What Is Your Diagnosis?

In cooperation with

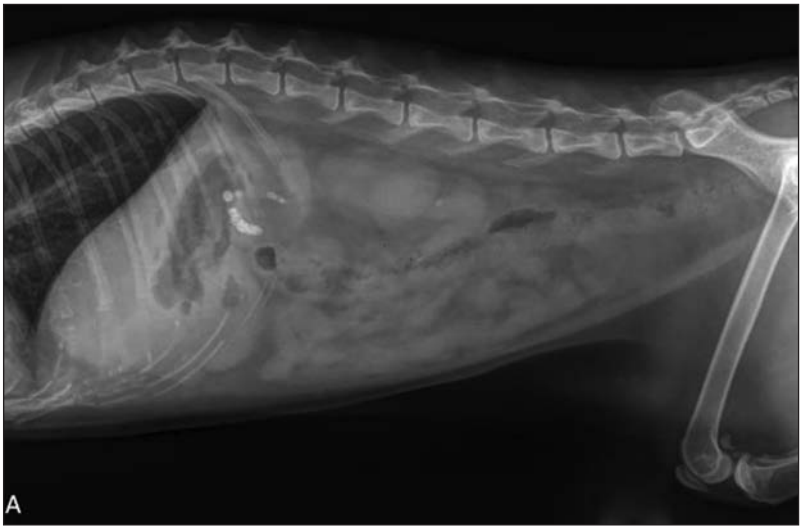

Figure 1—Right lateral (A) and ventrodorsal (B) radiographic views of the abdomen of a 14-year-old spayed female Persian cat evaluated because of anorexia, vomiting, and lethargy.

History

A 14-year-old spayed female Persian cat was referred for evaluation of lethargy, anorexia, and vomiting of 3 days' duration. The cat had a history of a chronic mild increase in serum aspartate aminotransferase activity. On physical examination, the cat was cachectic (body condition score, 1/5). A CBC revealed mild leukocytosis (28.4×10^9 leukocytes/L; reference range, 5.5×10^9 leukocytes/L to 19.5×10^9 leukocytes/L) characterized by moderate neutrophilia (27.2×10^9 neutrophils/L; reference range, 2.5×10^9 neutrophils/L to 12.5×10^9 neutrophils/L) and mild lymphopenia (0.7×10^9 lymphocytes/L; reference range, 1.5×10^9 lymphocytes/L to 7.0×10^9 lymphocytes/L). Abnormalities detected on serum biochemical analysis included mild hyperglycemia (12.9 mmol/L; reference range, 3.9 to 8.0 mmol/L), a slightly high increase in serum creatinine concentration (191 µmol/L; reference range, 50 to 177 µmol/L), mild hypokalemia (3.4 mmol/L; reference range, 3.7 to 5.8 mmol/L), and mild hypochloridemia (102 mmol/L; reference range, 109 to 130 mmol/L). Radiographs of the abdomen were obtained **(Figure 1)**.

Determine whether additional imaging studies are required, or make your diagnosis from Figure 1—then turn the page →

This report was submitted by Rhea L. Plesman, DVM, MVetSc; Alan Norris, DVM; and P. Brendon Ringwood, DVM, MS; from the Veterinary Emergency Clinic and Referral Center, 920 Yonge St, Ste 117, Toronto, ON M4W 3C7, Canada.
Address correspondence to Dr. Plesman (rplesmandvm@gmail.com).

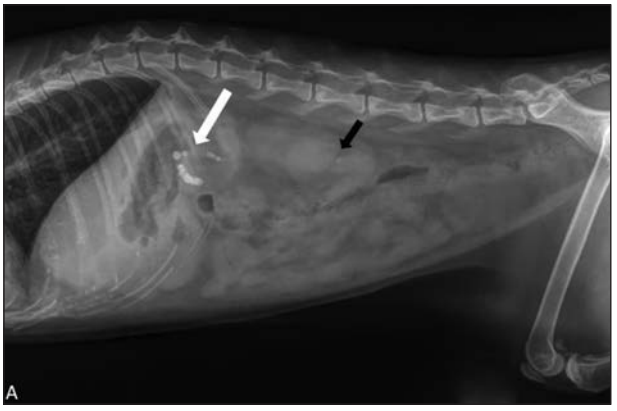

Figure 2—Same radiographic views as in Figure 1. Numerous round, smoothly marginated mineralized opacities, consistent with calculi, are located within the cranial portion of the abdomen, just right of the midline (white arrow). A smaller, smooth mineralized opacity is present within the left kidney (black arrow), and both kidneys appear slightly irregularly marginated. Radiographic findings are indicative of multiple pancreatoliths and a nephrolith.

Diagnostic Imaging Findings and Interpretation

Numerous round, smoothly marginated mineralized opacities, consistent with calculi, are located within the cranial portion of the abdomen, just right of the midline (**Figure 2**). A smaller, smooth mineralized opacity is present within the left kidney, and both kidneys appear slightly irregularly marginated. The remainder of the abdominal structures are radiographically normal. Incidentally, the cat also had evidence of a bronchial pulmonary pattern within the caudodorsal aspect of the pulmonary parenchyma. The radiographic findings were consistent with multiple pancreatoliths associated with the right lobe and body of the pancreas. The mineralized opacity present within the left kidney was consistent with a nephrolith. Incidentally, the bronchial lung pattern could be consistent with chronic bronchitis or asthma; clinically, however, the cat had no signs of respiratory disease.

The presence of multiple mineralized structures within the pancreatic duct was confirmed by means of ultrasonography. Ultrasonography also confirmed that the kidneys were irregularly marginated and that nephroliths were present in the left kidney. Initial medical treatment for the clinical signs included hospitalization and supportive care. The cat's appetite improved, and vomiting ceased after 3 days, at which time the cat was discharged from the hospital and prescribed antimicrobial treatment.

One week later, the cat was reevaluated because of vomiting, lethargy, retching, and anorexia. On physical examination, the cat was icteric. A serum biochemistry profile revealed marked hyperbilirubinemia, marked increase in alkaline phosphatase activity, and moderate increases in alanine aminotransferase and aspartate aminotransferase activities. Repeated ultrasonography revealed an enlarged gallbladder and dilation of the extrahepatic biliary (0.54 cm) and pancreatic ducts (0.43 cm). The intrahepatic bile ducts were normal in appearance. Numerous mineralized structures were observed within the pancreatic duct, with the largest measuring 0.39 × 0.89 cm. Differential diagnoses included pancreatoliths, cholangitis, and cholangiohepatitis.

Treatment and Outcome

Abdominal exploratory surgery was performed. The gallbladder was enlarged and thickened with an 8 × 8-mm firm area at the distal bile duct near the duodenal papilla. Adjacent to the bile duct, a palpable pancreatolith was present, resulting in secondary obstruction of the bile duct. Multiple pancreatoliths were present in the distended left and right pancreatic ducts. Longitudinal incisions were made in the left and right pancreatic ducts, and the pancreatoliths were removed via hydropulsion. The pancreatic ducts were closed, a cholecystoduodenostomy was performed, and a gastrostomy tube was placed. Biopsy specimens of the liver, gallbladder, middle portion of the descending duodenum, pancreas, and mass-like lesion at the duodenal papilla were submitted for histologic analysis.

The histopathologic lesions in the gallbladder were most consistent with recent ulceration of the gallbladder mucosa. The bile duct at the region of the duodenal papilla had changes compatible with ongoing inflammation or concurrent ischemic damage. These lesions were suggestive of constant mechanical abrasion and pressure necrosis from pancreatic or biliary calculi, the former being more clinically suspected. Histologic evaluation of the duodenum revealed an increase in intraepithelial lymphocytes, which can develop in aging cats. The liver was histologically normal. Unfortunately, pancreatic tissue could not be identified. The pancreatolith was a 50:50 mixture of calcium oxalate monohydrate and calcium phosphate (carbonate form). Aerobic and anaerobic microbial cultures of the pancreatoliths revealed light growth of *Pasteurella* sp and *Escherichia coli*.

Five days after surgery, the serum bilirubin concentration was lower, serum alkaline phosphatase activity was within reference range, and serum alanine aminotransferase activity was only mildly high. One month after surgery, the cat had failed to gain weight despite tolerating the gastrostomy tube feedings. Serum feline trypsin-like immunoreactivity concentration was within reference range (63.2 µg/L; reference range, 12 to 82 µg/L). A serum biochemistry panel revealed mild

hyperbilirubinemia and moderate increases in alanine aminotransferase and aspartate aminotransferase activities. Although the serum feline trypsin-like immunoreactivity concentration was within reference range, there was suspicion that pancreatic enzymes were likely not present within the gastrointestinal tract as a result of the previous secondary obstruction of the pancreatic duct and possible stricture. Thus, oral administration of pancrealipase[a] was initiated.

Two years after initial evaluation, the cat was returned for a recheck examination and was doing well. Its body weight had increased from 2.0 to 2.73 kg (4.4 to 6.0 lb). The cat was eating normally, and supplementation with pancrealipase had been continued via the gastrostomy tube. Removal of the gastrostomy tube was recommended but declined.

Comments

Radiographic analysis was useful for identification of the calculi in the cranial portion of the abdomen, just right of the midline. Given the location, pancreatoliths were one of the differential diagnoses. Ultrasonography of the abdomen was an important imaging technique to confirm that the calculi observed radiographically were within the pancreatic duct and to identify the obstruction of the duct.

Naturally occurring pancreatic stones have been reported in humans, cattle, and cats and have been experimentally induced in dogs.[1–4] In humans, pancreatoliths are associated with chronic pancreatitis, and the etiology is not completely understood.[1,2,5] In dogs, cattle, and humans, the stones are predominantly calcium carbonate.[1,3,4,6] To the authors' knowledge, there has only been 1 previous report[1] of a case of pancreatolithiasis in a cat, in which the presence of the pancreatolith was associated with concurrent evidence of chronic pancreatic changes on histologic evaluation, suggesting previous intermittent episodes of acute pancreatitis or chronic pancreatitis.

In the case described in the present report, the cat developed acute jaundice owing to a migrating pancreatolith that became lodged near the duodenal papilla. It is also possible that the obstruction was due to local inflammation. It is suspected that either the pancreatoliths were chronic, resulting in pancreatitis, or the cat had chronic pancreatitis resulting in stone formation. However, histologic evaluation of the pancreas would be needed to help resolve these questions. Overall, radiographic analysis was useful for identification of the pancreatic calculi, and ultrasonographic findings were important for identification of the obstruction of the pancreatic duct.

a. Viokase 16, Aptalis Pharma Canada Inc, Mont-Saint-Hilaire, QC, Canada.

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