



ONLINE VETERINARY CONFERENCE 2024

● **Current Approach to Examination & Interpretation
of the Feline Pancreas with Ultrasonography**

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Lecture Notes

Current Approach to Examination and Interpretation of the Feline Pancreas with Ultrasonography

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Radiography

Abdominal radiography is neither sensitive nor specific for the diagnosis of pancreatitis in cats.¹ The left limb of the pancreas can occasionally be identified on ventrodorsal radiographs in some cats with pancreatitis. However, clinical signs of gastrointestinal disease such as inappetence and vomiting, typically indicate the need for survey abdominal radiographs as a baseline diagnostic test to assess for gastrointestinal content, size of the bowel segments, foreign material, and liver and kidney abnormalities. Radiographic signs of acute pancreatitis in the cat are similar to dogs and can include peritoneal loss of detail in the cranial abdomen or a mass effect, and while both can be assessed by radiography, neither finding is specific for pancreatitis.² Endoscopic retrograde cholangiopancreatography in healthy cats has been reported as a contrast fluoroscopic technique to assess the biliary tract and the exocrine pancreas but is a technically challenging procedure requiring dedicated equipment and expertise and is not yet established as a diagnostic test in cats with suspect pancreatitis.³

Ultrasonography

Ultrasonography remains the most reported and the standard diagnostic imaging test for cats suspected of having pancreatitis and should be considered part of the minimum data base in suspected patients. Furthermore, cats with gastrointestinal signs may have comorbidities of the intestines and the liver, which can also be examined.⁴

Although high frequency transducers allow good visualization of the feline pancreas, pancreatic duct, surrounding mesentery and vasculature, they have some limitations. These include sonographer experience, lack of specificity to differentiate normal from acute or chronic pancreatitis and to differentiate hyperplasia from neoplasia when nodules or masses are detected.

Examination technique for the pancreas

A high frequency (>7.5 MHz) probe is necessary, either curved or linear array to examine the pancreas in cats. The hair of the ventral abdomen should be clipped, ideally washed with alcohol and scanned using ultrasound gel. The examination should begin by localizing the portal vein at the porta hepatis. The portal vein is then traced cranially to the caudal border of the stomach where the pancreatic body is seen ventral to the portal vein.⁵ The pancreas is isoechoic or hypoechoic compared to the surrounding mesentery and is similar to that of the liver. The left lobe is located between the caudal curvature of the stomach and the cranial border of the transverse colon and is more readily visible than the right.⁶ The pancreatic duct is usually visualized as a small hypoechoic tubular structure centrally located within the left lobe. The right pancreatic lobe is small and can be difficult to identify. It is best identified by tracing the body to the right of the portal vein and searching medial to the duodenum.

The left lobe thickness ranges from 5-9 mm while the right is 3-6 mm.⁶ The size of the pancreatic duct is 0.5-2.5 mm in diameter. The pancreatic duct diameter will increase with increasing age in healthy cats. In cats less than 10 years, the mean duct diameter is 0.8 +/- 0.25 mm and in cats greater than 10 years of age, the mean is 1.2 +/- 0.4 mm in diameter.⁷

Ultrasonographic features of Pancreatitis in cats

Acute pancreatitis in cats may have equivocal sonographic findings or resemble that of dogs, which includes enlargement, hyperechoic surrounding mesentery due to peripancreatic steatitis, fat necrosis, and focal abdominal effusion.² The sensitivity of these findings for diagnosing acute feline pancreatitis ranges from 11-67% and sensitivity is considered to be severity- and operator- dependent.² The duodenum can be distended or corrugated as well.

Agreement between pancreatic ultrasonography and feline pancreatic lipase immunoreactivity (fPLI) and DGGR lipase activity has been reported to be fair (kappa 0.264 and 0.221, respectively) in a single study with greatest agreement between the assays and hypoechoic and mixed echoic, hypoechoic, and enlarged pancreases.⁸

Ultrasonographic features of chronic pancreatitis are not well established in cats and lack the sensitivity and specificity to differentiate acute from chronic disease.^{9,10} Findings may include a hyperechoic or mixed echoic pancreas, peripancreatic fluid, a dilated common bile duct, an enlarged pancreas, and irregular margins.⁸ Due to the overlap between these features and those of acute pancreatitis, sonography is a poor diagnostic tool for chronic pancreatitis. Pancreatic neoplasms are rare in cats. Ultrasonographic findings include a pancreatic nodule or mass of variable echogenicity. The sensitivity and specificity for diagnosing pancreatic neoplasia in cats is unknown.⁶

Pancreatic nodular hyperplasia can be an incidental finding in older cats. Findings that are compatible include parenchymal nodules of up to 1 cm in diameter in addition to pancreatic enlargement. There is overlap between ultrasonographic findings in cats with pancreatitis, benign nodules, and even malignant ones and cytology or histopathology are necessary to differentiate them.⁶

Contrast-enhanced ultrasonography of the pancreas

Contrast-enhanced ultrasonography uses intravenous microbubble contrast agents to assess organ perfusion and the normal contrast-enhancement of the pancreas has been described in healthy and affected cats.^{11,12} Vascularity and blood volume were both shown to be significantly increased in a group of 25 cats with pancreatitis, 15 of which had confirmed diagnosis based on histology or cytology.¹² The affected cats had a diagnosis of either inflammatory infiltration, nodular hyperplasia, or neoplasia examined with contrast-enhanced Doppler compared with color and power Doppler techniques. Although these preliminary findings are promising, contrast-enhanced Doppler ultrasonography of the pancreas in cats has not gained wide use in veterinary medicine and is not well established as a routine diagnostic test at this time.

Computed Tomography

Recent studies have established the multiphase contrast enhanced computed tomographic features of the normal and abnormal feline pancreas.^{14,15} The pancreas in healthy cats enhances homogeneously on arterial, portal, and delayed phase scans. Pancreatic size and volume were established in the healthy cohort and no significant differences in volume and age or sex could be identified.¹⁴ The pancreas was found to be hypo- or isoattenuating to the liver and spleen on pre-contrast scans. Mean height, width, and length determined by CT were found to be similar to those obtained by ultrasonography.

In a case report of CT and radiolabeled leukocytes to detect pancreatitis in a cat, CT showed irregularity of the shape of the pancreas, enlargement, and heterogeneity.¹⁶ This cat also demonstrated delayed peak to time of contrast enhancement. In a cohort of cats with diabetes mellitus, pancreatic size, volume, and shorter peak portal enhancement were all found to be statistically different than in healthy control cats.¹⁵ However, at this time CT has not yet been established as a routine diagnostic test for feline pancreatitis.¹⁷

Magnetic Resonance Imaging

The normal pancreas in cats is T1 hyperintense and T2 isointense to hypointense. MRI features of suspected pancreatitis in 10 cats included T1 hypointensity, T2 hyperintensity of the parenchyma, enlargement, pancreatic duct dilation and contrast enhancement.¹⁸ Nine of the cats in this study had enlargement of the pancreas >1 cm, five cats had increased pancreatic duct diameters >2.5 mm, while two had peripancreatic hyperintensity. Similarly to CT, abdominal MRI has not been established as a routine diagnostic test for feline pancreatitis.

Ultrasound-guided fine needle aspiration of the feline pancreas

Ultrasound-guided fine-needle aspiration of the feline pancreas performed with a 20 or 22G hypodermic needle or spinal needle is a safe procedure in cats with pancreatitis and controls with little or no risk for complications.¹⁹ In one study, there was a 67% cytologic recovery rate of samples (24/73 samples were non diagnostic). Cytology was helpful in identifying inflammation, cysts, necrosis, hyperplasia, and neoplasia of the pancreas in some of the cats studied.

Summary

While abdominal radiography remains an important diagnostic tool for assessing feline patients with suspected pancreatitis for other differential diagnoses, ultrasonography remains the recommended primary imaging modality for feline pancreatic disease. CT and MRI are not yet established as a routine diagnostic tool for pancreatitis, both having some advantages that however do not justify the risk of anesthesia and increased cost. US-guided fine-needle aspiration of the feline pancreas is a safe procedure with complication rates similar to that following aspiration of other organs.

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