

Malignant lymphoma of the urethra in a cat

Maligne lymfoom in de urethra van een kat

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ABSTRACT

A thirteen-year-old, neutered, female Domestic Shorthair (DSH) was referred to the hospital with a suspicion of traumatic uroabdomen. Abdominal ultrasound revealed free peritoneal fluid and cellular infiltration of the urethra, kidneys, abdominal lymph nodes and cecal wall. Analysis of the free fluid confirmed the presence of uroabdomen. Cytology of the infiltrative lesions in the kidneys, urethra and lymph nodes confirmed the presence of multicentric malignant lymphoma. To the authors' knowledge, this is the first case report of lymphomatous infiltration of the urethra in a cat.

SAMENVATTING

Een dertien jaar oude, vrouwelijke, gesteriliseerde Europese korthaar werd doorverwezen met een vermoedelijk traumatisch uroabdomen. Echografie van het abdomen toonde vrij peritoneaal vocht en cellulaire infiltratie van de urethra, nieren, abdominale lymfeknopen en de cecumwand aan. Analyse van het vrij vocht bevestigde het vermoeden van uroabdomen. Cytologisch onderzoek van de infiltratieve letsels in de nieren, urethra en lymfeknopen bevestigde dat het om een maligne multicentrisch lymfoom ging. Volgens de auteurs is dit de eerste casuïstiek van lymfomateuze infiltratie van de urethra bij een kat.

INTRODUCTION

Neoplasia of the lower urinary tract is rare in cats (Carpenter et al., 1987). Malignant lymphoma is the most common neoplasia in cats (Vail, 2007). In dogs, malignant lymphoma involving the urethra has been described in a Golden retriever with malignant alimentary lymphoma (Struble et al., 1997), but lymphomatous infiltration of the lower urinary tract has not been reported in cats. In the present case, a cat with iatrogenic bladder rupture secondary to malignant urethral lymphoma and a lymphomatous infiltration in the kidneys and the abdominal lymph nodes is described.

CASE REPORT

A thirteen-year-old, neutered, female DSH cat was evaluated in a referral hospital for a suspected uroab-

domen secondary to an iatrogenic bladder rupture. The cat lived in a house with access to the garden but without contact with other animals. She was not vaccinated.

A week before presentation, the cat had shown signs of dysuria and the referring veterinarian noted a distended bladder, which was easily emptied by manual compression. Examination of urine sediment revealed hematuria and the presence of non-degenerate neutrophils with no evidence of bacteria. A few days later, there was recurrence of the clinical signs with dysuria and stranguria. Re-evaluation by the veterinarian again revealed a distended bladder. This time, manual compression did not elicit urination, but was associated with loss of the distended bladder on abdominal palpation. Immediately afterwards, the patient developed signs of distributive shock.

On presentation at the referral hospital, the cat was depressed with a heart rate of 150 bpm, a respiratory rate of 28 rpm and hypothermia (33.7°C). Abdominal



Figures 1. Abdominal radiograph showing a distended abdomen with loss of the serosal detail and an irregular contour of the left kidney.

palpation revealed a fluid thrill suggesting the presence of abdominal effusion.

A blood sample was taken for hematology and biochemistry (Table 1). The most important changes were neutrophilia and severe azotemia. The FeLV/FIV SNAP test was negative.

Abdominal radiography (Canon Medical Systems S.A. RadRex DR) and ultrasonography (Toshiba, Aplio™ 300, linear transducer) were performed to confirm the suspicion of bladder rupture. The radiographs revealed a distended abdomen with loss of the serosal detail and an irregular contour of the left kidney (Figure 1). The abdominal ultrasound (US) showed a large amount of hypoechoic free fluid with hyperechoic speckles in the peritoneal space. The bladder was empty, and its wall was irregularly thickened. In the proximal aspect of the urethra, there was a hypoechoic concentric and circumferential mass that measured 1 cm wide and 2 cm long, which was obstructing the urethral lumen (Figure 2). There were changes in both kidneys with loss of cortico-medullary differentiation and presence of multiple hypoechoic cortical nodules of varying size (from 0.25 to 1.5 cm in diameter). These nodules resulted in irregularity of the renal outline (Figure 3). Additionally, enlarged jejunal and colic lymph nodes (0.9 cm in diameter) were shown, which were hypoechoic and rounded with moderate perinodal mesenteric reaction (Figure 4). The cecal wall was mildly thickened (4 mm) and hypoechoic with loss of its normal stratification.

Thoracic radiographs were also performed to rule out the presence of a possible mediastinal mass, metastases or pleural effusion, but they did not reveal any abnormalities.

Abdominocentesis was performed and the analysis of the abdominal fluid confirmed the presence of a uroabomen (fluid creatinine 1662 $\mu\text{mol/l}$ in comparison with plasma creatinine of 858 $\mu\text{mol/l}$). Cytological examination of the abdominal fluid showed a high number of erythrocytes and abundant neutrophils; however, no lymphoid cells were identified.

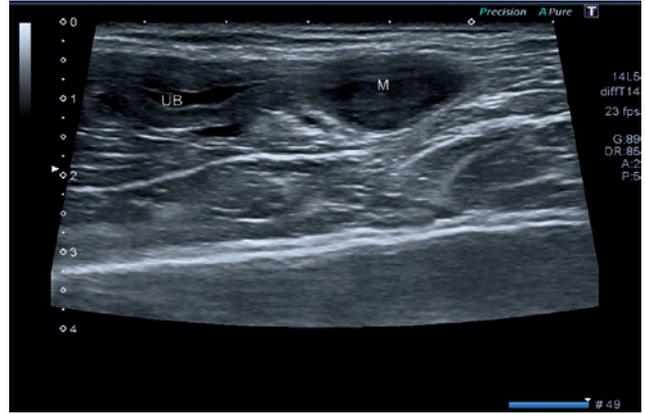


Figure 2. Sagittal ultrasound image showing the urethral hypoechoic mass (M) and an empty urinary bladder (UB) cranially.

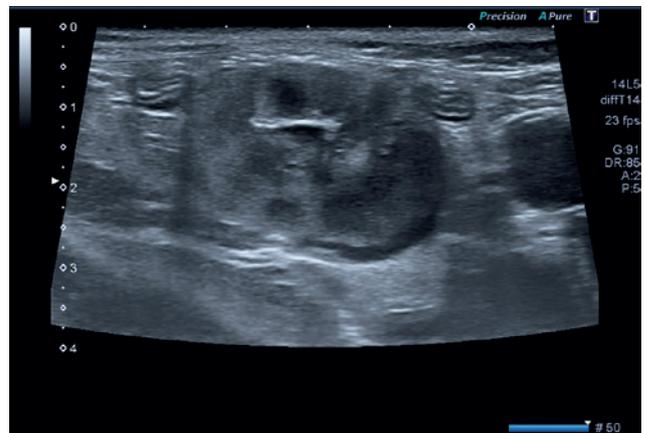


Figure 3. Sagittal plane of the left kidney showing irregular margin, loss of the cortico-medullary differentiation and the presence of multiple hypoechoic cortical nodules.



Figure 4. US image showing enlarged, rounded and hypoechoic mesenteric lymph nodes.-

Ultrasound-guided aspirate biopsies of the abnormal lesions were taken under sedation. These included the urethral mass, kidney nodules and lymph nodes. The cecal wall lesion was not sampled due to its position. Cytology of all the organs sampled was

Table 1. Hematology and biochemistry results. Abnormal results are written in bold.

Hematology		
Parameter	Value	Reference Interval
White blood cells	19.4 x 10 ⁹ /L	5.5-19.5 x 10 ⁹ /L
Neutrophils	16.6 x 10⁹/L	3.1-12.6 x 10 ⁹ /L
Lymphocytes	1.8 x 10 ⁹ /L	0.7-7.9 x 10 ⁹ /L
Monocytes	0.8 x 10 ⁹ /L	0.1-1.4 x 10 ⁹ /L
Eosinophils	0.2 x 10 ⁹ /L	0.1-1.9 x 10 ⁹ /L
Basophils	0.0 x 10 ⁹ /L	0.0-0.1 x 10 ⁹ /L
Red blood cells	6.8 x 10 ⁹ /L	4.6-10.2 x 10 ⁹ /L
Hemoglobin	100 g/L	85-153 g/L
PCV	27.1%	26-47%
Platelets	506 x 10 ⁹ /L	100-518 x 10 ⁹ /L
Biochemistry		
Potassium	4.7 mmol/L	3.5-5.10 mmol/L
Sodium	138.9 mmol/L	145-160 mmol/L
Chlorine	97.4 mmol/L	115-130 mmol/L
ALT	51 U/L	18-70 U/L
AST	45 U/L	10-55 U/L
ALP	13 U/L	25-125 U/L
GGT	0.6 U/L	2-9 U/L
Bilirubin	1 µmol/L	1-10 µmol/L
Total protein	71 g/L	55-79 g/L
Albumin	28 g/L	23-37 g/L
Creatinine	858 µmol/L	27-159 µmol/l
Urea	61 mmol/L	3.3-10.8 mmol/L
Phosphate	6.5 mmol/L	0.97-2 mmol/L
Calcium	2.5 mmol/L	2.3-3 mmol/L
Glucose	6.7 mmol/L	3.9-8.3 mmol/L

similar and revealed a significant number of lymphoblasts and the presence of cytoplasmic microvacuoles (Figure 5). Chromatin was present and nucleoli were sometimes prominent. Occasional mitoses were also detected. The diagnosis of a lymphoproliferative process, malignant lymphoma, affecting the urethra, kidneys and lymph nodes was made.

After discussion with the owners and due to the poor prognosis, the owners elected for euthanasia and declined any further diagnostic tests.

DISCUSSION

Neoplasia of the lower urinary tract is rare in cats (Carpenter et al., 1987) with only four published cases of urethral cancer: two transitional cell carcinomas (currently classified as urothelial carcinomas) (TCC) (Takasi et al., 2005; Barret and Nobel, 1976), one squamous cell carcinoma (SCC) (Christensen et al., 2010) and a leiomyoma (Swalec et al., 1989).

Malignant lymphoma is the most common neopla-

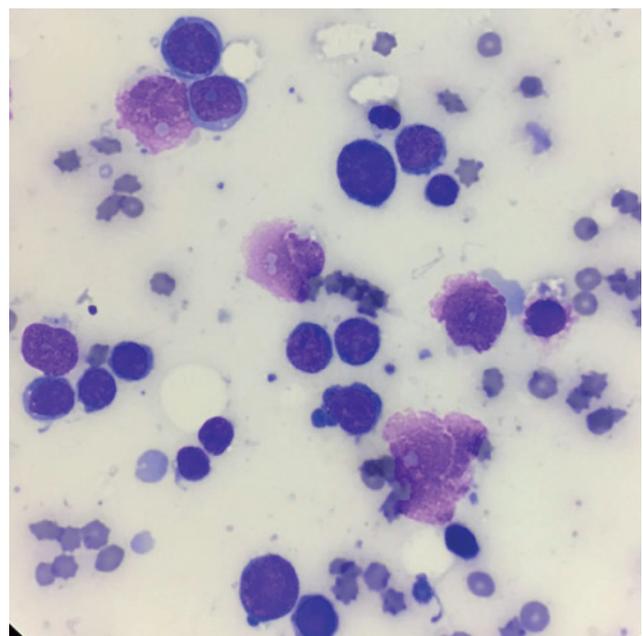


Figure 5. Cytology of the urethral mass showing a significant number of lymphoblasts.

sia in the feline population, affecting 33% of cats with cancer (Vail, 2007). The alimentary form is the most common form seen in cats (Vail, 2007). Malignant renal lymphoma has been reported in approximately 5% of cats with malignant lymphoma and can be primary or associated with alimentary lymphoma (Vail, 2007). The median age of cats with malignant renal lymphoma is 7.5 years and 25% of those cats are FeLV antigenemic (Vail, 2007).

To the authors knowledge, only one case of malignant urethral lymphoma has been described in the veterinary literature and this was in a Golden retriever with diffuse T-cell lymphoma (Struble et al., 1997). In this case report, US revealed a well-marginated tubular mass in the mid-urethra and a region of small bowel with an annular mural thickening with corrugations of the mucosal surface. The presence of a malignant lymphoma was confirmed on cytological examination (Struble et al., 1997).

In human medicine, malignant lymphoma of the urethra is a rare condition, with a total of 29 cases reported since 1949, of which, twenty cases were female, and the most common subtypes were diffuse, large B-cell lymphoma and MALT (mucosa-associated lymphoid tissue) lymphoma (Zahrani et al., 2012; Chen et al., 2014).

There is little information regarding urethral tumors in cats. The ultrasound appearance and its localization in three of the four reported cases were not described (Takasi et al., 2005; Barrett and Nobel, 1976; Swalec et al., 1989). In one of these cases with urethral TCC, a positive retrograde urethrography showed two space-occupying masses within the lumen of the proximal urethra (Takasi et al., 2005). In the remaining cat with a urethral TCC, ultrasound examination revealed several irregular mucosal masses within the bladder wall in the region of the trigone and a thickened proximal urethra with a mucosal bulge into the lumen of the urinary bladder (Christensen et al., 2010). In the present case, the changes were more localized, showing a hypoechoic, well-demarcated, concentric and circumferential lesion in the urethra, similar to the case in the Golden retriever (Struble et al., 1997), but there was also lymphomatous involvement of the kidneys and lymph nodes. The patient of the present case additionally had a cecal lesion, which could have been secondary to neoplastic infiltration or inflammation. Unfortunately, pathological examination was not performed.

The major limitation of this case report is the absence of histopathology confirmation. However, the ultrasonographic findings and the cytological appearance of the lesions make the authors' presumptive diagnosis very likely.

Uroabdomen is associated with rupture of urinary tract, most commonly involving the urinary bladder. Rupture of the bladder can be caused by overdistention secondary to a urethral obstruction (for example:

tumors or calculi) or due to a traumatic event. Feline idiopathic cystitis is rare in geriatric female cats without previous episodes.

Manual compression on a distended urinary bladder before the exclusion of an obstructive etiology is strongly discouraged in veterinary patients due to the high risk of causing bladder rupture and secondary uroabdomen.

The presented case had a poor prognosis but after the patient's stabilization, a possible treatment could have included a surgical repair of the bladder tear and an excision of the urethral mass with anastomosis to the rest of the urethra. Other possibilities included the urethral catheterization with a flexible permanent urinary catheter or a percutaneous suprapubic bladder drainage while a chemotherapy protocol is administered to reduce the size of the urethral mass and relieve the urinary tract obstruction. Although multiple chemotherapy protocols for feline malignant lymphoma have been reported, none have been described for urethral lymphoma. Limmer et al. (2016) described a twelve-week protocol consisting of cyclic administration of L-asparaginase, vincristine, cyclophosphamide, doxorubicin and prednisolone on cats with intermediate- high grade lymphoma and achieved 46% of complete remission (median duration of the first complete remission of 394 days) and 27% of partial remission (median duration of 41 days).

In a study by Collete et al. (2016), the application of a modified 25-week University of Wisconsin-Madison (UW-25) chemotherapy protocol resulted in 38% of complete remission and in 24% of partial remission in cats with intermediate to high-grade lymphoma.

In the present case, euthanasia was the first option due to the guarded prognosis because of the difficult surgical approach, the illness of the patient and the survival rate because of the malignant tumor.

CONCLUSION

To the authors' knowledge, this is the first case report showing the presence of a malignant multicentric lymphoma with involvement of the urethra in a cat and its ultrasonographic appearance. The risk of causing secondary iatrogenic bladder rupture is also highlighted. Veterinarians should include the differential diagnosis of malignant lymphoma in masses identified in the urethra in cats and in cases of uroabdomen of unknown origin.

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