



## CASE REPORT

### Loose Body in Feline Peritoneal Cavity

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#### ABSTRACT

Peritoneal loose bodies most often measure around 10cm and are incidentally diagnosed during laparoscopy of the abdominal cavity. In most cases, they do not cause any clinical symptoms. However, large peritoneal loose bodies in people may cause dysuria or intestinal obstruction. We report a case of a loose peritoneal body in a cat with special reference to the genesis of such bodies. We also discuss the problems associated with their diagnosis.

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#### INTRODUCTION

To date, there has been no description of a peritoneal loose body in the available veterinary literature. Although such cases have been described in human medicine. Peritoneal loose bodies most often measure around 10 cm and are incidentally diagnosed during laparoscopy of the abdominal cavity (Jang *et al.*, 2012). In most cases, they do not cause any clinical symptoms. Large peritoneal loose bodies may, however, cause dysuria or intestinal obstruction in people. We report a case of a loose peritoneal body in a cat with special reference to the genesis of such bodies. We also discuss the problems in their diagnosis.

In human medicine, loose bodies in the peritoneal cavity are rarely described. They are usually found incidentally during laparotomy or autopsy. To the authors' knowledge, this type of lesion has not been described in veterinary literature. Peritoneal loose bodies found in the peritoneal cavity in people are usually small (a diameter of 1-2 cm). However, in some cases, their diameter can exceed 5 cm (Sewkani *et al.*, 2011). Patients with loose bodies of a small diameter do not usually show any disease symptoms. Large peritoneal loose bodies, on the other hand, may press on the organs of the abdominal and pelvic cavity such as the rectum, the urinary bladder, or the urethra and cause clinical symptoms. The purpose of this paper is to present personal experiences associated with diagnosing a peritoneal loose body in a cat.

**Case history and findings:** A 13-year old European short-haired male cat was presented with suspected chronic kidney disease. The clinical examination revealed pink mucous membranes, a body temperature of 38.0°C and normal lymph nodes on palpation. No changes were found during auscultation of the respiratory system and heart. However, an increase in the volume of the abdominal cavity associated with the presence of fluid was noted. On palpation, there was evident pain in the kidney area. The results of the blood CBC and biochemistry have been presented in Table 1.

The ultrasonographic examination of the abdominal cavity revealed the presence of excessive fluid in the peritoneal cavity. In the right kidney, blurring of the boundary between the cortex and medulla and pyelectasis were evident. The left kidney also had a blurred structure and the presence of a large-sized haematoma was observed in its area. In addition, a 1.6 x 1.6 cm (Fig.1) spherical structure with an echogenicity close to that of soft tissues was noticed in the peritoneal cavity. Hyperechoic areas were visible inside this structure, which suggested the presence of mineralization. The fluid drawn from the abdominal cavity had transudate properties. The results of the laboratory examination of the abdominal fluid are presented in Table 2.

As a result of a poor general condition and a poor prognosis, the owners decided to euthanize the cat. During the autopsy, blood clots in the kidneys and urinary bladder were found. Hemorrhage was noticed under the capsules

**Table 1:** Results of the hematological and biochemical examinations in the cat

Parameter	Value	Reference Values (Willard and Tvedten, 2012)
Erythrocytes ( $10^{12}/L$ )	7.53	5.5–10.0
Hematocrit (L/L)	0.332	0.24–0.46
Hemoglobin (g/dL)	10.46	8.2–15.3
MCV (fL)	44	37–55
MCHC (g/dL)	19.5	26.2–35.9
Leukocytes ( $10^9/l$ )	24.1	7.73–18.6
Lymphocytes ( $10^9/l$ )	1.4	1.3–7.5
Monocytes ( $10^9/l$ )	2.9	0.1–1.1
Total neutrophils ( $10^9/l$ )	19.7	3.1–12.5
Platelets ( $10^9/l$ )	382	42–630
ALT (IU/l)	68	23–109
AST (IU/l)	40	14–41
ALP (IU/l)	12	4–81
BUN (mg/dl)	82.46	18–41
Creatinine (mg/dl)	10.56	0.7–2.2
Potassium (mEq/L)	4.42	3.6–5.8
Glucose (mg/dl)	88.2	57–131

**Table 2:** Results of the abdominal fluid examination in the cat

Parameter	Value
Color	pink
pH	7.5
Special gravity	1.008
number of leucocytes ( $10^9/l$ )	1.7
total protein (g/dl)	0.4
Albumin (g/dl)	0.1
BUN (mg/dl)	334.6
Creatinine (mg/dl)	33.26
Potassium (mEq/L)	14.55
Cytological examination	Low number of cells (dominated mainly by macrophages, lymphocytes and desquamated peritoneal cells)

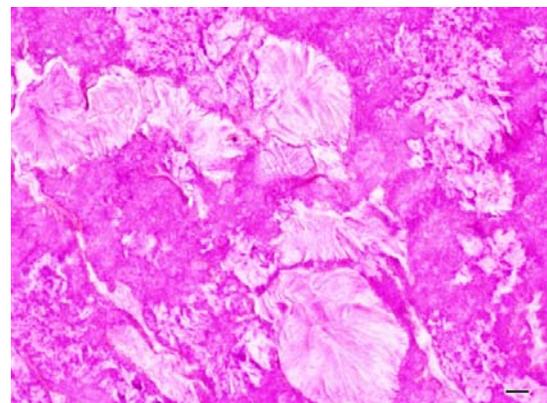
of both kidneys. The cross-section of the left kidney showed a considerable dilation of the renal pelvis with retained urine and a notably reduced (by approx.  $\frac{3}{4}$ ) and squeezed parenchyma with a blurred boundary between the cortex and medulla. In the right kidney, haemorrhage under the capsule was significantly smaller, as was the damage in the kidney itself. Its renal pelvis had a slight dilation and tiny cysts were noticed in the preserved parenchyma in the medulla and on the boundary between the cortex and the medulla.

A cream, yellow and pink coloured peritoneal loose body with a diameter of approx. 1.3 cm and a shiny and smooth surface was found (Fig. 2). Its consistency was hard. From outside, the loose body was surrounded by a thin capsule, which was tightly adherent to the surface of the body. The cross-section of the inside of the lesion showed the presence of a light grainy uniform mass.

The histopathological examination revealed that the spherical formation in the peritoneal cavity consisted of an amorphous, almost uniform and slightly acidophilic mass (Fig. 3). However, single streaky areas with stronger basophilicity were visible on its perimeter and in its centre, which saturated with calcium salts. The formation was surrounded by a thin connective tissue capsule mainly made of collagen fibres, including a small number of fibroblasts and fibrocytes.

## DISCUSSION

In human medicine, there are some reports of peritoneal loose bodies (Hedawoo and Wang, 2010; Nozu and Okumura, 2012). However, to date, the authors of this paper have not come across a description of a similar case

**Fig. 1:** Ultrasound of abdomen showing hypoechoic peritoneal fluid and hyperechoic loose peritoneal body in peritoneal cavity.**Fig. 2:** Macroscopic view: showing loose peritoneal body.**Fig. 3:** Histopathological view of the peritoneal loose body. Amorphous almost uniform slightly acidophilic mass. HE staining, bar: 50  $\mu$ m.

in small animal veterinary medicine. It is suspected that loose bodies form in the peritoneal cavity as a result of autoamputation of an epiploic appendix. The epiploic appendix is a small peritoneal pouch with a fragment of peritoneal fat situated inside it. The autoamputation takes place as a result of twisting of a fragment of the epiploic appendix, which causes clamping of blood vessels and ischaemia of this area (Koga *et al.*, 2010). It is thought that fat inside such a structure is subjected to gradual saponification, and consequently calcification. Finally, the fragment is separated and a loose body is formed in the peritoneal cavity. Most often, such a body remains in the peritoneal cavity for a long time and acellular elements

from the peritoneal serum, such as albumins, are deposited on it (Rajbhandari *et al.*, 2013). Spherical or oval structures are formed with mineralization in the centre and an amorphous mass on the outside. A loose body in the peritoneal cavity is subjected to continuous enlargement through the deposition of serum components on its surface. This, in turn, may lead to the formation of giant loose bodies in the peritoneal cavity (Hedawoo and Wagh, 2010).

Peritoneal loose bodies with a small diameter (1-2 cm) do not usually cause any clinical symptoms (Hyun-Soo *et al.*, 2013, Rajbhandari *et al.*, 2013). However, cases of large peritoneal loose bodies in the peritoneal cavity have been described in people. These are structures exceeding 5 cm and often cause serious clinical symptoms (Bhandarwar *et al.*, 1996; Hedawoo and Wagh, 2010). In most cases, as a result of an upright posture in man and under the influence of gravity, the bodies move, into the lower parts of the abdominal and pelvic cavity. They may subsequently press on structures such as the urethra or rectum (Bhandarwar *et al.*, 1996). It seems that in the case of animals, similar complications do not occur due to a different body posture. Hence, there is little likelihood of pressure being exerted on the surrounding organs.

The peritoneal loose bodies described in people had an oval or spherical shape and a smooth and shiny surface. Their colour was described as dirty white. The consistency was hard. Most of the authors compared their look to that of a peeled boiled egg (Bhandarwar *et al.*, 1996). The size varied between five and nine cm (Hedawoo and Wagh, 2010; Hyun-Soo *et al.*, 2013). The peritoneal loose body found in the peritoneal cavity in the above-mentioned cat was much smaller. However, its consistency and external look were similar to those described in people. The size of the loose body found in the cat indicated that it remained in the peritoneal cavity for a short period of time, since a large amount of acellular mass was not deposited on its surface. A cross-section showing the mass located in the centre saturated with calcium salts and a thin capsule may also indicate that the loose body was formed shortly before diagnosis. A macroscopic image of the organs of the abdominal

cavity of the cat suggested that the presence of urine in the peritoneal cavity was a result of a mechanical injury, which caused massive haemorrhage under the capsule in the kidneys and micro damage of the ureter at the ostium of the ureter in the left renal pelvis.

**Conclusion:** Loose bodies may form in the peritoneal cavity in animals similarly to humans. It is thought that their etiology is similar to that described in human medicine. According to the authors, the loose body was not the cause of a poor state of health of the described cat and there were no clinical symptoms suggesting its presence. The loose body in the peritoneal cavity was an incidental finding detected during the examination of the cat with a chronic kidney disease and uroabdomen.

**Author's contribution:** KG-S, MJ, PB, KK, JS, ZK performed the clinical examination, USG, abdominocentesis and collected samples for laboratory blood and fluid tests. SD performed the autopsy and histopathology. All authors interpreted the data and prepared manuscript.

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