

# Chronic Kidney Disease in Cat



## A clinical report submitted by

**Nigar Sultana Poly**

Intern ID: 12.

Roll No : 15/12.

Reg. No : 01426.

Session : 2014-2015

## A Case Report on Chronic Kidney Disease in Cat

Doctor of Veterinary Medicine (DVM)

Faculty of Veterinary Medicine

Chattogram Veterinary and Animal Sciences University,

Khulshi, Chattogram - 4225.



A clinical report submitted as per approved style and content

-----  
**Signature of the Author**

**Nigar Sultana Poly**

Intern ID: 12

Roll No: 15/12.

Reg. No: 01426

Session: 2014-2015

-----  
**Signature of the Supervisor**

**Dr. Mohammed Yousuf Elahi Chowdhury**

Professor

Department of Medicine and Surgery

Faculty of Veterinary Medicine

**Faculty of Veterinary Medicine**  
**Chattogram Veterinary and Animal Sciences University**  
**Khulshi, Chattogram-4225**

## INDEX

CHAPTER	CONTENT	PAGE NO
1.	Abstract.....	4
2.	Introduction.....	5
3.	Materials and methods.....	6-7
4.	Results and discussion.....	8-11
5.	Conclusion.....	12
6.	References.....	13-15
7.	Acknowledgements.....	16

## ABSTRACT

Chronic kidney disease (CKD) is one of the most common ill of geriatric cats. Common clinical signs include polydipsia, polyuria, decreased appetite, weight loss and vomiting. A 10 years male local breed cat was brought to the Teaching & Training Pet Hospital & Research Center with a history of decreased appetite, weight loss. In clinical examination it revealed signs of polyuria, polydipsia and dehydration. Based on the clinical signs the cat was suspected for CKD. The blood sample was collected for estimation of biochemical parameters like glucose, total protein (TP), SGPT, SGOT, serum creatinine, BUN, phosphorus, albumin etc. Urine sample was subjected to various tests to determine different parameters such as nitrite, specific gravity, proteinuria, glucose etc. Ultrasonography was performed to check the morphology of both kidneys. Increasing level of serum creatinine, total protein, BUN, Phosphorus, Proteinuria and thickened cortex of kidneys in ultrasonography confirmed that the cat was affected with CKD. As treatment the appetizer, fluid therapy, phosphate binder and vitamin were given with renal diet. The cat was followed for next one month. The cat had an uneventful recovery without future complications.

---

Key Words: Chronic Kidney Disease, Clinical examination, Polyuria, Polydipsia, Biochemical test, Ultrasonography etc.

## **CHAPTER 1: INTRODUCTION**

Chronic kidney disease (CKD) is commonly found in middle to old aged cats. About 3 in 10 geriatric cats are affected by this CKD (Lulich et al., 1992). The prevalence of CKD is increasing day by day in our country too. CKD is the end result of a wide range of primary disorders which ultimately cause irreversible damage to kidneys (Cannon, 2016). It may be caused by congenital problems such as polycystic kidney disease or renal dysplasia by glomerulonephritis which is secondary to certain conditions as neoplasia or infection or by undetectable causes (Lefebvre, 2011). In cats CKD is diagnosed on the basis of increasing serum creatinine concentration. But it is reported that about 75% of renal mass may be lost before the azotemia is detected (Ross et al., 1981). After diagnosis of CKD attention moves on treating and managing disease. It is proved that phosphate restriction, ideally through feeding specially formulated renal diet is the most effective management option. Proper treatment and management can make a great difference to quality of life.

## CHAPTER 2: MATERIALS AND METHODS

### 1) History and Clinical Examination:

A 10 years old local male cat was brought to the Teaching & Training Pet Hospital & Research Center with the history of anorexia, weight loss. On clinical examination the cat was found dehydrated with sunken eyeball, polyuria and polydipsia. The cat had 101° F body temperature. Based on clinical signs the cat was primarily suspected for chronic kidney disease. For the confirmation of CKD, blood sample was collected into two vacuum test tube with anticoagulant and without anticoagulant to the estimate of blood glucose, total protein (TP), SGPT, SGOT, serum creatinine, BUN, phosphorus and albumin. For further confirmation, urine sample was collected in a sterile glass vial by catheterization and biochemical test like urine nitrite, specific gravity, pH and proteinuria were examined.



Figure 1: Giving fluid therapy in intravenously

## 2) Laboratory Diagnosis:

For biochemical test the blood sample which was collected without anticoagulant allow to clot 15-30 minutes and place the tube in slant position. Then separate the serum from supernatant. Then the biochemical test was performed by HumaLyzer 3000 following the protocol of this machine. Biochemical test of blood was revealed blood glucose, total protein, SGPT, SGOT, BUN, serum creatinine, phosphorus and albumin. Urine sample showed pH, specific gravity, glucose, protein etc.

## 3) Ultrasonography:

For the further confirmation ultrasonography of ventral lower abdomen was taken. Before taking ultrasonography ventral lower abdomen was shaved by a blade then performed the ultrasonography at 15A and 4.0MHz frequency. Ultrasonography probe was put on the ventral lower abdomen for locating the kidneys which revealed cortex of both kidneys were slightly hyperechoic and thickened (Figure.1).

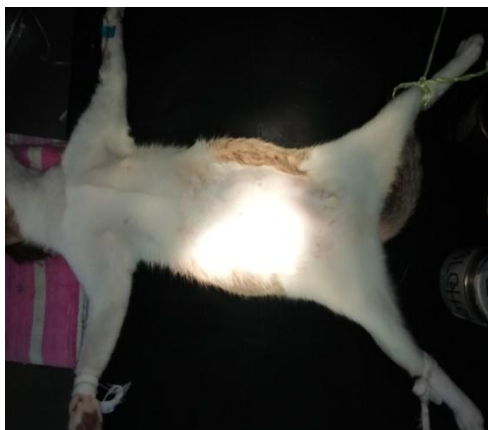


Figure 2: Prepared the cat for USG



Figure 3. Hyperechoic and thickened cortex of kidneys in Ultrasonography.

## CHAPTER 3: RESULT & DISCUSSION

The physical examination of cat showed polyuria, polydipsia along with anorexia and weight loss. According to Dr. Celeste Clements these are the earliest clinical sign of CKD.

The biochemical analysis revealed total protein (TP)-15.3(gm/dl), albumin-5.3(gm/dl), proteinuria-10(gm/dl) which are more than the reference value (table 1). Research over past decade showed that proteinemia and proteinuria are highly related to reduce the survival rate of both azotemic and non azotemic cats and dogs (Littman et al., 2013; Less et al., 2005; Cook et al., 1996; Jacob et al., 2005; Syme et al., 2006; King et al., 2007; Kuwahara et al., 2006; Jepson et al., 2009; Whener et al., 2008 ). It is showed that renal diet which contain high dose of omega 3 poly unsaturated fatty acid may reduce the proteinuria and proteinemia (De Caterina et al., 1993).

The glucose level in blood and urine was 256.9 (mg/dl) and 150 (mg/dl) respectively which are greater than the reference value and indicate that the cat was suffering from diabetes. In previous study showed that there were a relationship between diabetes and CKD. On the basis of creatinine and urea obtained in antemortem, 23.3% of cats with diabetes and 31.6% of controls were considered to have CKD (Zini et al., 2014). If the renal disease is mild a phosphate binder added to a diabetic diet might be most appropriate for the management of both conditions (Sparkes et al., 2015, 2016).



**Table 1: Biochemical analysis of blood and urine of cat**

<b>Name of test</b>	<b>Result</b>	<b>Reference Value</b>
<b>Blood test</b>		
Total protein (gm/dl)	15.3	5.2-8.8
Albumin (gm/dl)	5.3	2.5-3.9
Glucose (mg/dl)	256.9	50-170
S. creatinine ( $\mu\text{g}/\text{dl}$ )	1.8	0.6-1.5
BUN (mg/dl)	41	14-36
SGPT(u/l)	56.6	10-100
SGOT(u/l)	40.1	10-100
Phosphorus(mg/dl)	13.2	2.4-8.2
<b>Urine test</b>		
pH	6.4	6.3-6.6
Specific gravity	1.008	1.001-1.085
Proteinuria(gm/dl)	8.0	0.5-1.0
Bilirubin (gm/dl)	0.5	0-0.9
Glucose(gm/dl)	150	80-120

From table 1 the creatinine and BUN (Blood Urea Nitrogen) value are 1.8 ( $\mu\text{g}/\text{dl}$ ) and 41 (mg/dl) respectively.

**Table 2: International Renal Interest Society (IRIS) classification system for staging CKD in cats on the basis of creatinine values:**

Stage	Serum creatinine μg/dl (μmol/L)	Comments
1	<1.6 (<140)	Non azotemic: Some renal abnormalities other than azotemia is present such as abnormal findings of renal imaging or palpitation or progressively increasing the creatinine level.
2	1.6-2.8 (140-249)	Mild renal azotemia: Clinical signs are typically mild or absent.
3	2.9-5.0 (250-439)	Moderate renal azotemia: Systemic clinical signs may be present.
4	>5.0 (>440)	Severe renal azotemia: Systemic clinical signs are usually present.

According to IRIS value (table 2) the cat of our study was in 2 stage of CKD. According to IRIS cats with mild renal azotemia typically have biochemical values within reference limits but because of the insensitivity of creatinine concentration as a screening test cats with creatinine values close to the upper limit often have renal disease. In the study of Jepson et al.( 2009) showed that 30% of cats recruited had developed azotemia by 12 months and proteinuria was significantly associated with development of azotemia although cause cannot be inferred.

From table 1, the phosphorus level was 13.2 (mg/dl) which is higher than the reference value. Normally phosphorus is filtered from blood stream by the kidneys. When the kidneys begin to fail, the phosphorus level begins to rise (Plotnick, 2007). Phosphorus restriction has been given when a high phosphorus level is detected in blood stream. Fluid therapy can correct the acid base balance and helps in restoring the normal phosphorus potassium level (Dow et al., 1990; Elliott et al., 2000).

Successful therapy in CKD is depended on proper treatment with a special renal diet. In the present case the cat showed great improvement after the treatment which agreed with the P. Arnold; 2007 (20) study where the author reported that appetizer, phosphate binder along with renal diet were the best choice of treating CKD animals. According to Polzin DJ et al. renal diet is playing a good role for improving the CKD condition (Polzin et al., 2009).

## **CHAPTER 4: CONCLUSION**

Chronic kidney disease is very common disease in older cats but in the most cases the primary causes are undetectable. It is proved that early diagnosis and proper effective treatment and management can play very significant role in the recovery of CKD patients. Evidence based advises and guidelines are necessary on the diagnosis, investigation and management of CKD in all its stages.

## REFERENCE

- Lulich, J. P., Osborne, C. A., O'brien, T. D., & Polzin, D. J. (1992). Feline renal failure: questions, answers, questions. *The Compendium on continuing education for the practicing veterinarian (USA)*.
- Cannon, M. (2016). Diagnosis and investigation of chronic kidney disease in cats. *In Practice*, 38(Suppl 3), 2-9
- Lefebvre.S; (2011) Literature review-Epidemiology of feline chronic kidney disease; Banfield Applied Research & Knoeledge Team.
- Ross, L. A., & Finco, D. R. (1981). Relationship of selected clinical renal function tests to glomerular filtration rate and renal blood flow in cats. *American journal of veterinary research*, 42(10), 1704.
- Dr. Celeste Clements; Cat health/ Cat Diseases & conditions A-Z/ Chronic kidney disease: What does kidney failure in cats really mean? Pet health Network
- Littman, M. P., Wiley, C. A., Raducha, M. G., & Henthorn, P. S. (2013). Glomerulopathy and mutations in NPHS1 and KIRREL2 in soft-coated Wheaten Terrier dogs. *Mammalian Genome*, 24(3-4), 119-126.
- Lees, G. E., Brown, S. A., Elliott, J., Grauer, G. F., & Vaden, S. L. (2005). Assessment and management of proteinuria in dogs and cats: 2004 ACVIM Forum Consensus Statement (small animal). *Journal of veterinary internal medicine*, 19(3), 377-385.
- Cook, A. K., & Cowgill, L. D. (1996). Clinical and pathological features of protein-losing glomerular disease in the dog: a review of 137 cases (1985-1992). *Journal of the American Animal Hospital Association*, 32(4), 313-322.

- Jacob, F., Polzin, D. J., Osborne, C. A., Neaton, J. D., Kirk, C. A., Allen, T. A., & Swanson, L. L. (2005). Evaluation of the association between initial proteinuria and morbidity rate or death in dogs with naturally occurring chronic renal failure. *Journal of the American Veterinary Medical Association*, 226(3), 393-400.
- Syme, H. M., Markwell, P. J., Pfeiffer, D., & Elliott, J. (2006). Survival of cats with naturally occurring chronic renal failure is related to severity of proteinuria. *Journal of Veterinary Internal Medicine*, 20(3), 528-535.
- King, J. N., Tasker, S., Gunn- Moore, D. A., & Strehlau, G. (2007). Prognostic factors in cats with chronic kidney disease. *Journal of Veterinary Internal Medicine*, 21(5), 906-916.
- Kuwahara, Y., Ohba, Y., Kitoh, K., Kuwahara, N., & Kitagawa, H. (2006). Association of laboratory data and death within one month in cats with chronic renal failure. *Journal of small animal practice*, 47(8), 446-450.
- Jepson, R. E., Brodbelt, D., Vallance, C., Syme, H. M., & Elliott, J. (2009). Evaluation of predictors of the development of azotemia in cats. *Journal of Veterinary Internal Medicine*, 23(4), 806-813.
- Wehner, A., Hartmann, K., & Hirschberger, J. (2008). Associations between proteinuria, systemic hypertension and glomerular filtration rate in dogs with renal and non-renal diseases. *Veterinary Record*, 162(5), 141-147.
- De Caterina, R., Caprioli, R., Giannessi, D., Sicari, R., Galli, C., Lazzerini, G., ... & Rindi, P. (1993). n-3 fatty acids reduce proteinuria in patients with chronic glomerular disease. *Kidney international*, 44(4), 843-850.
- Zini, E., Benali, S., Coppola, L., Guscetti, F., Ackermann, M., Lutz, T. A., ... & Aresu, L. (2014). Renal morphology in cats with diabetes mellitus. *Veterinary pathology*, 51(6), 1143-1150.

- Sparkes, A. H., Cannon, M., Church, D., Fleeman, L., Harvey, A., Hoenig, M., ... & Rosenberg, D. (2015). ISFM consensus guidelines on the practical management of diabetes mellitus in cats. *Journal of feline medicine and surgery*, 17(3), 235-250.
- Sparkes, A. H., Caney, S., Chalhoub, S., Elliott, J., Finch, N., Gajanayake, I., ... & Quimby, J. (2016). ISFM consensus guidelines on the diagnosis and management of feline chronic kidney disease. *Journal of Feline Medicine and Surgery*, 18(3), 219-239.
- International Renal Interest Society. Staging of CKD. 2009. [www.iris-kidney.com/pdf/IRIS2009\\_Staging\\_CKD.pdf](http://www.iris-kidney.com/pdf/IRIS2009_Staging_CKD.pdf). Accessed Aug. 15, 2011.
- Jepson, R. E., Brodbelt, D., Vallance, C., Syme, H. M., & Elliott, J. (2009). Evaluation of predictors of the development of azotemia in cats. *Journal of Veterinary Internal Medicine*, 23(4), 806-813.
- Plotnick, A. (2007). Feline chronic renal failure: long-term medical management. *Compendium Veterinary*, article, 1.
- Dow, S. W., Fettman, M. J., Smith, K. R., Hamar, D. W., Nagode, L. A., Refsal, K. R., & Wilke, W. L. (1990). Effects of dietary acidification and potassium depletion on acid-base balance, mineral metabolism and renal function in adult cats. *The Journal of nutrition*, 120(6), 569-578.
- Elliott, J., Rawlings, J. M., Markwell, P. J., & Barber, P. J. (2000). Survival of cats with naturally occurring chronic renal failure: effect of dietary management. *Journal of Small Animal Practice*, 41(6), 235-242.
- Polzin, D. J., Osborne, C. A., & Ross, S. (2009). Evidence-based management of chronic kidney disease. *Kirks Current Veterinary Therapy. XIV. Saunders Elsevier, St Louis, Missouri*, 872-878.

## ACKNOWLEDGEMENTS

All praises are due to “Almighty Allah” who enabled the author to complete this report successfully.

The author express her deep sense of gratitude, heartfelt respect and immense indebt to her supervisor **Dr. Mohammed Yousuf Elahi Chowdhury**, Professor, Department of Medicine & Surgery, Chattogram Veterinary and Animal Sciences University for his valuable advice, scholastic guidance, suggestions, inspiration and who was involved with this report through its inception.

I also express thank to my friends for their help and co-operation during the tenure of writing of this report. The author is immensely grateful to all of them, although it is not possible to mention everyone by name.



