicillin), with the specific goals of preventing infection, reducing inflammation, and achieving bladder homeostasis. Given its capacity to treat the majority of frequently found urinary infections, including *Proteus spp and E. coli*, amoxicillin is a suitable option for the first choice (Weese et al., 2011).

Dextrose and sodium chloride fluids aided in rehydrating and removing bacteria and inflammatory mediators from the urine. Dexamethasone reduced bladder wall swelling and the resulting pain, providing immediate inflammation management. It has a depressing effect at Phospholipase A2 activity which inhibits the production of

Arachidonic Acid metabolites e.g prostaglandins, prostacyclins, thromboxane and leukotriens. Struvite uroliths are known to form in alkaline environments, as urinary pH is 6 which is acidic in nature, so potassium citrate and citric acid are employed as systemic alkalisers to prevent uric acid and cystine stone formation.

Moreover, vitamin A helps to repair the damaged epithelial layer at the affected urinary tract and vitamin B complex help to relieve the neuropathic pain and maintain homeostasis too. (Alberto et al., 2016).

The improvements in clinical signs like haematuria should resolve within one week after commencement of the treatment. The follow-up findings obtained normal clinical, radiographic and ultrasonographic results that depict the efficacy of the therapeutic regimen. Possibly early treatment and compliance with a nutritionally adequate diet also contributed to non-recurrence.

This case therefore shows that in the diagnosis of FLUTD, clinical examination, laboratory evaluation, and imaging should be used on the same patient. Nevertheless, bacterial cystitis is still less frequent than idiopathic FLUTD and is an important disease that needs specific treatment (Gerber et al., 2008). It is therefore important to avoid anything that may bring about recurrence of the condition; this include; Drinking enough water, taking balanced diets with low levels of urinary irritants and regular visits to the veterinarian for checkup.

Stoppage of the dry canned food intake for certain period of time and offer wet food of the cat are advised.

3.1 Follow up and Outcome

Following the 7-day course of treatment, Luchi's health significantly improved. There was no sign of haematuria, or bleeding in the urine, and her urine flow returned to normal. Additionally, every additional symptom that once pointed to her illness has been completely eliminated.

Figure-7: Ultrasound scan of patients bladder (after one month)

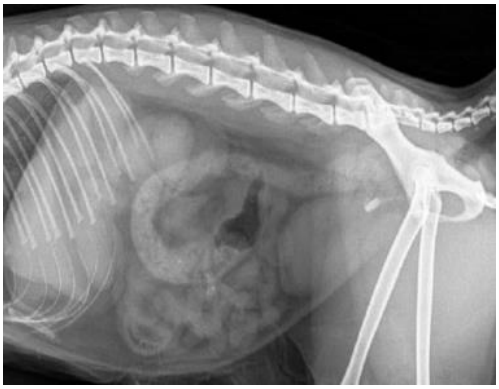

Figure-8: Radiology of patients bladder (after one month)

A follow-up examination was conducted a month later, and the results of the general clinical examination were normal. Any hyperechogenic foci or large-sized radiodense masses that had previously been demonstrated were excluded with the aid of ultrasound testing (Fig. 7) and radiographic investigations (Fig. 8). These results imply full recovery, with no recurrence of the original state's symptoms after therapy.

Conclusion

This case reports on the clinical management of a 6-year-old female crossbred short-haired cat with bacterial cystitis dominated by E. coli, which left her noticeably improved. Imaging along with laboratory tests clinical history and physical examinations were key tools diagnostic history. The treatment included systemic alkalinizers, antibiotics, anti-inflammatory agents and supportive care like vitamins and fluids to gain a complete recovery in 1 month. The case also brings attention to the early use of diagnostic and therapeutic goals for FLUTD, and multiple approaches to its treatment, nutritional and water intake, and veterinary care to promote and maintain healthy urinary systems in cats.

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The Author
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Biography of Author

This is Mohammad Abrar Halim, son of Md Abdul Halim and Jabonnasa Khnam from Village: Barkal, Upazila: Chandanaish, District: Chattogram. He passed the Secondary School Certificate examination in 2015 (G.P.A- 5.00) and the Higher Secondary Certificate examination in 2017 (G.PA- 4.58). He is a student of 24th Batch and now an intern student under the Faculty of Veterinary Medicine in Chittagong Veterinary and Animal Sciences University. He has a keen interest in veterinary medical research and I want to serve the nation through my knowledge and creativity so that we can conquer the current challenges in this field.