IJVAR International Journal of Veterinary and Animal Research

Journal homepage: https://ijvar.org/index.php/ijvar

CASE REPORT

Unilateral Perinephric Pseudocyst in a Young British Shorthair Cat: Diagnostic Imaging and Surgical Outcome

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ARTICLE INFO

Received: 28/03/2025
Accepted: 25/03/2026

DOI: 10.71336/ijvar.676

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Keywords

Chronic kidney disease
Felis catus
Nephrectomy
Perinephric pseudocyst
Ultrasonography

Cite this article as: *Eren E. et al. 2026. Unilateral Perinephric Pseudocyst in a Young British Shorthair Cat: Diagnostic Imaging and Surgical Outcome International Journal of Veterinary and Animal Research, 9(1): xx-xx. DOI: 10.71336/ijvar.676.*

ABSTRACT

This case report describes the clinical presentation, diagnostic imaging, histopathological findings, and surgical management of a 2-year-old spayed female British Shorthair cat with a unilateral left-sided perinephric pseudocyst. The cat presented with lethargy, anorexia, weight loss, and progressive abdominal distension. Clinical examination revealed a palpable abdominal mass, which was confirmed as a perinephric pseudocyst via ultrasonography and radiography. Surgical intervention involved capsulectomy and nephrectomy, with histopathological confirmation of the diagnosis. The cat initially recovered but developed similar symptoms 54 days postoperatively, with ultrasonographic evidence of cystic structures in the contralateral kidney, necessitating a capsulectomy. Despite initial stabilization, the cat progressed to stage II renal failure 73 days postoperatively and succumbed to the disease. This case highlights that perinephric pseudocyst, although rare, should be considered in the differential diagnosis of young cats presenting with abdominal distension and renomegaly. Notably, biochemical markers of renal pathology may remain within normal limits, underscoring the importance of ultrasonography and histopathology for accurate diagnosis. Although surgical intervention can alleviate symptoms, long-term prognosis remains guarded due to potential recurrence and progressive renal dysfunction. Further studies are needed to explore potential genetic predisposition in British Shorthair cats.

INTRODUCTION

Perinephric pseudocyst is an uncommon renal disorder in cats, characterized by the accumulation of fluid within a fibrous sac lacking an epithelial lining (Ochoa et al., 1999). These cysts are more frequently diagnosed in middle-aged to older cats, with a reported median age of 11–16 years (Beck et al., 2000; Mazzanti et al., 2013). While male cats appear to be more commonly affected, no definitive breed predisposition has been identified (Beck et al., 2000).

The exact etiology of perinephric pseudocysts remains unclear, though proposed mechanisms include increased hydrostatic pressure, lymphatic obstruction, or rupture of renal cysts (Adamama-Moraitou et al., 2018). Possible contributing factors include chronic kidney disease (CKD), trauma, congenital defects, or idiopathic origins (Mouat et al., 2009). Clinical presentation varies significantly, ranging from incidental findings to symptomatic cases with abdominal distension, palpable masses, anorexia, or urinary obstruction (Mazzanti et al., 2013; Salgüero et al., 2015). Additionally, histologically, perinephric pseudocysts lack an epithelial lining, which differentiates them from true renal cysts (Lemire and Read, 1998). Diagnosis is primarily based on ultrasonographic findings, where an anechoic fluid accumulation between the renal capsule and parenchyma is characteristic (Schaefer et al., 2018).

Management of perinephric pseudocysts depends on size, clinical impact, and concurrent renal disease. Small, asymptomatic pseudocysts may be managed conservatively, whereas larger or symptomatic cases require surgical intervention, including capsulectomy, nephrectomy, or percutaneous drainage (McCord et al., 2008; Placer and McManis, 2019). Postoperative monitoring is essential to detect complications such as hemorrhage, infection, and progressive renal dysfunction (Beck et al., 2000).

Perinephric pseudocysts should also be differentiated from several other cystic or fluid-accumulating conditions affecting the kidney and the perirenal region. Differential diagnoses include true renal cysts, hydronephrosis, perirenal hematoma, urinoma, and perirenal abscess, which may produce similar ultrasonographic findings characterized by fluid accumulation surrounding the kidney (Beck et al., 2000; Debruyn et al., 2012). In

addition, parasitic cystic diseases such as cystic echinococcosis should also be considered, as hydatid cysts may rarely involve the kidneys and can present as cystic renal lesions associated with abdominal distension (Erdem et al., 2022).

This case report describes the diagnosis, surgical treatment, and postoperative outcome of a young British Shorthair cat with a unilateral perinephric pseudocyst, emphasizing the role of ultrasonography and the challenges associated with long-term management.

MATERIALS AND METHODS

A 2-year-old spayed female British Shorthair cat was presented with lethargy, anorexia, weight loss, and progressive abdominal distension. On physical examination, significant abdominal distension was noted, with asymmetry favoring the left side. No other abnormalities were detected.

Diagnostic Evaluation

Blood samples were collected from the jugular vein using 21-gauge needles into serum and anticoagulant (EDTA) tubes for hematological and biochemical analysis. Complete blood count (CBC) was performed using an automated hematology analyzer (Mindray BC-5000Vet, China). Biochemical parameters, including blood urea nitrogen (BUN), creatinine (CRE), blood urea nitrogen-to-creatinine ratio (BUN/CRE), phosphorus (P), total protein (TP), albumin (ALB), albumin-to-globulin ratio (ALB/GLOB), alanine aminotransferase (ALT), alkaline phosphatase (ALP), gamma-glutamyl transferase (GGT), glucose (GLU), total bilirubin (TBIL), total cholesterol (TCHO), and calcium (Ca), were measured using a biochemistry autoanalyzer (Fuji DRI-CHEM NX700V, Japan) (Tables 1 and 2).

Table 1. Complete Blood Count Parameters and Reference Ranges.

Complete Blood Count			
Parameters	**Value**	**Results**	**Reference Range**
WBC (x 10^9/L)	5.99	N	5.5 - 19.5
BAS (x 10^9/L)	0.00	N	0.0 - 0.1
BAS (%)	0.1	N	0.0 - 1.2
NEU (x 10^9/L)	4.52	N	3.1 - 12.6
NEU (%)	75.5	N	38.0 - 80.0
EOS (x 10^9/L)	0.31	N	0.1 - 1.9
EOS (%)	5.0	N	1.0 - 11.0
LYM (x 10^9/L)	1.03	N	0.7 - 7.7
LYM (%)	17.2	N	12.0 - 45.0
MON (x 10^9/L)	0.13	N	0.1 - 1.4
MON (%)	2.2	N	1.0 - 8.0
RBC (x 10^{12}/L)	7.63	N	4.6 - 10.2
HGB (g/dL)	10.2	N	8.5 - 15.3
MCV (fL)	**37.9**	**L**	38.0 - 54.0
MCH (pg)	13.4	N	11.8 - 18.0
MCHC (g/dL)	35.3	N	29.0 - 36.0
RDW-CV (%)	22.8	N	16.0 - 23.0
RDW-SD (fL)	36.9	N	26.4 - 43.1
HCT (%)	28.9	N	26.0 - 47.0
PLT (x 10^9/L)	125	N	100.0 - 518.0
MPV (fL)	12.0	N	9.9 - 16.3
PDW (Adet)	14.7	N	12.0 - 17.5
PCT (ml/L)	1.50	N	0.9 - 7.0

WBC: White blood cell, BAS: Basophil, NEU: Neutrophil, EOS: Eosinophil, LYM: Lymphocyte, MON: Monocyte, RBC: Red blood cell, HGB: Hemoglobin, MCV: Mean corpuscular volume, MCH: Mean corpuscular hemoglobin, MCHC: Mean corpuscular hemoglobin concentration, RDW-CV: Red cell distribution width coefficient of variation, RDW-SD: Red cell distribution width standard deviation, HCT: Hematocrit, PLT: Platelet, MPV: Mean platelet volume, PDW: Platelet distribution width, PCT: Plateletcrit. N: Normal, L: Low, H: High.

Table 2 Serum Biochemistry Parameters and Reference Ranges in the Case Study Cat.

Serum Biochemistry Parameters			
Parameters	**Value**	**Results**	**Reference Range**
ALB (g/dL)	2.7	N	2.3 - 3.5
ALB/GLOB	**0.40**	**L**	0.6 - 1.5
ALP (U/L)	26	N	9.0 - 53.0
ALT (U/L)	64	N	22.0 - 84.0
BUN (mg/dL)	26.2	N	17.6 - 32.8
BUN/CRE	22.20	N	4.0 - 33.0
Ca (mg/dL)	10.3	N	8.8 - 11.9
CRE (mg/dL)	1.18	N	0.8 - 1.6
GGT (U/L)	10	N	1.0 - 10.0
GLU (mg/dL)	107	N	71.0 - 148.0
P (mg/dL)	**6.9**	**H**	2.6 - 6.0
TBIL (mg/dL)	0.2	N	0.1 - 0.4
TCHO (mg/dL)	129	N	89.0 - 176.0
TP (g/dL)	**9.5**	**H**	5.7 - 7.8

ALB: Albumin, ALB/GLOB: Albumin-to-globulin ratio, ALP: Alkaline phosphatase, ALT: Alanine aminotransferase, BUN: Blood urea nitrogen, BUN/CRE: Blood urea nitrogen-to-creatinine ratio, Ca: Calcium, CRE: Creatinine, GGT: Gamma-glutamyl transferase, GLU: Glucose, P: Phosphorus, TBIL: Total bilirubin, TCHO: Total cholesterol, TP: Total protein, N: Normal, L: Low, H: High.

Abdominal radiography (ventrodorsal and lateral views) revealed a large mass localized in the left renal region (Figure 1A, B). Ultrasonography (VETUS 7, MINDRAY, China) confirmed the presence of anechoic fluid surrounding the left kidney (Figure 2).

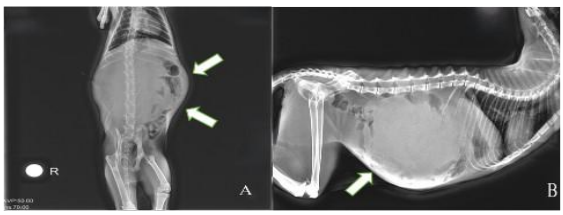

Figure 1. A) The radiograph of a 2-year-old female domestic British Shorthair cat reveals a swollen lesion in the ventrodorsal radiography and B) lateral radiography, indicated by arrows.

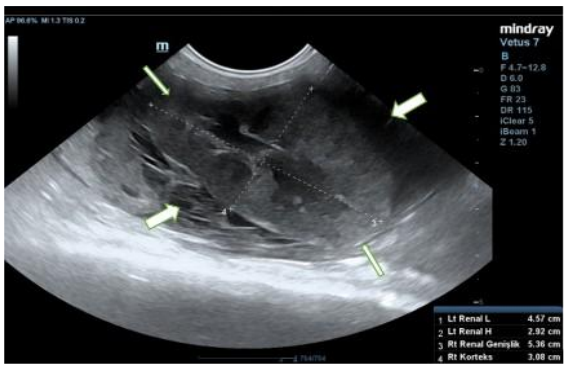

Figure 2. Abdominal ultrasonography of the 2-year-old female domestic British Shorthair cat. Left Kidney. The kidney (small arrows) was surrounded by a large amount of anechoic fluid (large arrows).

Surgical Intervention

The cat was referred for surgical management, and a left unilateral nephrectomy was performed (Fossum, 2019). Anesthesia was induced with Propofol (6 mg/kg IV, Fresenius Kabi, Germany) and maintained with isoflurane (MAC=1.5%, Piramal Critical Care, USA) (Clarke et al., 2014). A midline incision through the linea alba allowed

access to the abdominal cavity, and the peritoneum over the left kidney was incised. The pseudocyst fluid was aspirated, followed by a stab incision for complete drainage (Figure 3A, B). The kidney was carefully elevated, and the renal vein and arterial branches were ligated. The left ureter was also ligated near the bladder before the kidney and ureter were excised.

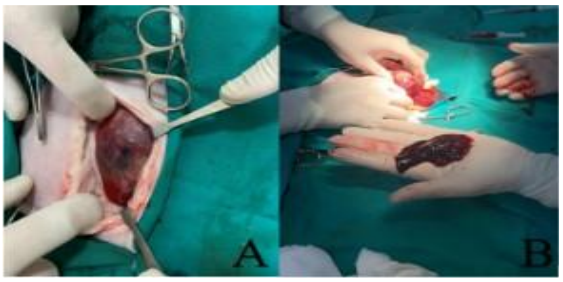

Figure 3. A) Appearance of the cyst in the left kidney; B) Left kidney surrounded by the pseudocyst.

Postoperatively, the cat received Cefazolin (22 mg/kg IM, Cezol, Türkiye) for one day and a single dose of Tramadol (2 mg/kg SC, Contramal, Türkiye) for pain management (Fossum, 2019; Clarke et al., 2014).

Histopathological Findings

Microscopic examination of the excised kidney, which included eight sections, revealed widespread tubular epithelial enlargement with granular and occasional vacuolar degeneration. Focal hemorrhagic areas were observed, along with mononuclear inflammatory infiltrates and glomerular hypertrophy. Additionally, fibrous connective tissue proliferation and lymphoid cell accumulations were noted. The kidney capsule exhibited significant thickening with necrotic foci and dense pseudomembrane formations. Based on these findings, the final diagnosis was chronic nephrosis, interstitial nephritis, and perinephric pseudocyst formation (Figure 4).

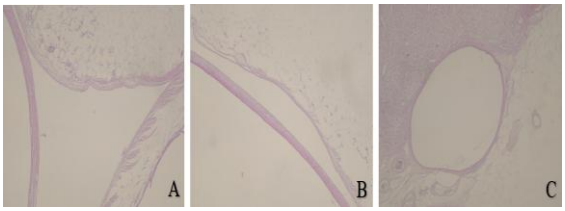

Figure 4. Histopathological appearance of the perinephric pseudocyst in the kidney of the cat. A) Multilocular cystic structures located within the perirenal adipose tissue (H&E, 4x). B) Cyst wall and lumen surrounded by adipose tissue (H&E, 4x). C) Cystic structure with a fibrous wall and a large cystic lumen (H&E, 4x).

Postoperative Course and Recurrence

The cat initially recovered well; however, 54 days post-surgery, it presented with abdominal asymmetry. A biochemical profile showed elevated BUN (36.7 mg/dL) with normal CRE and P levels. Ultrasonography confirmed fluid accumulation around the right kidney (Figure 5), prompting a capsulectomy (Figure 6A, B).

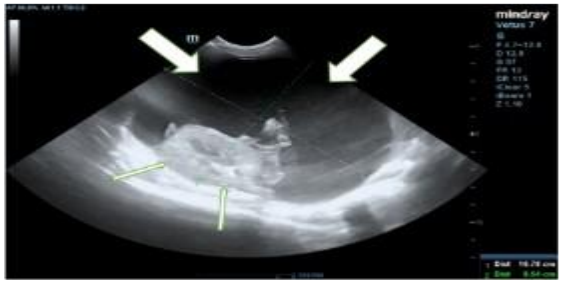

Figure 5. Abdominal ultrasonography of right kidney in the 2-years-old female domestic British Shorthair cat. The kidney (small arrows) was surrounded by a large amount of anechoic fluid (large arrows).

Figure 6. A) Appearance of the cyst in the right kidney; **B)** Right kidney surrounded by the pseudocyst.

Seventy-three days postoperatively, the cat exhibited signs of progressive renal dysfunction, including polydipsia, polyuria, anorexia, vomiting, and generalized weakness. Laboratory evaluation indicated a marked increase in BUN to 77.9 mg/dL, CRE to 1.85 mg/dL, and P to 13.2 mg/dL, consistent with declining renal function (Elliott and Barber, 1998; Polzin, 2011). Urinalysis revealed an isosthenuric urine specific gravity of 1.011, suggesting impaired renal concentrating ability (Debruyn et al., 2012). Based on these findings, the cat was classified as having stage II CKD according to the International Renal Interest Society (IRIS) guidelines (IRIS, 2023).

Supportive Therapy and Outcome

Supportive treatment was initiated to manage renal dysfunction and improve clinical stability. Fluid therapy was administered to enhance renal perfusion, and the cat's diet was adjusted to a therapeutic regimen, Prescription Diet® k/d® feline, provided in three daily portions (Salgüero et al., 2015). To control hyperphosphatemia, lanthanum carbonate (400 mg/cat, orally) was prescribed (Kim et al., 2006), while maropitant (1 mg/kg, subcutaneously) was administered to alleviate vomiting (Hickman et al., 2008).

Despite intensive supportive care, the cat's renal function continued to deteriorate, ultimately leading to death three days after the initiation of therapy. Postmortem examination confirmed progressive renal insufficiency as the primary cause of mortality.

DISCUSSION AND CONCLUSION

Previous studies indicate that perinephric pseudocysts predominantly affect older cats, typically over 8 years of age (Beck et al., 2000). A retrospective study of 26 cases reported a mean age of 11 years, with 73% of affected cats being male (Ochoa et al., 1999). Another study involving 13 cats documented a mean age of 16 years (Mazzanti et al., 2013).

Perinephric pseudocysts in younger cats are rare, and their etiology remains unclear. While some cases are associated with CKD, infectious diseases, or acute kidney injury, a significant proportion remain idiopathic (Polzin, 2011). In the present case, the cat was relatively young, female, and had no history of trauma or toxin exposure, suggesting an idiopathic origin. Renal dysfunction in perinephric pseudocysts is thought to result from parenchymal compression or interstitial fibrosis, leading to progressive renal impairment (Debruyn et al., 2012). Approximately 90% of affected cats exhibit some degree of renal disease at diagnosis (Salgüero et al., 2015). Although serum CRE levels were initially within the reference range, renal parameters worsened over time, particularly after nephrectomy. This aligns with previous reports indicating that biochemical markers alone may not reliably reflect renal function in unilateral perinephric pseudocysts (Schaefer et al., 2018). Ultrasonography remains the most valuable diagnostic tool, allowing early detection of cystic structures and monitoring of disease progression (Beck et al., 2000; Schaefer et al., 2018). Similarly, in our case, the use of ultrasonography allowed the diagnosis of a perinephric pseudocyst despite normal hematological and serum biochemical findings.

Management strategies for perinephric pseudocysts include percutaneous drainage, capsulectomy, and nephrectomy, depending on the severity and progression of the disease (McCord et al., 2008). While percutaneous drainage may provide temporary relief, recurrence is common (Beck et al., 2000). In this case, nephrectomy was performed due to left kidney dysfunction, resulting in an initial resolution of clinical signs. However, perinephric pseudocysts subsequently developed in the remaining kidney, ultimately leading to progressive renal failure and death. Survival time following diagnosis varies widely, with a reported mean postoperative survival of 9 months in previous studies (Beck et al., 2000). In our case, the survival period was only 4.5 months following surgery, likely due to bilateral disease progression and the limited compensatory capacity of the remaining kidney. This highlights the importance of long-term postoperative monitoring and early intervention in cases of contralateral renal involvement.

Although rare, perinephric pseudocysts should be considered in the differential diagnosis of young cats presenting with abdominal distension and renomegaly. Given that biochemical markers may not reliably indicate underlying renal pathology, abdominal ultrasonography and histopathological evaluation remain the gold standard for accurate diagnosis and disease monitoring. While surgical intervention is the most effective treatment, recurrence remains a significant challenge, necessitating close postoperative follow-up.

Furthermore, the potential genetic predisposition of British Shorthair cats to perinephric pseudocysts warrants further investigation. Future studies evaluating breed-specific risk factors, as well as alternative treatment approaches, could provide valuable insights for improving prognosis and disease management in affected cats.

Acknowledgement
The authors declare that there are no acknowledgements.

Ethical Declaration
This study is a single-case report. All diagnostic and therapeutic procedures were performed as part of routine clinical practice. Therefore, institutional ethics committee approval was not required. Informed consent was obtained from the animal owner for the use of the clinical data and images in a scientific publication.

Conflict of Interest
The authors declare that there is no conflict of interest regarding the publication of this article.

Authorship contributions
Concept: E.E., M.S.A., Design: E.E., M.S.A., Data Collection or Processing: M.İ., S.O., Analysis or Interpretation: M.İ., M.S.A., Literature Search: E.E., S.O., Writing: E.E., S.O.

Financial Support
This research received no grant from any funding agency/sector.

Additional informations.
This study does not cover any thesis. This study has not been previously presented at any congress/symposium or published in another journal.

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