

# CLINICAL DIAGNOSIS AND MANAGEMENT OF POLYCYSTIC KIDNEY DISEASE WITH CONCURRENT CYSTITIS ASSOCIATED WITH *KLEBSIELLA* SPP IN A PERSIAN CAT

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## Abstract

Polycystic kidney disease (PCKD) is an autosomal inherited disorder commonly seen in Persian cats. A four-year-old male Persian cat was presented with vomiting, anorexia and anuria for two days. Clinical examination revealed dehydration, hyperthermia, pale mucous membranes and bladder distension. Hematology showed neutrophilia, while serum biochemistry indicated azotemia and hyperphosphatemia. Ultrasonography revealed renomegaly with multiple anechoic renal cysts and cystitis. Urinalysis showed pyuria, proteinuria and hematuria. *Klebsiella spp.* was isolated and treated accordingly. Supportive therapy resulted in marked clinical improvement within seven days.

**Keywords:** Polycystic kidney disease, Cystitis, Cat

## Introduction

Polycystic kidney disease (PKD) is one of the common genetic diseases of cats. Feline polycystic kidney disease is an autosomal dominant disease characterized by the presence of one or multiple cysts in one or both kidneys. Sometimes, presence of cysts may also be seen in liver and pancreas (Bosje, J.T *et al.*, 1998). The disease is highly prevalent in cats, particularly in Persian cats, where it is among the most common feline genetic disorders alongside diabetes and feline lower urinary tract disease (Gendron, K *et al.*, 2013). Mutations in the PKD1 gene have been identified as the underlying cause of felines (Helps, C. *et al.*, 2007). Renal cysts form in the tubular cells from birth and are commonly seen in the kidney's cortex and cortico-medullary junction (Sato, R *et al.*, 2019). Imaging plays

a key role in feline PKD diagnosis, with radiographs and intravenous urography used in more severe cases featuring multiple large cysts. Cysts are visualized as hypo- to anechoic spherical formations, sometimes associated with later contrast enhancement, and their size can vary from 1 mm to more than 20 mm (Lee, Y.-J *et al.*, 2010). The Renal Resistive Index (RI), assessed using Doppler ultrasound, is notably higher in cats with PKD, suggesting increased intrarenal vascular resistance due to cyst development (Tipisca *et al.*, 2016). Guerra, J.M. and colleagues reported that the combination of ultrasonography and PKD1 gene analysis showed that the accuracy and timing of PKD diagnosis in cats depended on the animal's age. Kruger *et al.* (2009) reported that, taking into account factors like lower urinary tract symptoms and the moisture

content of the diet, cats have an approximately 65% chance of experiencing another lower urinary tract episode within two years. Management of feline Polycystic Kidney Disease (PKD) is aimed at slowing the progression of chronic kidney disease (CKD), enhancing quality of life, and controlling associated complications, as no curative treatment is currently available. Therapeutic strategies include the use of renal-specific diets, maintenance of adequate hydration, administration of phosphate binders, regulation of systemic blood pressure, and pharmacologic management of complications such as anemia and nausea. Early detection and monitoring, particularly in high-risk breeds such as Persian cats, are essential for optimizing clinical outcomes and long-term management. This case report highlights the diagnosis and management of polycystic kidney disease with concurrent cystitis associated with *klebsiella* spp in a persian cat.

**Case history and Observation**

A four-year-old intact male Persian cat was presented to the University Veterinary Hospital, Kokkalai, Thrissur, with a two-day history of vomiting, anorexia, and anuria. On physical examination, the cat was found to be moderately dehydrated and hyperthermic, with pale mucous membranes suggestive of compromised perfusion or anemia. Abdominal palpation revealed a markedly distended urinary bladder, indicating possible lower urinary tract obstruction.



**Figure 1.** Cat presented with a markedly distended abdomen and stranguria

Hematological examination demonstrated neutrophilia, suggestive of an underlying inflammatory or infectious process. Serum biochemical analysis revealed marked azotemia, characterized by elevated blood urea nitrogen and creatinine levels, along with hyperphosphatemia, consistent with impaired renal function.

**Table 1.** Serum biochemical values of cat on day 0 and day 14

Parameters	Result (Day 0 )	Result (Day 14 )
BUN (mg/dl)	50.41	23.2
Creatinine (mg/dl)	9.6	1.3
Phosphorus (mg/dl)	8.7	6.2

Abdominal ultrasonography showed an intact urinary bladder with a thickened bladder wall of 1.9 mm and the presence of hyperechoic sediments, suggestive of cystitis and intraluminal debris. Additionally, both kidneys were enlarged (renomegaly) and exhibited multiple, well-demarcated, anechoic cystic



structures ranging from 5 to 10 mm in diameter, findings consistent with polycystic kidney disease. Resistive index was estimated around 0.82. Diagnostic urethral catheterization was performed to relieve obstruction and to obtain a urine sample for culture and sensitivity (C&S) testing. *Klebsiella* spp organism was isolated and was sensitive for amoxicillin/clavulanic acid. Urinalysis revealed pyuria, proteinuria, and hematuria, further supporting the presence of urinary tract inflammation or infection. Based on the clinical findings, laboratory results, and imaging studies, a diagnosis of polycystic kidney disease complicated by acute-or-chronic renal dysfunction and lower urinary tract obstruction was considered.

### Treatment and Discussion

The cat was stabilized with intravenous fluid therapy and medications started with Amoxicillin-Sulbactam @ 15 mg/kg b.w.t and Pantoprazole @ 1 mg/kg b.w.t for five days. Oral treatment was continued with prazosin hydrochloride (1 mg/cat, BID), flavoxate (30 mg/kg, BID), and renoprotective supplementation (Pronefra). Clinical improvement was observed after seven days of treatment. Following five days of therapy, animal showed improvement in food intake and urine passage without any difficulty. Urethral catheter was withdrawn from the animal once the animal's condition improved. On day 14, animal showed reduced total leucocyte count and serum phosphorus with normal creatinine. Owner was advised to continue oral pronefra syrup to the animal.

Treatment aims to control clinical signs and slow disease progression through renal therapeutic diets, fluid therapy to maintain hydration, and medications to manage hyperphosphatemia, hypertension, nausea, and anemia (A Volta *et al.*, 2010). PJ Quinn *et al.* (2011) reported that *Klebsiella pneumoniae* is a major cause of UTIs in domestic animals, with

infection mainly arising from fecal contamination of the lower urinary tract or the environment, as the organism normally inhabits the intestinal tract. In a case study by Chandran *et al.* (2024) polycystic kidney disease with concurrent uroabdomen was reported in a Persian cat, highlighting the occurrence of multiple renal cysts and urine accumulation in the abdominal cavity on ultrasonography.

Ultrasonographic examination in mature cats is a valuable method for routine detection of polycystic kidney disease (Jaturanratsamee, K *et al.*, 2024). Wills *et al.* (2009) described feline polycystic kidney disease on ultrasonography as kidneys with multiple anechoic to hypoechoic, round to irregularly shaped cystic structures of varying sizes, often with indistinct corticomedullary junctions and distortion of normal renal architecture, enabling reliable diagnosis and monitoring of disease progression in affected cats. a domestic shorthair cat was documented with concurrent polycystic kidney disease and renal lymphoma, illustrating that PKD can be present alongside neoplastic processes in feline patients ( S.D. Drobatz *et al.*, 1992). Metabolic acidosis develops when excess plasma anions outweigh cations, resulting in a reduced blood pH. In these conditions, sodium bicarbonate therapy is useful, particularly in patients with bicarbonate loss caused by diarrhea or proximal renal tubular acidosis (Adeva-Andany *et al.*, 2014). Amoxicillin combined with clavulanic acid, at a dose of 7–39 mg/kg twice daily, is frequently used as a first-choice empirical antibiotic for treating urinary tract infections in cats (Gerber *et al.*, 2008). Treatment is mainly focused on reducing creatinine and phosphorus levels and alleviating clinical signs. Despite observed clinical improvement, renal cysts are expected to persist and may predispose affected cats to the development of chronic kidney disease later in life.

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