

CASE REPORT

Companion or pet animals

Clinical and diagnostic features of a paraprostatic cyst of a true uterus masculinus in a male cat presented with tenesmus

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Abstract

A 5-year 11-month-old, male, neutered, Bengal cross cat was examined for a 5-week history of tenesmus. Positive contrast urethrocystography and computed tomography scan demonstrated a fluid-filled structure occupying the pelvic canal. Midline coeliotomy and symphysiotomy revealed a large cystic structure dorsal to the urethra in the area of the prostate. This structure was communicating with the urethra via a duct and both vas deferens were inserting in it. The duct was ligated and partial ablation and omentalisation of the structure was performed. Histopathological examination identified features consistent with a true uterus masculinus. Bacteriology of the cystic fluid cultured *Escherichia coli* and *Bacteroides fragilis*. The cat recovered uneventfully and with no ongoing clinical issues.

KEYWORDS

cats, reproduction, surgery, urinary tract, uterus masculinus

BACKGROUND

Prostatic disease in cats has been rarely reported, and included a prostatic abscess,¹ a paraprostatic cyst,² two prostatic carcinomas³ and three suspected uterus masculinus (UM).^{4–6} Some paraprostatic cysts in dogs have been associated with remnants of the UM; they are generally large, located in the cranio-lateral or dorsal aspect of the prostate and attached to the prostate via a stalk of tissue or adhesions.^{7,8} UM, or persistent Mullerian duct syndrome, is a rare condition reported in dogs, horses, cats and humans. It is the vestigial remnant of the paramesonephric ducts that should regress soon after testicular development,^{9,10} and has been associated with constipation, dysuria and anuria in dogs.¹¹ Mullerian structures including uterus, oviducts, cervix and cranial vagina could be present in dogs with UM. It is known to be an inherited autosomal recessive disorder in miniature schnauzers.¹² Only three previous feline cases are described: two presented for urinary signs that included retention and incontinence, and stranguria, respectively^{4,6}; the other was asymptomatic with the cystic UM, an incidental discovery.⁵

This is the first case report describing the clinical and diagnostic characteristics and surgical treatment of a true paraprostatic cyst of a UM in a cat.

CASE PRESENTATION

A 5-year 11-month-old, male, neutered Bengal cross cat presented with a 5-week history of tenesmus. On examination, two fluid-filled space-occupying lesions could be palpated in the caudal abdominal cavity, one believed to be the urinary bladder. Rectal examination under sedation revealed a large smooth swelling occupying the entire intrapelvic region ventral to the rectum and extending cranially towards the caudal abdomen. No improvement on lactulose treatment was reported.

INVESTIGATIONS

Ultrasonography revealed a fluid-filled structure caudal to the urinary bladder. The structure was drained with ultrasound guidance and 5 mL of straw-coloured fluid was removed. Fluid analysis revealed a protein-rich fluid with no bacteria seen, and low to moderate numbers of poorly preserved lysed cells.

Retrograde urethrocystogram revealed a single, smoothly margined, contrast-filled structure visible within the pelvic canal. It was rounded cranially and tapered caudally. No connection was visible between the urethra and the abnormal

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structure; however, a communication with the urethra was considered likely. The rest of the urinary tract was deemed unremarkable (Figure 1).

Images of pre- and post-contrast computed tomography (CT) studies of the caudal abdomen with a Siemens Sensation 64 (WW/WL 350/40 kVp 120, slice thickness 2 mm) revealed a large, rounded fluid attenuating (7 HU) structure within the pelvic canal, caudodorsal to the urinary bladder. Post-contrast, the lesion exhibited a contrast-enhancing rim with a non-enhancing centre. A small amount of gravity-dependent hyperattenuating debris was present within the suspected cystic structure. This lesion caused dorsal displacement and compression of the colon. The urethra was displaced ventrally, contacting the ventral surface of this structure (Figure 2a,b).

DIFFERENTIAL DIAGNOSIS

Differential diagnoses included cystic UM, paraprostatic cyst and urethral diverticulum. Further characterisation between these differentials was not possible without surgical intervention and histopathology. As the intrapelvic structure was causing clinical signs, this was performed.

TREATMENT

The cat was referred for surgical exploration. A 3 F rigid urethral catheter was placed pre-operatively. A ventral mid-line coeliotomy and pubic symphysiotomy were performed. The intrapelvic urethra was isolated, and a large cystic structure dorsal to the urethra occupying the entire pelvic canal was noted (Figure 3a). Both vas deferens were identified entering the cystic structure and were ligated and transected. The prostate was not visible grossly. The pre-placed urinary catheter had entered the cystic structure (Figure 3b). During dissection, the cyst ruptured and purulent material was seen, a sample of which was taken for aerobic and anaerobic bacterial culture and antimicrobial susceptibility testing. The cyst was explored via a ventral incision, and found to connect to the urethra through a 1 mm duct. The urinary catheter was removed and a second urinary catheter was placed antegrade in the urethra from the bladder using an intravenous catheter and guidewire (Figure 3c). The duct connecting the cyst to the urethra was ligated, and the cyst partially ablated and omentalisised (Figure 3d). The abdomen was closed routinely, and the urinary catheter was left in place for 24 hours. The cat recovered without complications and was discharged 96 hours after surgery with meloxicam (Metacam; Boehringer Ingelheim; 0.05 mg/kg orally every 24 hours), gabapentin (Gabapentin; BOVA; 7 mg/kg orally every 8 hours) and amoxicillin/clavulanic acid (Kesium; Ceva Animal Health; 25 mg/kg orally every 12 hours).

Cytological examination of the cyst contents revealed a protein-rich (38 g/L), neutrophilic exudate with intracytoplasmic bacterial rods and cocci. Bacterial culture isolated a moderate, mixed growth of *Escherichia coli* and *Bacteroides fragilis* sensitive to amoxicillin/clavulanic acid.

Histopathological examination of the cyst identified features consistent with a true UM, including a simple columnar epithelium and smooth muscle stroma with infrequent

LEARNING POINTS/TAKE-HOME MESSAGES

- Cystic uterus masculinus should be considered as a differential in cats presenting with tenesmus and an intrapelvic cystic structure.
- Retrograde urethrocystogram is a useful diagnostic tool when investigating intrapelvic structures.
- Surgical ablation and omentalisation of a cystic uterus masculinus can result in an excellent outcome with no clinical recurrence.

glandular structures reminiscent of endometrial glands (Figure 4a–c). The lining epithelium was ulcerated, and infiltrating the oedematous cyst wall was a predominantly neutrophilic, mixed inflammatory population. The serosa was expanded with immature, inflamed granulation tissue and lined by an ulcerated and reactive mesothelium. The cyst lumen contained proteinaceous material with cellular debris. Within the lumen and adjacent to the cyst wall was a ductus deferens with a characteristic longitudinally folded, pseudostratified columnar epithelium. The cyst epithelium did not label with immunohistochemical markers for urothelium (Uroplakin III IHC).

OUTCOME AND FOLLOW-UP

Follow-up was for 729 days, and no complications or recurrence of clinical signs were reported.

DISCUSSION

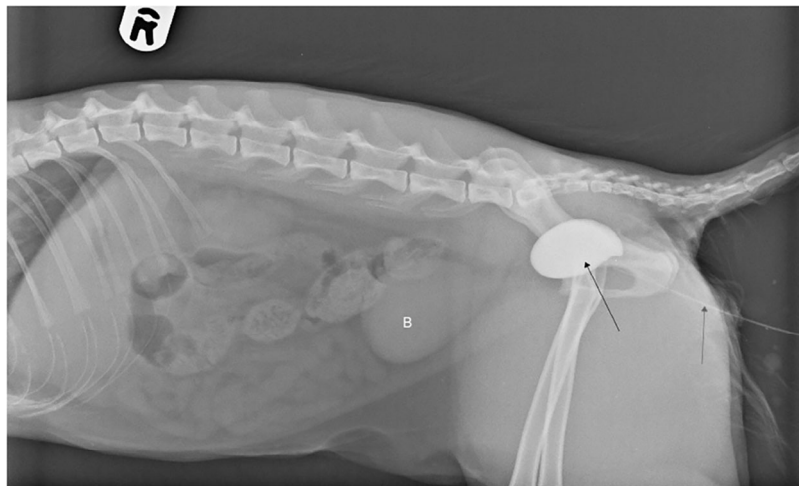
This report describes the diagnosis and the surgical management of a paraprostatic cyst of a true UM in a male cat presenting with tenesmus. Paraprostatic cysts are structures that developed between the prostate and the urinary bladder and occasionally communicate with the urethra via the prostate.¹³ The aetiology of paraprostatic cysts is not fully understood, but are considered to be of the UM origin.^{13,14}

The UM is a vestigial embryological remnant of the Müllerian duct system present in males.¹⁵ Its presence is usually asymptomatic; however, occasionally clinical signs such as urinary retention and incontinence, fever, pollakiuria, stranguria or tenesmus are seen.^{4–6,10,13,16} In this cat, only tenesmus was reported due to the enlargement of the cyst and the consequent mass effect on the intrapelvic colon. Despite the size of the cyst, no urinary signs were described.

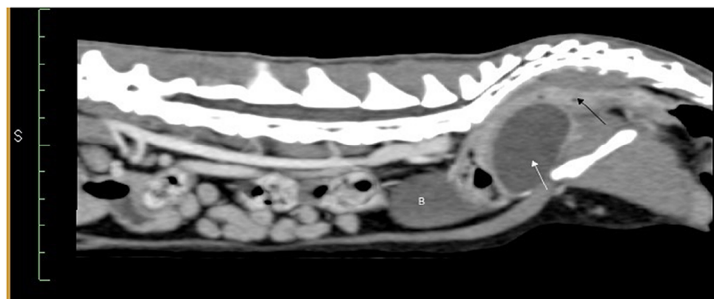
Diagnosis can be made based on clinical history, physical examination and diagnostic findings. Excretory urography, positive contrast retrograde urethrocystography and ultrasonography have been used to investigate similar conditions of the urinary tract.^{2,4,5,13} In this cat, positive contrast urethrocystography and CT scan helped with diagnosis and surgical planning, identifying the cystic structure and the communication with the urethra.

Given the severity of the clinical signs, surgical intervention was elected; the intrapelvic location of the cyst warranted

FIGURE 1 Right lateral abdominal radiograph taken as part of a positive contrast retrograde urethrocytogram study. A urinary catheter (grey arrow) containing contrast is seen within the urethra. Contrast is seen within the structure in the pelvic canal (black arrow). There is no contrast within the urinary bladder (B). The colon had been partially evacuated before this radiograph being acquired.



(a)

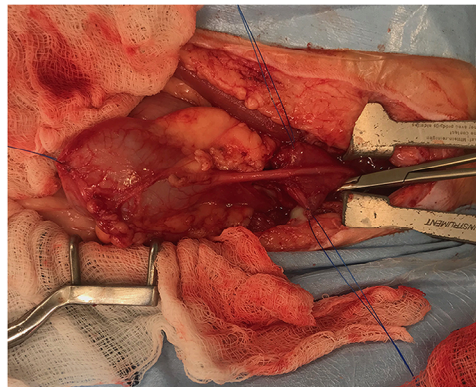


(b)

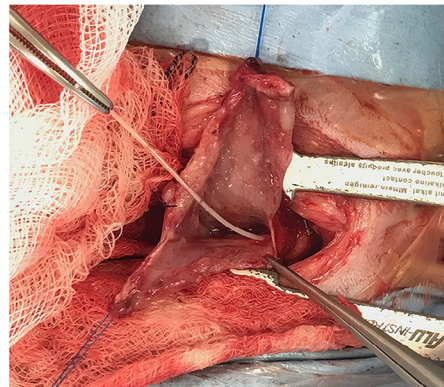


FIGURE 2 (a and b) Post-contrast parasagittal (a) and transverse (b) multiple plane reconstruction computed tomography image. WW 350, Window level 40. The large fluid attenuating (7 HU) structure with a contrast enhancing rim of soft tissue is seen within the pelvic canal (white arrows) and causing compression of the colon (black arrows). The urinary bladder (b) is seen in its normal location within the caudal abdomen.

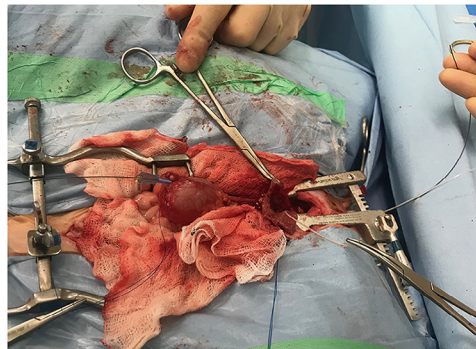
(a)



(b)



(c)



(d)

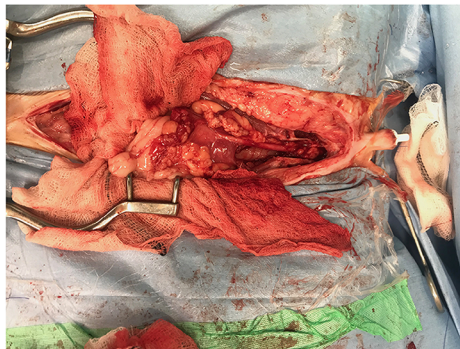


FIGURE 3 (a) Intraoperative image after pubic symphysiotomy of a large cystic structure (between the two stay sutures) dorsal to the urethra. Head of the cat to the left. (b) Image of the communication between the cyst and the urethra through a 1 mm duct. Note the urinary catheter inserted retrograde through the urethra exiting into the cystic structure. (c) Image of the guidewire placed antegrade from the bladder along the urethra placed coaxially to the urinary catheter placed retrograde from the urethra into the cyst. (d) Image of the surgical site after ablation of the cyst.

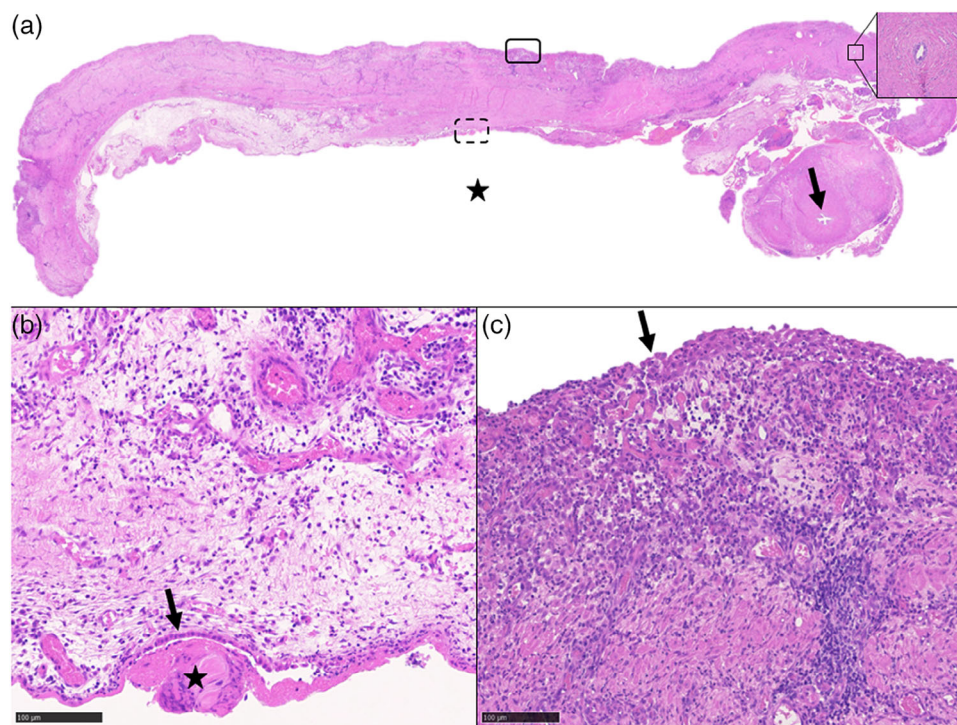


FIGURE 4 (a–c) Transverse section through the wall of the paraprostatic cyst (*uterus masculinus*); H&E. (a) Low magnification of the tubular cyst wall, comprising an inflamed and oedematous lamina propria and smooth muscle layer with rare glandular structures (inset). Within the cyst lumen (*) is a ductus deferens with a longitudinally folded, pseudostratified columnar epithelium (→). (b) High magnification of the luminal surface (hatched box in A). The cyst lumen is lined by an ulcerated, simple columnar epithelium (→) and contains proteinaceous material (*). The lamina propria is oedematous and infiltrated by neutrophils. (c) High magnification of the peritoneal surface (solid box in A). The serosa is expanded with inflamed granulation tissue and is lined by an ulcerated, reactive mesothelium (→).

a pubic symphysiotomy to allow sufficient exploration of the pelvic cavity. Due to the mature adhesions to the urethra and pelvic region, the cyst was partially ablated and omentalisated. This surgical management is similar to the one described in dogs with prostatic and paraprostatic cysts.¹⁷ Surgical castration is also recommended to terminate prostatic secretory function¹⁷; however, this cat was already neutered at a younger age, and the prostate was not visible during surgery.

In this cat, a duct connecting the cyst to the urethra was present and was ligated during surgery. A similar communication was described in human patients (Ikoma et al.¹⁸), in horses,¹⁹ in one dog¹³ and in the other reports of UM in cats.^{4–6}

The bacteriology from the cyst yielded *E. coli* and *B. fragilis*; this is similar to the case described by Kyllar and Čížek. As the initial fluid analysis had no evidence of bacteria, an iatrogenic contamination is possible. Alternatively, inadvertent fluid sampling of the bladder on initial investigation is possible, resulting in a false-negative culture sample.

Outcome following surgery appeared to be good in the only dog described.¹³ No information on long-term outcome is available in cats following surgical treatment, although surgery has been reported once for a feline patient with a UM.⁶ In this cat, no recurrence of clinical signs was reported during the follow-up period, therefore the outcome was considered excellent.

The main limitation of this case is the lack of information regarding the clinical history of the cat at the time of castration and the histopathological evaluation of the testicles to assess for hermaphroditism. In future cases, karyotyping

could be considered to assess for chromosomal abnormality if histopathology is unavailable.^{5,20}

As little feline-specific treatment recommendations are available, this case shows that ablation and omentalisation of a cystic UM is a good option in feline patients, and can provide excellent outcomes with no complications and no evidence of clinical recurrence. Cysts of a true UM should be a differential diagnosis for neutered male cats presenting with tenesmus and diagnosed with an intrapelvic cystic structure.

AUTHOR CONTRIBUTIONS

Laura Doeven wrote the paper, with assistance from Dylan Yaffy and Coleen Jones in histopathology and imaging sections, respectively. Matteo Rossanese performed the surgery and edited the manuscript.

CONFLICT OF INTEREST STATEMENT

The authors declare they have no conflicts of interest.

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ETHICS STATEMENT

The authors confirm that the ethical policies of the journal, as noted on the journal's author guidelines page, have been adhered to. No ethical approval was required, as this is a case report with no original research data.

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IMAGE QUIZ

Figure 1 A right lateral abdominal radiograph taken during a positive contrast urethrocystogram shows a fluid-filled structure within the pelvic canal.

MULTIPLE-CHOICE QUESTION

What is the most likely diagnosis for the cystic structure indicated by the black arrow?

POSSIBLE ANSWERS TO

MULTIPLE-CHOICE QUESTION

- A. Paraprostatic cyst
- B. Prostatic cyst
- C. Cystic uterus masculinus
- D. Urethral diverticulum

CORRECT ANSWER

A. Paraprostatic cyst.

Given the location of the structure and previous reports in the literature, a paraprostatic cyst was considered the most likely diagnosis. However, surgical intervention and histopathology was required for definitive diagnosis, which confirmed a cystic uterus masculinus.