**Signalment:** “Beepster” 2 years male castrated Domestic Medium Hair

**History:** Presented to primary veterinarian for lethargy, heavy breathing, and abdominal pain. Radiographs revealed ventral deviation of kidney and increased retroperitoneal opacity just caudal to the kidneys. Bloodwork showed moderate neutrophilia and marked toxic left shift. The patient was treated with Baytril, polyflex, and Vitamin B prior to referral to VMSG. The patient was outdoor primarily, and was suspected to have been attacked by another household cat 3 days prior to presentation. The patient has not been acting himself for about 2 weeks.

**Clinical Exam:** The patient was obtunded and laterally recumbent upon presentation. He was hypothermic at 99.1 °F, with a heart rate of 180 bpm, and tachypneic with a respiratory rate of 72 breaths per minute. His femoral pulses were weak bilaterally. The patient appeared painful when being picked up and had a semi-firm unilateral swelling at the right mid sublumbar region. All other physical exam findings were unremarkable.

**Initial Diagnostic Findings:**
- **Bloodwork:** revealed a severe leukocytosis with a left shift (WBC 62,900, neutrophils 35,800, bands 16,300, metamyelocytes 2516/μL, monocytes 3,100), a mild anemia (PCV 30%) with slight icterus, and a mild hypoalbuminemia (1.8). The patient was also hypotensive with NIBP of 101/48 (66) mmHg.
- **Ultrasonography** (VMSG): Large (>5 cm) complex echogenicity in the right dorsal retroperitoneal/sublumbar region extends from the caudal margin of the right kidney to the pelvic inlet. Small amount of retroperitoneal fluid adjacent to the caudal pole of the right kidney. Ultrasound guided FNA recovered small amount malodorous brown liquid consistent with pus.

**Tentative Diagnosis:** Retroperitoneal abscess secondary to cat bite or migrating foreign body

**Treatment/Management:**
**Day 1:** Beepster's hypotension resolved with fluid resuscitation on initial presentation. A brief ultrasound exam showed a cavitated lesion at the sublumbar/retroperitoneal region. FNA performed and recovered 3cc of malodorous pus. Surgical debridement of abscess was attempted with sedation but only marked cellulitis noted at the right sublumbar region. Beepster was then hospitalized overnight and placed on IV fluids, Baytril and Timentin. The fluid was submitted for bacterial culture.

**Day 2:** Hypotension recurred and Dopamine CRI (5μg/kg/min) was started. Advanced imaging was performed (listed above). A PT/PTT, blood type, and cross-match were performed. Because Beepster’s PTT was moderately prolonged (186s), he received 3 units of FFP type B. Exploratory celiotomy was performed and revealed a right retroperitoneal abscess caudal to the kidney and extending deep into the epaxial muscles. Purulent material was compartmentalized in the abscess with fibrin strands. Suction and blunt dissection used to remove necrotic tissue from the dorsal margin along the vertebrae and epaxial muscles, dorsal to the right kidney and along the body wall. A plant awn (foxtail) was found in the center of the abscess. The retroperitoneal space was then lavaged copiously and the region was packed with omentum. A JP drain was placed exiting the left ventral body wall and routine closure was performed. A urinary catheter was placed and Beepster received 1 unit of pRBC intraoperatively because he was mildly anemic.

**Post-operative Complications:**
- Beepster was persistently hypotensive intra- and post-operatively with a MAP of 60-75mmHg and he became hypoxic with a SPO2 of 93% during recovery. Therefore, Dopamine was gradually increased to 10μg/kg/min and flow-by oxygen was initiated. Beepster was maintained on 10mLs/hr of crystalloid and Hetastarch at 5mLs/hr overnight.
Day 3: The morning after surgery, Beepster became febrile (Temp105F) and active cooling was used to lower his temperature. He became mildly obtunded, laterally recumbent, and tachypneic. A grade 2/6 left parasternal murmur was auscultated and hematuria was noted. Echocardiogram and thoracic radiographs were performed and showed marked amount of pleural effusion in the right hemithorax. Thoracocentesis yielded purulent sanguineous fluid. In house cytology showed degenerative neutrophils. A thoracostomy tube was placed in the right hemithorax and Beepster was kept on 40% supplemental oxygen overnight.

Diagnostic Result & Follow-up Imaging:  
- Anaerobic & Aerobic Culture. Enterococcus spp was cultured and appeared sensitive to most commonly used antibiotics.  
- Urine culture was negative.  
- Thoracic radiographs showed marked amount of pleural effusion present on day 3 and appeared completely resolved on day 13.

Day 4-Day13: Beepster was slowly weaned off oxygen over 3 days. Pleural lavage was performed daily with sterile saline. The fluid aspirated was monitored daily cytologically for improvement. Beepster's fluid production fluctuated and finally started to improve 5 days post thoracostomy tube placement. Beepster had poor appetite throughout hospitalization and an esophageal feeding tube was placed on day 9 for supplemental feeding. Beepster had lost a total of 0.9kg (18% BW) at discharge.

Discussion:  
Migrating grass awns is a rare cause of pyothorax and internal abscessation in cats and dogs. Ingestion, rather than inhalation, is thought to occur more commonly in the cat. In Beepster’s case, a grass awn is theorized to be ingested, have traveled through the mediastinum and pleural space, and migrate to the retroperitoneal cavity along the diaphragmatic margin. The seeding of bacteria along this tract resulted in pyothorax and retroperitoneal abscessation.

Multi-cat household are 3.8 times more likely to developed pyothorax, compared to cats in a single-cat household; and interestingly, indoor/outdoor lifestyle is not thought to be a risk factor (1). This implies that inter-cat aggression/bit is more likely to result in injury to the pleural space rather than a migrating foreign body. Bacteria associated with a migrating grass awn include Streptococcus spp, Staphylococcus aureus, Pasteurella multocida, Actinomyces spp, Nocardia spp, Fusobacterium spp, and Enterococcus (2,3). Most common clinical signs include dysphagia, anorexia, pyrexia, abdominal painful, and dyspnea.

The pyothorax was not diagnosed until the day following surgical intervention for the retroperitoneal abscess. Beepster was persistently hypotensive with respiratory compromise the morning following surgery. Further investigation resulted in the diagnosis of a pyothorax. The cause of the pyothorax may have been related to FB migration, pulmonary abscessation, or less likely may have been from bacterial translocation via the communication of the thoracic pleura with the retroperitoneal space. The patient recovered with pleural fluid drainage via a chest tube, lavage treatments, and antibiotics. Beepster was discharged 13 days after presentation and the esophageal feeding tube was removed 2 weeks later.

The patient’s initial presentation was consistent with SIRS/sepsis in cats. Sepsis is the clinical syndrome caused by an infection and the host’s systemic inflammatory response to it. Sepsis had been further defined to better classify the severity; severe sepsis is sepsis complicated by dysfunction of one or more organs, and septic shock is acute circulatory failure and persistent hypotension associated with sepsis. It is advantageous to diagnosis SIRS/sepsis as soon as possible to improve patient outcomes. Brady et al proposed that cats meeting 3/4 of the following criteria should have diagnostics performed to rule out the presence of severe sepsis: temperature: >103.5 or <100°F, HR >225 or < 140bpm, RR >40, and WBC >19,500/mcL or <5,000/mcL or band neutrophils >5%. Following drainage of not only the retroperitoneal abscess but also the pyothorax Beepster started to hemodynamically improve.

In summary, retroperitoneal abscess, although rare, should be considered in febrile cats and dogs presented with either abdominal or sublumbar pain. Plant awn migration, reaction to suture material, and trauma (e.g. dog bite) are some possible causes for development of a retroperitoneal abscess (4). Reported causes of pyothorax in cat include foreign body migration, penetrating thoracic wounds, focal pulmonary abscess, and parapneumonic spread. Demetriou et al. described successful outcome in 86% of patient with pyothorax treated with surgery and medical management, involving thoracostomy tube placement, pleural lavage, and antimicrobial therapy (5). In this case report complete resolution of clinical signs was achieved with surgery to remove the source of infection (foxtail) from the retroperitoneal space and medical management involving daily pleural drainage/lavage and antibimicrobial therapy for the pyothorax.

References:  