

What's Wrong with His Plumbing?

Ultrasound and the post-hepatic icteric cat.

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When faced with an icteric cat, the clinical sonographer's task is to rule out intra-hepatic and post-hepatic causes of jaundice that may require biopsy, aspirate, or surgical intervention.

The following images demonstrate different case study examples of post-hepatic pathology in clinically icteric cats.

Case 1: Katie

HISTORY: A 10-year-old female spayed domestic longhair feline presented for progressive anorexia, weight loss and vomiting over the previous 10 days.

PHYSICAL EXAM: moderate icterus, confirmed weight loss, poor body score. The CBC was normal. Blood chemistry analysis: moderate elevations in SAP, ALT, total bilirubin, mild AST elevation, and a subnormal T₄ value. Urinalysis: pH 6.5, USG 1.047, protein 2+, and bilirubin 3+, moderate bilirubin crystals.

CLINICAL DIFFERENTIAL DIAGNOSIS: Hepatic lipidosis, cholangitis, pancreatitis, hepatic or post hepatic neoplasia, biliary calculi/plug.

SONOGRAPHIC INTERPRETATION: * Image 2: Abrupt termination of a markedly dilated common bile duct. A homogeneous soft tissue mass is present. Lack of narrowing or tapering of the common bile duct prior to the obstruction supports an intraluminal location.

* Image 3: Confirmation of the intraluminal location of the mass by demonstrating focal and marked distention of the common bile duct.

SONOGRAPHIC DIFFERENTIAL DIAGNOSIS: Common bile duct mass. Marked, focal mucoid hyperplasia is considered less likely. Please note that the biliary neoplasms are commonly similar in echogenicity and echotexture to the surrounding hepatic parenchyma, making distinction between an intra and extraluminal obstructive process difficult.

SAMPLING: Exploratory surgery was performed at a referral facility with the intent of performing a bile duct deviation procedure. The liver was found to be pale, enlarged, and friable. A primary 2.5 cm, distal bile duct mass was found as well as multiple parenchymal masses ranging from 3 to 4 cm each. The hepatic metastatic lesions were not overtly visualized during the sonogram.

OUTCOME: The patient was euthanized at owner's request during the surgical procedure



➤ Which one is the gall bladder? A 6-year-old male neutered domestic shorthair cat presented for progressive anorexia with moderate elevations in SAP, ALT and total bilirubin. Note a distended viscous ventral (dorsal on the screen) to the gall bladder with suspended debris. This was surgically removed and found to be a mucocoele derived from a second gall bladder remnant. The patient thrived post surgery.

Case 2: Sergio

HISTORY: An 11-year-old male neutered Balinese cat presented for anorexia, lethargy and jaundice seven days post Bilroth I surgery for resection of a gastroduodenal granuloma.

PHYSICAL EXAM: Dehydration, mild icterus, and focal cranial abdominal pain. The CBC and blood chemistry analysis showed moderate leukocytosis with a left shift, moderate total bilirubin and ALT elevations with slight elevations in SAP and cholesterol. A recent urinalysis had not been performed.

CLINICAL DIFFERENTIAL DIAGNOSIS: Post operative complications due to intestinal dehiscence, post-hepatic obstruction, pancreatitis, GI ulceration, neoplasia.

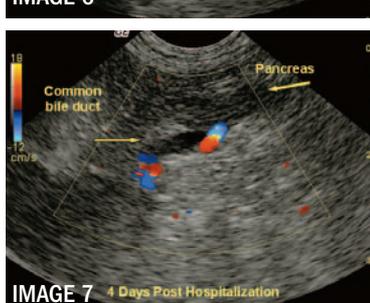
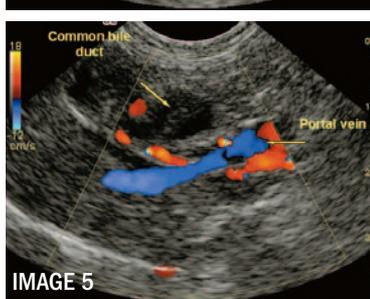
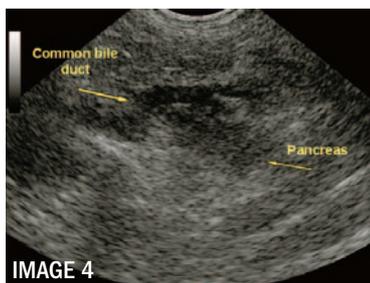
SONOGRAPHIC INTERPRETATION: * Image 4: demonstrates generalized pancreatic enlargement with a markedly hypoechoic parenchyma. The bordering mesenteric and omental fat are markedly echogenic.

* Image 5: A dilated and tortuous common bile duct is visible within the near field, at the level of the portal hilus. Color flow Doppler reveals normal blood flow within the portal vein and adjacent portal hilar vascular structures.

Suboptimal resolution of the common bile duct is commonly inevitable in cases of pancreatitis, due to attenuation by the overlying, inflamed soft tissues. * Image 6: A mild gallbladder and moderate cystic and proximal common bile duct distention. The omental and mesenteric fat adjacent to the distal portion of the dilated common bile duct in the region of the hilus is moderately echogenic.

* Image 7: Four days post treatment presentation moderate resolution of the pancreatic and peripancreatic inflammation with minor residual common bile duct dilation.

SONOGRAPHIC DIFFERENTIAL DIAGNOSIS: Severe pancre-



Causes of Icterus in the Cat

Pre-hepatic	Hemolytic disease
Intra-hepatic	Lipidosis, cholangitis, cholangiohepatitis, neoplasia, FIP
Post-hepatic	Pancreatitis, biliary plug/calculi, neoplasia, mucocele, duodenal pathology, post surgical adhesions, parasitic migration.

atitis and peripancreatic inflammation and moderate, diffuse common bile duct dilation. Common bile duct dilation could be the result of partial obstruction and/or referred inflammation secondary to the pancreatic pathology.

SAMPLING: Sampling at the time of surgery revealed concurrent eosinophilic pyogranulomatous chronic active pancreatitis along with similar cell type found in the gastro duodenal non neoplastic "mass."

COMMENTS: The patient was focally painful when imaging the pancreatic region shown in the first image. The bilirubin and ALT values diminished to slightly above normal after four days of medical treatment without the use of steroids (Image 7). Pain was not present during imaging at the follow-up sonogram, having responded to medical management. The patient's hepatic values normalized after six days of hospitalization and parenteral antibiotics. Relapses of a palpable gastric enlargement that occasionally recur clinically respond to outpatient azithromycin therapy.

Case 3: Missy

HISTORY: A 14-year-old female spayed DSH presented for lethargy and vomiting.

PHYSICAL EXAM: Icterus, dehydration and emaciation with thickened bowel loops and irregularly shaped kidneys on palpation.

The CBC revealed only elevated absolute monocytes while blood chemistry results revealed a marked elevation in ALT, lipase and total bilirubin, moderate azotemia, hyperglycemia and subnormal T₄. Urinalysis revealed 3+ bilirubinuria, spec gravity 1.032, cocci bacteria. **CLINICAL DIFFERENTIAL DIAGNOSIS:** Cholangitis/primary hepatic disease, pancreatitis with extrahepatic biliary obstruction, neoplasia, primary bile duct obstruction, IBD, infectious disease.

SONOGRAPHIC INTERPRETATION: * Image 8: An irregularly shaped, discretely marginated, hypoechoic mass with evidence of septation is visible within the pancreas.

SONOGRAPHIC DIFFERENTIAL DIAGNOSIS: Pancreatic mass compatible with neoplasia such as adenocarcinoma.

SAMPLING: 22- and 25-gauge US-guided FNA revealed pancreatic carcinoma with moderate chronic active inflammation.

COMMENTS: The patient was euthanized due to poor response to therapy.

These case studies represent an exemplary case format to be found in the upcoming textbook, "Clinical Approach to Veterinary Sonographic Pathology; Small Animal and Exotics," Lindquist, Yanik and Frank, offered by SonoPath.com. ●

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