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Perirenal Pseudocyst in a Cat

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ABSTRACT: This study described clinical and radiological evaluations and pathological findings as well as surgical treatment in a cat diagnosed with unilateral perirenal pseudocyst. In a 5-year old cat, a palpable cyst in the right abdominal cavity was suspected upon clinical examination. Perirenal pseudocyst of radiological diagnosis to confirm the mass included radiography, ultrasonography (US), renal Doppler ultrasonography (DUS), and excretory urography (EU). Together with radiological findings, observations during laparatomy, and histopathological findings revealed that the mass was a unilateral perirenal pseudocyst. The cyst with its capsule was extirpated and removed performing right renal nephrectomy. In conclusion, we consider that determination of renal function is important in cases of sporadically encountered perirenal pseudocyst that the EU and Doppler US needing to be performed in that context support one another in determining the type of perirenal pseudocyst, renal function and renal damage.

Key words: Cat, Excretory urography, Perirenal pseudocyst, Renal Doppler Ultrasonography

Bir Kedide Perirenal Pseudokist

ÖZET: Bu çalışmada, unilateral perirenal pseudokist tanısı konan bir kedide klinik, radyolojik, patolojik bulguların ve gerçekleştirilen operatif sağaltımının sunulması amaçlandı. 5 yaşlı, erkek kedinin klinik muayenesinde sağ abdominal boşlukta palpe edilebilen bir kitle saptandı. Radyolojik tanısı amacıyla radyografi, ultrasonografi (US), renal Doppler ultrasonografi (DUS) ve ekskretuar ürografi (EU) yapıldı. Perirenal pseudokistin radyolojik tanısı laparatomi sırasındaki gözlemlerle ve histopatolojik incelemelerle kesinleştirildi. Kistik oluşum, kapsülü ile birlikte ekstirpe edildi ve sağ böbrek nefrektomi yapılarak uzaklaştırıldı. Sonuç olarak; sporadik olarak karşılaşılan perirenal pseudokist olgularında renal fonksiyonun değerlendirilmesinin önemli olduğu; EU ve renal DUS'nin perirenal pseudokist tipinin, renal fonksiyonun ve renal hasarın değerlendirilmesinde katkı sağlayacağı kanısına varıldı.

Anahtar kelimeler: Kedi, Ekskretuar Ürografi, Perirenal pseudokist, Renal Doppler Ultrasonografi

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INTRODUCTION

Perirenal pseudocyst is seen sporadically in cats (Abdinoor, 1980; Geel, 1986; Hawe, 1991) and occurs unilaterally and bilaterally as a result of accumulation urine or transudate between renal parenchyma and renal capsule due to various reasons (DiBartola and Westropp, 1997). It is more common in the males, but gender predisposition has not yet been proven (Kirberger and Jacobson, 1992; Inns, 1997; DiBartola and Westropp, 1997). Perirenal pseudocysts often cause renal dysfunctions (Lemire and Read, 1998; Beck, et al, 2000). The degree of severity of renal dysfunction indicates the prognosis of perirenal pseudocyst (Beck, et al, 2000). Lethargy, weight loss, abdominal tension, and irritability and sensitivity in the abdominal region are common symptoms. Conventional radiography and ultrasonography are usually utilised for diagnosis. The treatment includes percutaneous drainage of cyst (Beck, et al, 2000) or capsullectomy alone or with nephrectomy (Lemire and Read, 1998; Beck, et al, 2000). This report describes diagnosis and treatment of a rare case of unilateral perirenal pseudocyst in a cat.

CASE DESCRIPTION

The study material was a 5-year old, intact male cat of local breed, referred to the Surgery Clinic of Faculty of Veterinary Medicine, Ankara University. A palpable mass in the abdominal cavity was detected in the first examination. An unclear bordered mass with a mild opacity was determined in direct radiography taken at the right lateral (L) and ventrodorsal (V/D) recumbence. Other structures were eliminated due to yielding no contrast.

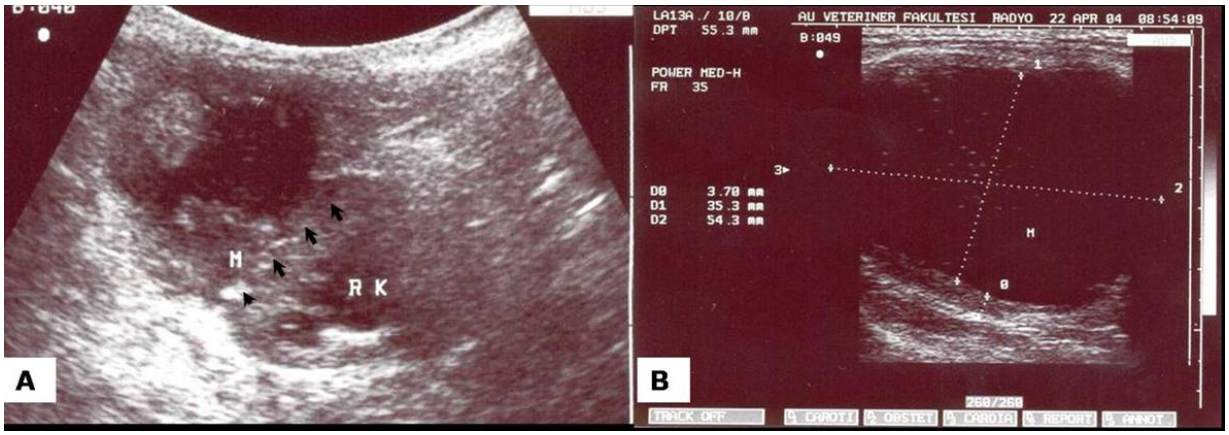

Figure 1. Ultrasonographic images of the right kidney and cystic mass. A: Arrows indicate the cyst wall that is separate from the renal cortex and adhesive to the right kidney. Irregular thickening of the cyst wall. B: Dimensions of the cystic mass.

Şekil 1. Sağ böbrek ile kistik yapının ultrasonografik görünümleri. A: Sağ böbreğe adeziv ve renal korteksten ayrı bir yapı olarak görülebilen kist duvarı (oklar) ile kist duvarındaki düzensiz kalınlaşmalar ve B: Kistik yapının boyutları görülmektedir.

In ultrasonography and Doppler ultrasonography (Esaote, Genova, Italy), equipment-specific probes (7.5-10 MHz multi-frequency linear and 3.5-5 MHz multi-frequency convex ones) were used. There was a cystic structure adhesive to the right kidney. Although the cyst wall and the right cortex yielded isoechoic image, the caudodorsal cortex of kidney and adhesive cyst wall could be distinguished (Figure 1A). It was noted that cyst liquid though appeared anechoic; it contained hyperechoic particles, as well. The wall did not uniformly surround the cyst and exhibited irregular thickening, without extending a septum

inside (Figure 1). The right kidney was 50.3 mm at the dorsal plane, whereas the left kidney was 47.7 mm at the sagittal plane, as both being renomegalic. As compared with the left kidney, there was hydronephrosis in the right kidney accompanied by a higher cortex:medulla ratio, a less noticeable corticomedullar line, a greater extent of echogenity in the cortex. There was also a dilatation in the right proximal urethra (Figure 2). Renal Doppler ultrasonography revealed that the resistive indexes (RIs) were 0.89 and 0.66 for the right and left kidneys, respectively (Figure 3). The RI difference (0.23) exceeded the threshold value (0.11).

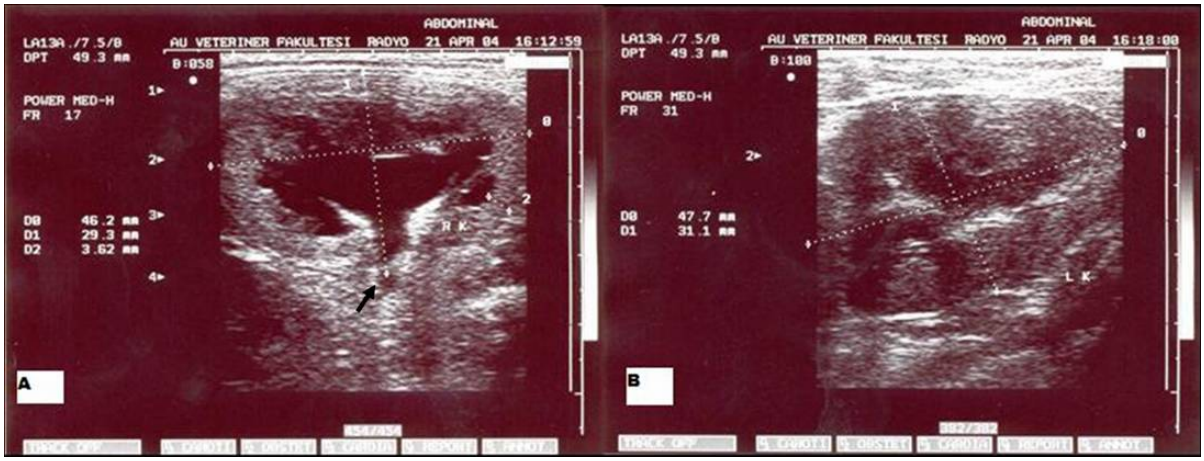

Figure 2. Ultrasonographic images of the right and left kidneys. A: Dimension of the right kidney at the dorsal plane. Ultrasonographic image shows dilatation of pelvis renalis, pelvicouretheral cross, and proximal urethra (arrow) B: Dimension of the left kidney at the sagittal plane.

Şekil 2. Sağ ve sol böbreğin ultrasonografik görünümleri. A: Ultrasonografik görümünde dorsal planda sağ böbrek boyutları, pelvis renalis, pelvikoüreteral birleşim noktasında ve proksimal üreterde (ok) dilatasyon izlenmektedir. B: Sagital planda sol böbrek ve boyutları (B) görülmektedir.

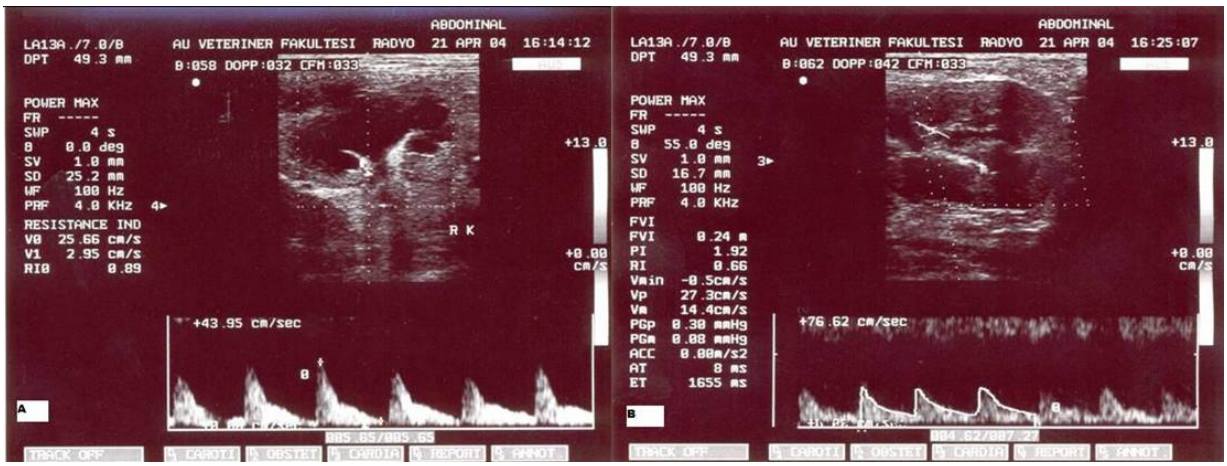

Figure 3. Duplex Doppler ultrasonographic images of the right (A) and left (B) kidneys. The RI value was greater for the right kidney than for the left kidney; RI difference between the right and left kidneys (0.23) being much greater than the threshold value of 0.11.

Şekil 3. Sağ böbreğin (A) ve sol böbreğin (B) dupleks Doppler ultrasonografik görünümleri. Sağ böbrekte yüksek intrarenal Rİ değeri izlenmektedir. Sağ ve sol böbrek arasındaki Rİ farkı 0,23 sayısal değeriyle 0,11 eşik değerinin üzerinde olduğu görülmektedir.

In the guidance of ultrasonography, the cyst liquid was aspirated and then sampled. The liquid was in a dark yellowish transudate form and had a specific gravity of 1.007. It contained the monocytes and lymphocytes. Blood sample was also analysed for blood urea nitrogen (27 mg/dl) and creatinine (1.4 mg/dl).

Excretory urography (EU) was conducted via a rapid administration of an nonionic contrasting agent (Iopromide, Ultravist 370; Schering, Germany) through cephalic vein at the dose of 1.5 ml/kg body weight (BW). Radiograms in the EU were obtained during administration of contrast agent and at 5, 20, 40, 90 min relative to the EU. This was also extended to a late measurement at 24 h. Nephrogram, pyelogram, and cystogram phases were only achieved in the left kidney. The left kidney was 2.6 folds greater than the second lumbar column. No increase in opacity of the cystic mass due to contrast agent was noted (Figure 4).

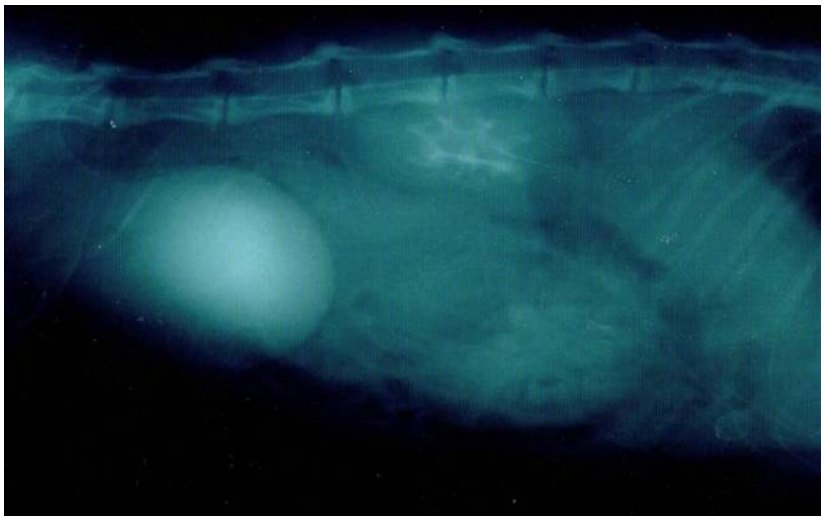

Figure 4. Pyelogram and cystogram phases in the left kidney at 90 min post-EU. There was nothing at the right kidney in right L radiogram.

Şekil 4: UE'nin 90. dakikasında sol böbrekte pyelogram ve sistogram fazı. Sağ L radyogramda sağ böbrek izlenmemektedir.

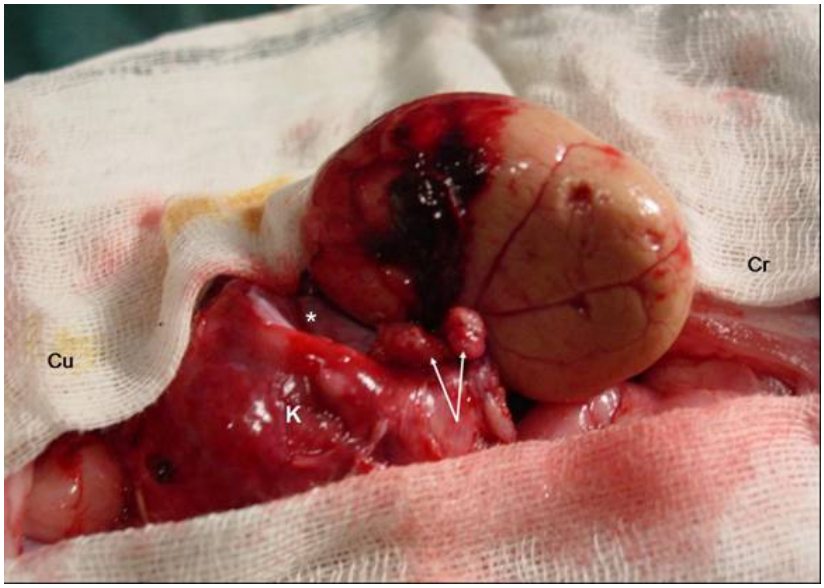

Figure 5. Liberation of the right kidney from the cyst wall (*). Arrows indicate fibrotic tissue at the pelvicouretheral interception. Cr: cranial, Cu: caudal, and K: the cystic mass.

Şekil 5. Sağ böbreğin kist duvarından serbestleştirilmiş olan görüntüsü. Sağ böbreğin caudodorsal kenarından serbestleştirilmiş kist duvarı (*) ve pelvikoüreteral birleşim noktasındaki fibröz doku (oklar) izlenmektedir. Cr: kranial; Cu: kaudal; K: kistik yapı.

Considering clinical and radiological findings, we decided to remove the cystic mass surgically. After general anaesthesia (Xylazin HCl 1 mg/kg/BW, i.m., Rompun, Bayer, Germany and Ketamine HCl 10 mg mg/kg/BW, i.m., Alfamine, Ege-Vet, Turkey), laparatomy was performed in craniomedial lining. During the laparatomy, it was noted that the cystic mass localised retroperitoneally. It was difficult to separate the cystic mass from the right kidney. Because, as if the right kidney internalised within the cyst wall, the attached cyst wall to the caudodorsal edge of the kidney was reflected by dissection of kidney. The cyst wall adhered to the renal hilus, vena cava caudalis, aorta abdominalis, as well as upper and right abdominal wall. It was also pressing the right urethra with a strong fibrotic tissue at the urethropelvic cross (Figure 5). Macroscopically, there was a colour change in the right kidney. The cystic mass and the right kidney were removed by capsullectomy and nephrectomy.

Histopathology revealed that the cystic mass comprised only of fibrous tissue, without epithelial cells. In histopathological evaluation of the right kidney, there were moderate dilatation in the pelvis renalis, infiltration of mononuclear cells and interstitial fibrosis as well as atrophy and degeneration in tubulus. This was referred as chronic interstitial nephritis.

Post-operative clinical examinations and ultrasonographic evaluations confirmed disappearance of previous clinical findings, improvement in global remission, and absence of complications.

DISCUSSION

Perirenal pseudocyst is interchangeably used as pararenal pseudocyst, perirenal cyst, pararenal cyst, capsular cyst, parenchymal cyst, perinephric pseudocyst, and capsulogenic renal cyst (Lemire and Read, 1998; Essman, et al., 2000). It exists in three types. The first is also known as perirenal urinoma and characterised by urine leakage from the urinary region (Davidson, 1985). Perirenal urinoma occurs resulting from accidental injury and/or intraoperative trauma as well as a complication of benign prostate hypertrophy and lower urinary tract obstruction (Abdinoor, 1980). This type requires the EU for differential diagnosis to attain connection between the urinary region and the cystic mass (Geel, 1986). Lacking laparatomy from anamnesis, absence of lower urinary tract obstruction via preoperative ultrasonography and radiography, and no increase in opacity with the cystic mass via the EU indicate that the case should not be diagnosed as perirenal urinoma. The second type, intracapsular cysts, commonly occurs as a result of accumulation of transudes between parenchyma of affected kidney and perirenal capsule (Hawe, 1991; Inns, 1997). In the third type, transudate also accumulates, but between perirenal capsule and retroperitoneum (Abdinoor, 1980; Rishniw, et al., 1998). Differential diagnosis of intracapsular and extracapsular perirenal pseudocyst is quite difficult (Beck, et al, 2000). In our case, 1-ultrasonography showed a considerable separation of the cyst wall from the caudodorsal cortex, and 2-reflecting adhesive cyst wall from the kidney's caudodorsal edge to make liberation of the right kidney possible during surgical intervention, which at first the renal capsule and the cyst wall were indistinguishable. These were convincing to declare diagnosis of extracapsular cyst.

Cats with perirenal pseudocysts often suffer from renal dysfunction (Beck, et al, 2000; Lemire and Read, 1998). Kim et al. (2006) reported that experimental unilateral ureteral obstruction led no significant change in blood urea nitrogen, or urine protein/creatinine ratio. Excretory urography is a type of contrast study used to verify and localise urinary tract disease. In some instances, information

regarding the renal function and disease pathophysiology can also be obtained (Heuter, 2005). Progressive chronic renal disease probably reflects a nonspecific renal scarring process characterised by the interstitial fibrosis, loss of capillaries and glomeruli, resulting in a reduction in the number and area of renal vessels (Azar, et al., 1977; Ruilope et al., 1994). Prominent changes in the unilateral ureteral obstruction (UUO) include decreases in renal function and increased fibrosis, tubular apoptosis, and cellular proliferation (McDougal, 1982; Bander et al., 1985). Intrarenal RI value indirectly reflects the degree of intrarenal vascular resistance (Bude et al., 1994). Resistive index increases in the cases of urethral obstruction and tubulointerstitial diseases (Sarı et al., 1999). A reduction in diastolic flow relative to systolic flow occurs in hydronephrotic kidneys, and this reduction is reflected in an increased intrarenal RI (Platt et al., 1989). The RI correlated to the severity of the renal disease (Petersen et al., 1997). For unilateral obstruction, comparison of RI values of suspected kidney and healthy one is invaluable. Resistive index difference between the right kidney and left kidney being equal to 0.11 or greater indicates the existence of ureteral obstruction (Platt, 1992; Rawahdeh et al., 2001). In our case, blood urea and nitrogen (BUN) and serum creatinine were within the normal limits. These frequently used biochemical analyses may not be adequate in order to permit observation of renal function in cases of unilateral perirenal pseudocyst, and may mislead the clinician. Unilateral renal dysfunction was confirmed by without monitoring nephrogram and pyelogram phases in the EU at right kindey. Results from laparotomy support the idea that the high RI difference can be used as a clinical parameter in the diagnosis of unilateral urethral obstruction. The EU was important in this case in terms of evaluating both the renal function and also type of perirenal pseudocyst, and the high RI value in the right kidney was significant in terms of determining the severity of this renal damage.

Although capsullectomy could be effective to get rid of clinical findings, it may not suppress the illness progression. Moreover, the cyst liquid is reported to reaccumulate even after its subcutaneous drainage (Beck et al., 2000). Nephrectomy was performed due to renal dysfunction at the right kidney. Upon capsullectomy and nephrectomy, all disturbing clinical findings disappeared without reoccurrence.

In conclusion, we consider that determination of renal function is important in cases of sporadically encountered perirenal pseudocyst and that the EU and Doppler US needing to be performed in that context support one another in determining the type of perirenal pseudocyst, renal function and renal damage.

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