

A CASE OF SOLITARY RENAL CYST IN A DOG

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Summary

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A clinical case of solitary renal cyst in a dog is described. The literature review showed that the disease was more common in some cat breeds than in dogs. By means of blood laboratory analysis, ultrasonography and radiology, tentative and differential diagnoses were made. The disease was confirmed intraoperatively, and then a nephrectomy was performed. The patient's follow-up continued for 4 months after the surgery and no deviations from the general and surgical state were observed. Based on literature evidence and the outcome, it was concluded that when the contralateral kidney is properly functioning, the removal of the cyst together with the kidney was the better therapeutic approach.

Key words: dog, operative treatment, renal cyst

Renal cysts are more commonly encountered in cats than in dogs. They appear both in the tubular system of the nephron as well as subcapsularly. Some of them are formed during the organogenesis in the embryonic period, while others appear later in the ontogenesis due to various reasons. In the literature, reports about polycystic kidney disease in cats are more frequently encountered, with higher incidence among long-haired breeds (Battershell & Gareia, 1969; Rendano & Parker, 1976; Crowell, 1979; Lulich, 1988; Biller, 1990). The age of affected cats ranged between 1 to 10 years.

Two cases of polycystic kidney disease are described in a Cairn Terrier and a Belgian malinois dog (McKenna & Carpenter, 1980; Ramos-Vara *et al.*, 2004) as well as an obstructive renal cyst 26 mm in

size in a mixed-breed dog (Zatelli *et al.*, 2008). The clinical signs of the disease are non-specific and include abdominal distention, vomiting, anorexia, polydipsia, polyuria and weight loss (Northington & Juliana, 1977; Biller, 1990). In most instances, cysts are discovered accidentally during ultrasonography or radiography on a different occasion. Ultrasonography is a non-invasive readily available technique of choice for diagnosis of cystic lesions of kidneys. Cysts, regardless of their location, are visualized as round, anechoic zones with smooth borders and increased echogenicity of the tissues behind them. Cysts with diameter size 1 cm or more are well seen. When cysts are multiple, the ultrasonographic image is similar to that of hydronephrosis. From differential diagnostic point of view, kidney malignancies

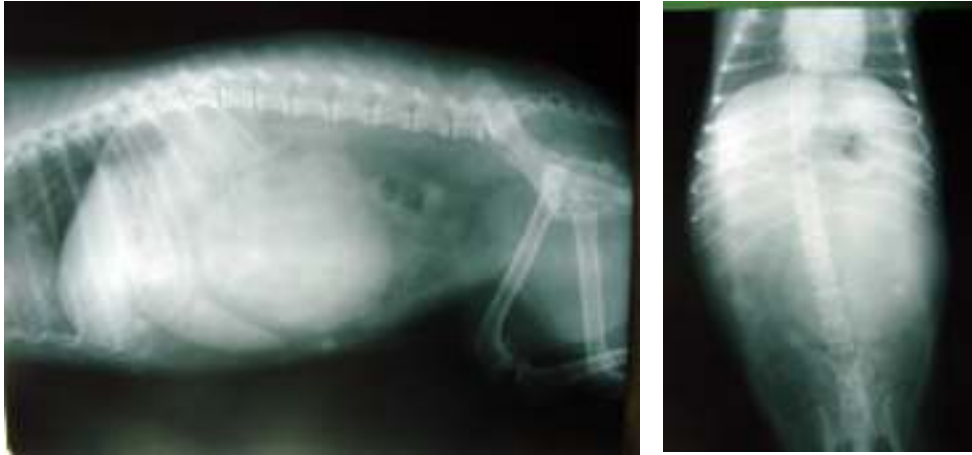


Fig. 1. Abdominal radiography of the patient: lateral and ventrodorsal views.

should also be considered (Timev *et al.*, 2009). From the point of view of the treatment options, nephrectomy is recommended due to the risk of infection (Battershell & Gareia, 1969). To our best knowledge, literature data about solitary renal cysts in dogs are not reported.

On 27 August 2009, a 12-year-old female Miniature Pinscher weighing 3.6 kg was referred for examination at the Small Animal Clinic of the Faculty of Veterinary Medicine, Stara Zagora with a 5-day history of refusal of food but not water, fever and lethargy. The defecation was absent, but urination was normal. It received general supportive drugs and antibiotics in another clinic but no diagnosis was made.

The physical examination revealed a very good body condition, yet with a distended abdomen. The rectal body temperature was 39.3 °C, heart rate 120/min⁻¹, respiratory rate 44/min⁻¹, visible mucosae – pale, without coating or discharge. Blood laboratory tests, radiography and ultrasonography were performed.

The lateral abdominal radiography revealed an oval abnormal apple-sized shadow, located in the middle of the ab-

dominal cavity, behind the stomach and over the spleen (Fig. 1). Proximally, it did not reach the thoracic and lumbar vertebrae. Its structure was homogeneous with sharp and regular borders. In ventrodorsal view, the mass was delineated rather in the left and contacted the left abdominal wall. The density of the shadow was similar to that of parenchymal organs (liver and spleen).

The ultrasonography of the abdomen showed a round, anechoic area with smooth borders, about 7 cm in diameter, linked to the cranial pole of the left kidney (Fig. 2). About one-third to one-half of the normal renal structure was seen. The right kidney was with normal size and echoic structure. Neither the ovaries, nor the uterus were seen.

The results of blood laboratory tests are shown in Table 1. At admission, there was a marked leukocytosis with mild thrombocytopaenia, moderately elevated liver transaminases, amylase and blood glucose. The other haematological parameters, blood urea and creatinine were within the reference range.



Fig. 2. Ultrasonography of the left kidney (white arrow) with the cyst (black arrow).

The results from the clinical and blood laboratory examination suggested a cystic formation in the region of the left kidney and the left ovary. A diagnostic laparotomy was advised to pose a definitive diagnosis and if possible, to remove the formation.

Anaesthetic protocol: premedication with atropine sulfate (Atropinum sulfu-

ricum, Sopharma, Sofia, Bulgaria) at 0.02 mg/kg s. c.; induction – diazepam (Diazepam[®], Sopharma, Sofia, Bulgaria) at 0.5 mg/kg, i.v. and ketamine hydrochloride (Ketaminol[®], Intervet, Boxmeer, Netherlands) at 10 mg/kg, i.v.; intubation and maintenance of anaesthesia: 2 vol% isoflurane (Furan[®], Abbott Laboratories Ltd, Kent, UK).

Operative protocol: A median laparotomy was performed by consequent incision of the skin, the subcutaneous connective tissue, the white line and the peritoneum. After the abdominal cavity was exposed, a blister (cyst), 7–8 cm of size, located immediately behind the stomach was observed (Fig. 3). When it was removed from the abdominal cavity, the suspensory ligament of the left ovary was found to be connected to the cyst (Fig. 4). The ligament was ligated and incised, revealing that the cyst was solitary and to the left kidney. The gross appearance and the size of the right kidney were normal. A total nephrectomy of the left kidney together with the cyst was performed by

Table 1. Blood laboratory parameters in the renal cyst patient

Parameters	Reference range	August 27	September 01	October 02	December 30
Haemoglobin (g/L)	120–180	138	128	146	132
Haematocrit (%)	37–55	41	35.1	48	40
Erythrocytes (T/L)	5.5–8.5	5.8	5.03	6.2	5.4
Leukocytes (G/L)	6–17	28.05	13.6	10.6	16.2
MCV (fL)	60–80	72.2	69.8	74.0	68
PLT (G/L)	160–430	138	126	128	136
Total protein (g/L)	54–78	60	59	77	68
Glucose (mmol/L)	3.0–6.1	6.17	5.06	5.80	5.16
Urea (mmol/L)	1.7–7.4	5.22	4.92	8.21	6.4
Creatinine (µmol/L)	40–120	65.8	68.3	117.3	73
ASAT (U/L)	15–40	66	60	61	65
ALAT (U/L)	15–55	118	160	153	164
Amylase (U/L)	10–900	985	750	842	815

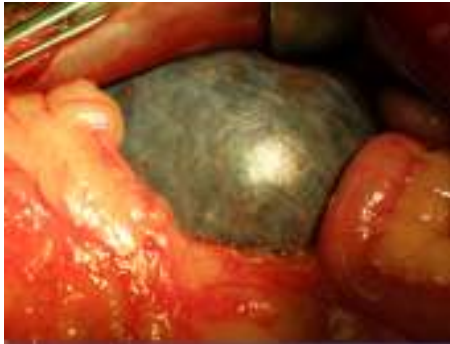


Fig. 3. Appearance of the renal cyst after laparotomy.



Fig. 4. Intraoperative view of the cyst – its connection with the left ovary is seen.

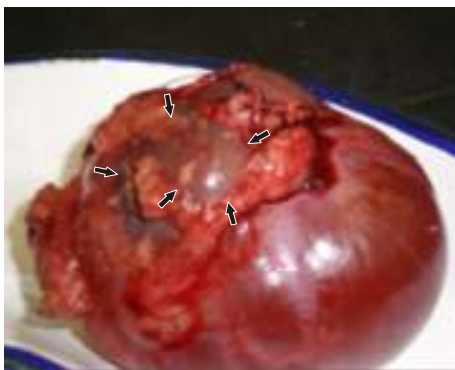


Fig. 5. The renal cyst after its removal. The kidney (arrows) is about 10% of the total mass.

successive ligations of the renal artery, vein and the respective ureter, blunt sepa-

ration of the kidney and the cyst from the peritoneum and the perirenal fat tissue. Taking consideration on the patient's age and on owner's request, ovariohysterectomy was also performed. The abdomen was routinely closed. The formation was postoperatively examined and it was found out that the kidney was located in one of cyst's poles and was approximately 10% of the total volume (Fig. 5). The total weight of the cyst with the kidney was 180 g, and only the fluid – 120 mL.

Post operative antibiotic treatment consisted in a 5-day course of enrofloxacin (Baytril[®], Bayer Animal Health GmbH, Leverkusen, Germany) and 3-day fluid therapy with sodium chloride 0.9%, 50 ml glucose 5% (Serum glucosae[®], B. Braun Melsungen AG Production Pharma, Melsungen, Germany) and 50 mL Ringer lactate (Ringer Actavis[®], B. Braun Melsungen AG Production Pharma, Melsungen, Germany). Control examinations and blood laboratory tests were scheduled and performed on post operative days 4, 30 and 120 (Table 1). As early as the 4th day, leukocyte counts and blood amylase returned to normal. Liver transaminases and thrombocytes did not change. There were no complications in the post operative period. The body temperature ranged within 38.6–39.1 °C. The appetite was restored within a week.

The review of literature made clear that renal cysts were encountered much more frequently in cats than in dogs. It is thought that the condition is hereditary in Persian cats (Biller, 1990). Solitary cysts are rare and in most instances, an occasional symptomatic finding (Stowater, 1975). This motivated us to report the presented clinical case. Excluding the genetic background, the etiology of canine renal cysts is not clear or at least, opinions are conflicting. Parathyroid hormone and

vasopressin could be involved (Coffin, 1990; Wang *et al.*, 2008) but then, there are radiologically visible calcificates on cyst's capsule. We did not found out such formations in our patient and thus assumed that parathyroid hormone did not play a role. Rather, the pathology was related to the age and obstruction of renal tubules (retention cyst).

The clinical signs and blood laboratory results indicated an inflammatory process within the abdominal cavity. The radiology finding was however firmly indicative for a pathological formation around the left kidney and ovary. The ultrasonography added to the information suggesting a fluid-filled formation. Ultrasonography allows for the differentiation of renal diseases (hydronephrosis, renal abscess and subcapsular haematoma of the kidney), neoplasms, nephrolithiasis and ovarian cyst (Espada *et al.*, 2006). In this case, doubts were related to whether the cyst was renal or ovarian. The clinical signs, ultrasonography finding, age and the absence of disturbed sexual cycle indicated kidney pathology.

Grantham & Levine (1985) observed that 16.4% of renal cyst patients developed later tumour metaplasia with distant metastasis. In this case, we could not determine the time of onset of the pathology, but no tumour metaplasia or metastases were established. Nevertheless, the total removal of the affected kidney given that the contralateral one was functioning, was the better choice because of the risk of infection or malignant transformation. Normal blood urea and creatinine values after the surgery indicated that the right kidney was functioning normally and compensated for the damaged (preoperatively) or absent (post operatively) left kidney.

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