

Herniation of the urinary bladder through a congenitally enlarged inguinal canal in a cat

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Summary

A two-year-old, castrated male Main Coon cat was referred because of chronic, recurrent pollakiuria, haematuria, and acute vomiting. On clinical examination, a smooth, soft-tissue mass, suspected to be the urinary bladder, was palpable outside of the abdominal wall in the inguinal area. On radiographs, the urinary bladder was found to be extra-abdominal, and herniated through an enlarged right inguinal canal at exploratory coeliotomy. The left inguinal canal was also enlarged. The urinary bladder was repositioned and fixed to the caudal abdominal wall by incisional cystopexy and both enlarged inguinal canals were partially closed with an interrupted suture pattern.

Keywords: cat, Main Coon, inguinal hernia, bladder

Herniation der Harnblase durch einen angeborenen erweiterten Inguinalspalt bei einer Katze

Eine zweijährige, männlich kastrierte Main Coon-Katze wurde infolge chronisch rezidivierender Pollakisurie, Hämaturie und akutem Erbrechen überwiesen. Bei der klinischen Untersuchung konnte eine weiche Masse ausserhalb der Bauchhöhle im Inguinalbereich palpiert werden. Das abdominale Röntgenbild bestätigte den Befund einer extraabdominal verlagerten Harnblase. Bei der explorativen Coeliotomie konnte eine Herniation der Harnblase durch den rechten erweiterten Inguinalspalt erkannt werden. Der linke Inguinalspalt war ebenfalls erweitert. Die Harnblase wurde reponiert und mittels inzisionaler Zystopexie an die kaudale Abdominalwand fixiert. Beide erweiterten Inguinalspalten wurden partiell mittels Einzelknopfnähten verschlossen.

Schlüsselwörter: Katze, Main Coon, Inguinalhernie, Harnblase

Introduction

The inguinal canal appears as a sagittal slit between the abdominal muscles, bordered by the internal and external inguinal rings. Normal contents include the spermatic cord in males or the round ligament in females, the genital branches of the genitofemoral nerve, artery and vein, and the external pudendal vessels. Widening of the inguinal rings may allow protrusion of abdominal contents, resulting in inguinal hernia (Parks, 1981). Inguinal hernias can be direct or indirect in females, and direct in males; indirect inguinal hernias in males are called scrotal hernias (Smeak, 2003).

Inguinal hernias can be congenital or acquired in origin. Only little information on inguinal hernia in cats is found in the literature. Congenital inguinal hernias in cats have been reported to have an incidence of 0.02 to 0.025% (Priester et al., 1970; Hayes, 1974), and there seems to be no breed or gender predilection. Acquired inguinal hernias have not been described in cats. This report describes a cat with a congenital inguinal hernia caused by a prolapse of the urinary bladder.

Case History

A two-year-old, castrated male Main Coon indoor cat, weighing 4 kg, was referred for chronic recurrent pollakiuria and haematuria, and for acute vomiting. Five days prior to examination, the referring veterinarian had performed abdominal radiographs, which revealed ventral extra-abdominal herniation of the urinary bladder (Fig. 1). Subsequently, the bladder had been catheterized and emptied, and further abdominal radiographs revealed an intra-abdominal bladder with luminal air accumulation (Fig. 2). At physical examination, the cat was mildly depressed with an elevated rectal temperature (39.8° C). A smooth soft-tissue mass of approximately 4 cm diameter was palpated in the right inguinal region. The owner had noticed a similar swelling several weeks previously but this had apparently spontaneously regressed. Results of a complete blood count, biochemical profile, and FeLV and FIV serology were unremarkable. Abdominal radiographs revealed ventral extra-abdominal displacement of the urinary bladder (Fig. 3). For exploratory coeliotomy, the cat was intravenously

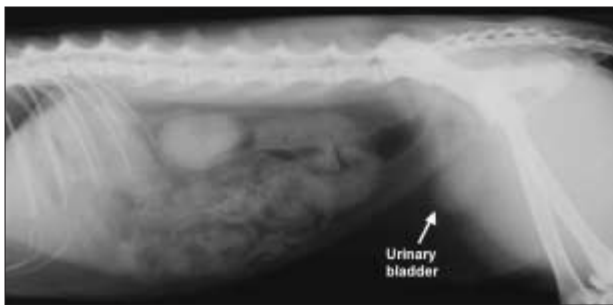


Figure 1. Abdominal radiograph with extra-abdominal displacement of the urinary bladder.



Figure 2. Caudal abdominal radiograph after catheterisation and emptying of the urinary bladder. The bladder is delineated with intraluminal gas, and is now located inside the abdominal cavity.



Figure 3. Radiography taken at referral. The urinary bladder is filled and re-herniated.

premedicated with 0.2 mg/kg midazolam (Dormicum; Roche) and 7 mg/kg propofol (Propofol; Fresenius Kabi). Anaesthesia was maintained with isoflurane (Forene; Abbott) delivered in 100 per cent oxygen. Pain relief was addressed intravenously with 5 µg/kg/h fentanyl (Sintanyl; Sintetica) during surgery and prophylactic administration of antibiotics were 22 mg/kg cefazolin (Kefzol; Teva Pharma) intravenously perioperatively. On coeliotomy, the urinary bladder was fully herniated through an enlarged right inguinal canal (Fig. 4), but located outside the vaginal process, indicative for a direct inguinal hernia. The diameter of the right inguinal canal was 25 mm and the left one was 20 mm in diameter. The mesenteric lymph nodes were mildly enlarged. All other abdominal organs were normal. The urinary bladder was emptied by

cystocentesis and repositioned. Adhesions were not found, but mild circular bladder wall haemorrhage was observed (Fig. 5). The right inguinal canal was closed using two interrupted cruciate sutures of polydioxanone size 3–0 (PDS; Ethicon/Johnson & Johnson) between the rectus abdominis and internal abdominal oblique muscles. The widened left inguinal canal was also closed with an interrupted cruciate suture pattern. The inguinal canals were not totally closed but openings of about 5 mm wide were left for the neurovascular structures to run through. An incisional cystopexy was performed to attach the bladder neck to the left caudal abdominal wall using PDS 3–0. Finally, a biopsy of the mesenteric lymph nodes was performed and the abdomen was lavaged with 200 ml/kg of warm lactated Ringer's solution. The linea alba was closed with a simple continuous suture using PDS 2–0, the subcutaneous layer with simple interrupted sutures using PDS 4–0, and the skin was closed with a stapler.

Analysis of the urine sampled intra-operatively revealed a specific gravity of 1.023, a pH of 8.0, and moderate amounts of blood. Crystals were not found after sedimentation and culture revealed no bacterial

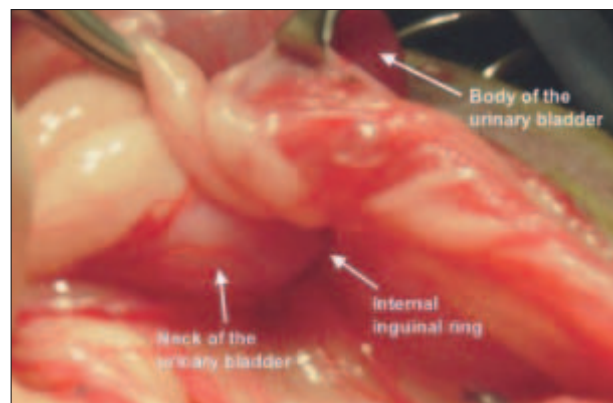


Figure 4. Intraoperative view showing the urinary bladder herniated through the inguinal ring.



Figure 5. Intraoperative view following bladder reposition (bladder wall haemorrhage is evident).

growth. Histopathology of the mesenteric lymph nodes showed follicular reactive hyperplasia. Postoperative pain medication was 0.014 mg/kg buprenorphine (Temgesic; Essex Chemie) intravenously, administered every four hours during 24 hours and prophylactic antibiotics were 22 mg/kg cephalexin (Cefacat; Biokema SA) orally, twice a day for 5 days following surgery.

One day after surgery, the cat was in a good general condition, urinating normally, and was discharged from the hospital. The cat was presented again three months later for acute pollakiuria and haematuria. Physical examination was unremarkable and abdominal radiographs confirmed a normally positioned urinary bladder. Sonographic evaluation of the abdomen revealed a thickened urinary bladder wall (maximal width 2.5 mm), and bladder sediment. The urethra was not dilated. Cystitis was suspected and the cat was treated for two weeks with oral cephalexin at the same dose as previously. The clinical signs rapidly disappeared and no further problems occurred during one year after surgery.

Discussion

This report describes a direct inguinal urinary bladder hernia in a male cat. Looking at the history before referral, the bladder spontaneously repositioned after catheterization and emptying, but was again herniated five days later. There was also a suspected previous episode of spontaneous herniation and repositioning. It appears that the inguinal canal was large enough to permit entry and exit of the bladder when empty, but leads to incarceration when the bladder is filled with urine. Adhesions would be likely found if the bladder was chronically herniated, which would then not permit a spontaneous repositioning of the bladder. The mild chronic signs could easily have been mistaken for signs of any of the more common feline lower urinary tract disorders. Haematuria was likely to have resulted from bladder wall strangulation in the hernia opening. The cause of acute vomiting and elevated body temperature, however, remains unclear.

The hernia was most likely congenital, based on the finding of bilateral enlargement of the inguinal canals, and absence of a trauma history. All of the 15 cases of feline inguinal hernias mentioned in the literature (Priester et al., 1970; Hayes, 1974) were also of congenital origin. In one of those studies (Hayes, 1974), 7 of 10 cats described were male and three were female but the number of cases does not allow any statement about gender predilection. Maybe the inguinal canal in male cats is wider due to testicular descent compared to females. This has also been suspected to be the reason for the higher incidence of congenital inguinal hernias in male dogs (Waters et al., 1993). Con-

genital inguinal hernias may spontaneously disappear in male dogs by 12 weeks of age when the relative size of the inguinal rings decreases (Fox, 1963). All of the cats described so far were domestic shorthair, except for two Siamese (Hayes, 1974) and a breed predilection in cats has never been apparent. In dogs, certain breeds have been shown to be predisposed to this defect (Hayes, 1974).

The authors are not aware of any publications providing measurements of the inguinal canal in healthy cats. The width of the inguinal canal in 10 cats that underwent a medial coeliotomy for reasons other than inguinal hernias was therefore measured and found to be approximately 5 mm in diameter, which is considerably less than the 20 and 25 mm measured in our cat. Possible contents of inguinal hernias in cats have not been reported until now. Contents of inguinal hernias in dogs have shown to include omentum, fat, ovary, uterus, small intestine, colon, bladder, and spleen (Bellenger, 1996). The omentum is reportedly the most common organ present in canine inguinal hernias (Waters et al., 1993). Herniation of the bladder was reported in one dog with acquired inguinal hernia (Bellenger, 1996). To the authors' knowledge, inguinal herniation of the urinary bladder has not been previously reported in the cat. Herniation of the urinary bladder has been described in one cat having a traumatic abdominal wall hernia (Hauptman and Hurd, 1978), and in another cat having a retroflexion of the bladder within a perineal hernia (Risselada et al., 2003).

Inguinal hernias can be closed using an abdominal or extra-abdominal approach (Smeak, 2003). Based on location of the hernia, abdominal closure of the hernia was chosen and performed using interrupted sutures (Bellenger, 1996). The fascia of the muscles that form the canal should be included in the suture. Cystopexy was performed to prevent displacement of the bladder and is part of the surgical correction of perineal hernias with bladder retroflexion (White and Herrtage, 1986; Huber et al., 1997; Maute et al., 2001; Risselada et al., 2003).

Congenital inguinal hernia with urinary bladder prolapse is a very rare disorder that should be considered in the differential diagnoses of lower urinary tract signs in cats. With an abdominal approach, the hernia can easily be located and repositioned. Partial closure of the widened inguinal canals and cystopexy should be performed to prevent the urinary bladder to herniate again.

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