



Diagnosis and Management of Chronic Kidney Disease (CKD) in a Geriatric Cat

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Abstract: Feline chronic kidney disease (CKD) is one of the most frequent idiopathic clinical occurrences in geriatric cats which are marked by the irreversible loss of kidney function. The present study shows the clinical and biochemical findings of CKD and proposed therapeutic recommendations for a geriatric cat. The cat was bought to the SAQ Teaching Veterinary Hospital of Chattogram Veterinary and Animal Sciences University (CVASU) with a history of abnormal drinking and urination behaviour for few weeks along with sudden abdominal swelling and debilitation. The most predominant clinical findings recorded in that 8 years old cat were dullness with recumbency, polyuria with dysuria, ascites, polydipsia, paleness of mucosa, anorexia, and bloody diarrhoea. After haematological and biochemical analysis, according to the International Renal Interest Society (IRIS) staging system, the cat was diagnosed with stage III CKD. Though the prognosis is poor, proper medication and dietary supplements were suggested to increase the lifespan of the affected cat.

Keywords: Chronic Kidney Disease, Geriatric cat, Polyuria, Polydipsia, Ascites.

INTRODUCTION

Chronic kidney disease (CKD) is one of the most frequently encountered disorders in cats, having increased in prevalence in recent decades. The kidneys are responsible for maintaining fluid balance in the body; producing certain hormones; regulating many electrolytes in the body, and excreting waste products (via urine). Felines with CKD exhibit polyuria, polydipsia, anorexia, vomiting, weight loss, pallor of the mucous membrane, oral ulceration, and acute blindness (McGrooty, 2008). Patient history, results of physical examination, urinalysis, hematology, serum biochemistry, and nephron-sonography provide a practical means of diagnosing CKD in cats (Oburai *et al.*, 2015). The International Renal Interest Society (IRIS) has developed a staging system in which the stages are based on the serum creatinine concentration in animals with stable CKD (IRIS, 2019). The staging system is used as a guide for therapeutic intervention, as well as

prognostication. Since pre-renal contributions will often increase the degree of azotemia to the next stage, normal renal perfusion (adequate patient hydration and effective circulating volume) should be restored before determining the patient's stage of CKD. Clinico-pathological changes include reduction of structural and functional components resulting in the retention of metabolic waste products, decreased urinary concentrating ability, and variable electrolyte and acid-base imbalances and the most frequent morphologic diagnosis is chronic tubule-interstitial nephritis (DiBartola *et al.*, 1987).

Prognosis is associated with the severity of the disease. Studies have shown shorter median survival times in cats with higher IRIS stages. Median survival time for IRIS Stage-I was over 400 days, Stage-II ranged from 200 to 400 days, Stage-III ranged from 110 to 200 days, and Stage-IV ranged from 14 to 80 days (O'Neill *et al.*, 2013; Parker *et al.*, 2021). Although CKD is not a curable or reversible disease, appropriate support and treatment can both increase the quality of life and prolong life by slowing down the progression of the disease. In this regard, one of our objective was to review the common diagnostic procedures of CKD with emphasis on the IRIS standard method based on the level of serum creatinine in blood and observe the proper line of treatment of CKD in the cat.

MATERIALS AND METHODS

Case Presentation

An 8 years old male indigenous cat weighing 5 kg was brought to the SAQ Teaching Veterinary Hospital of CVASU, Chattogram. The owner complained that the animal was dull and depressed, off feed, and gradually emaciated. It was also suffered from polyuria and polydipsia. Moreover, clinical examination revealed abnormal abdominal swelling. Based on clinical history and observations urine and blood samples was collected from the cat and sent to the Clinical Biochemistry lab, CVASU. The cat was sent to the radiology department for an X-ray considering the

lateral view of the abdominal region to find any problem in the abdominal region.

RESULTS AND DISCUSSION

In clinical practice, feline CKD is often diagnosed based on a combination of findings from clinical signs, physical examination, renal imaging, urinalysis, and serum biochemistry. In this present study, clinical observations revealed lateral recumbency with decreased pain perception in the hind limbs. Also, there was ascites evidenced by radiographic image. Polyuria and polydipsia along with bloody diarrhoea were observed in the affected cat which is similar to the findings of Chakrabarti *et al.*, 2012 who diagnosed stage III in geriatric cats.

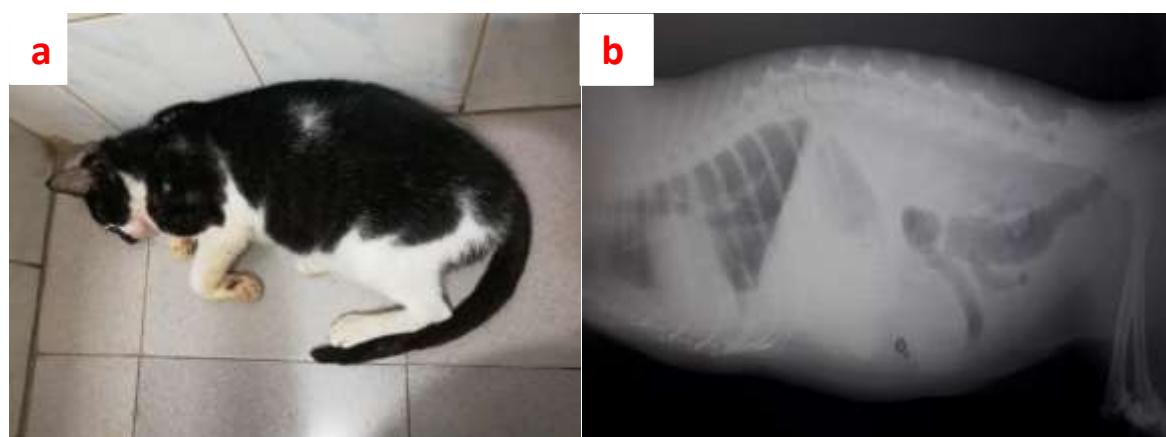


Figure 1: a) Recumbent depressed cat b) Accumulation of fluid in abdomen-lateral X-ray view

The lab result showed an elevation of Blood Urea Nitrogen 86.8 mg/dl and serum creatinine level 3.4 mg/dL, where the normal value is 20-30 mg/dL according to the Merck Veterinary Manual Online, 2013.

Table 1: Biochemical parameters of serum sample

Biochemical parameter	Result	Reference range
Serum BUN	86.8 mg/dL	20-30 mg/dL
Serum Creatinine	3.4 mg/dL	0.8-1.8 mg/dL
Haemoglobin	6.5 gm %	8-15 gm %
Total count of TEC	3.3 (million/cumm)	5-10 (million/cumm)
Total count of TLS	5.3 (thousand/cumm)	5.5- 19.5 (thousand/cumm)

The urine analysis report doesn't show any significant changes.

Table 2: Urinalysis report of affected cat

Source	Free catch
Color	Pale yellow
Turbidity	Clear
Specific gravity	1.010
Blood	Negative
Glucose	Negative
Ketones	Negative
Bilirubin	Negative
pH	6
Sediment analysis	No RBC, WBC or crystals seen. Rare granular cast.

Based on the International Renal Interest Society (IRIS), CKD has to be first diagnosed by clinical signs, and then IRIS staging can be applied according to serum creatinine level (Chew *et al.*, 2010). After evaluating the information gained from the history, physical examination, and lab results, present case was diagnosed as stage III CKD.

Table 3: International Renal Interest Society Stages of chronic kidney disease in cats

Stage	Renal Azotemia	Serum Creatinine concentration
1	Non azotemic	< 1.6 mg/dL
2	Mild renal azotemia	1.6-2.8 mg/dL
3	Moderate renal azotemia	2.9-5.0 mg/dL
4	Severe renal azotemia	> 5.0 mg/dL

Specific medicines, as well as certain components of conservative medical care, are available as treatment choices for treatable primary kidney disorders. As CKD is a life-long problem, improving long-term survival as well as maximizing quality of life should be emphasized. In this study this patient was treated with, Amoxicillin @20mg/kg body weight to prevent secondary bacterial infection along with Ringer's lactate to check dehydration and Pantoprazole @1 mg/kg body weight to minimize acid secretion. A kidney tonic was given to increase kidney function. Usually CKD treatments were unique to the patient and established based on results of a thorough diagnostic evaluation of the patient including the medical history, physical exam findings. Present treatment strategy was supported by Polzin *et al.*, 2013.

Based on clinical trial findings, feeding a kidney diet is the therapeutic intervention most likely to enhance long-term survival and quality of life for patients with IRIS CKD Stages III and IV (Ross *et al.*, 2006). Here we recommended a low protein diet, restricted Na and P rich foods, adequate Vitamin B complex, and most importantly fiber-rich diet.

Chronic kidney disease is the most common kidney disease in dogs and cats. The incidence of the diagnosis of CKD in cats is made 2 to 3 times as frequently compared to dogs and is especially common in geriatric cats. It is clinically characterized by the development of variably progressive irreversible intra-renal lesions and loss of renal functions. A variety of interventions (diet and drugs) can slow the progression of renal disease, improve the quality of life for the patient, and/or extend the quantity of life.

Clinical signs occur in the late stages of renal disease, so populations at higher risk of CKD should be screened routinely (Reynolds *et al.*, 2013). IRIS, 2019 standard is an outstanding practice to diagnose CKD in patients both in the early and late stages. Targeted screening requires the identification of risk factors to establish cats at risk within the population. The present study suggests, regular monitoring of serum creatinine and BUN level help to diagnose CKD. A reduced level of high-quality protein, restricted sodium, and phosphorus-rich foods is recommended to reduce the risk of CKD in cats and dogs. International Society of Feline Medicine, the American Association of Feline Practitioners, and the American Animal Hospital Association all recommend Health assessments in every six months for cats above the age of seven (including body weight, body status score, and blood pressure), as

well as some blood imaging such as hematology and serum biochemistry (Sparkes *et al.*, 2016; Vogt *et al.*, 2010).

CKD-associated complications (systemic hypertension, secondary renal hyperparathyroidism, hypokalaemia, anaemia, metabolic acidosis) must not be overlooked as they may affect the progression of disease. Serial monitoring of dogs and cats is essential because of the progressive nature of the disease.

CONCLUSION

Management of CKD is largely focused on supportive and symptomatic therapy with the aim of improving the quality of life of affected cats (especially those in CKD stages III and IV) and, where possible, slowing the progression of disease (especially in CKD stages III and IV). Nutritional help, treatment of hypokalemia and metabolic acidosis, elimination of proteinuria, hydration, decrease accumulation of wastes such as nitrogen-containing compounds, minimization of renal secondary hyperparathyroidism and hyperphosphatemia, and reduction of blood pressure if systemic arterial hypertension is present are all aims of management.

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Author's Contributions

MS diagnosed and treated this case under the guidance of PP. FI and AL performed and interpreted radiological and laboratory examination. MS, SKN, AL, FI drafted and PP finalized the manuscript. All authors read and approved the final manuscript.

Conflict of interest

The authors declare that they have no competing interests.

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