Ultrasound Imaging of the Hepatobiliary System and Pancreas

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KEYWORDS

• Liver • Gallbladder • Bile duct • Pancreas • Obstruction • Neoplasia • Mucocele • Pancreatitis

KEY POINTS

- The normal and abnormal appearance of the liver is variable and subjective. Interpretation should take into consideration all aspects of the case, using cytology/histopathology for the final diagnosis when appropriate.
- Ultrasound assessment of the biliary system is extremely useful for the diagnosis of obstruction and inflammation.
- The canine pancreas is not a well-visualized organ. Anatomy and adjacent landmarks should be used to find the pancreatic area to search for pancreatic disease.
- The ultrasound appearance of pancreatitis, pancreatic abscess, pancreatic neoplasia, and pseudocyst can all appear similar.

Video content accompanies this article at http://www.vetsmall.theclinics.com/

INTRODUCTION

Ultrasonography is a valuable noninvasive imaging modality for the evaluation of hepatic and biliary disease. Indications for hepatic ultrasound include hepatomegaly, cranial abdominal masses, icterus, ascites, detection of portosystemic shunts, and search for metastases. Ultrasound is commonly used to guide needle placement for fine-needle aspiration and true-cut biopsy.

Normal Ultrasound Appearance of the Liver

The liver is a coarse, moderately echogenic organ located between the diaphragm cranially and stomach and right kidney caudally (**Fig. 1**A, B). The hepatic echogenicity is similar to the cranial pole of the right kidney (can be slightly more or less echogenic)

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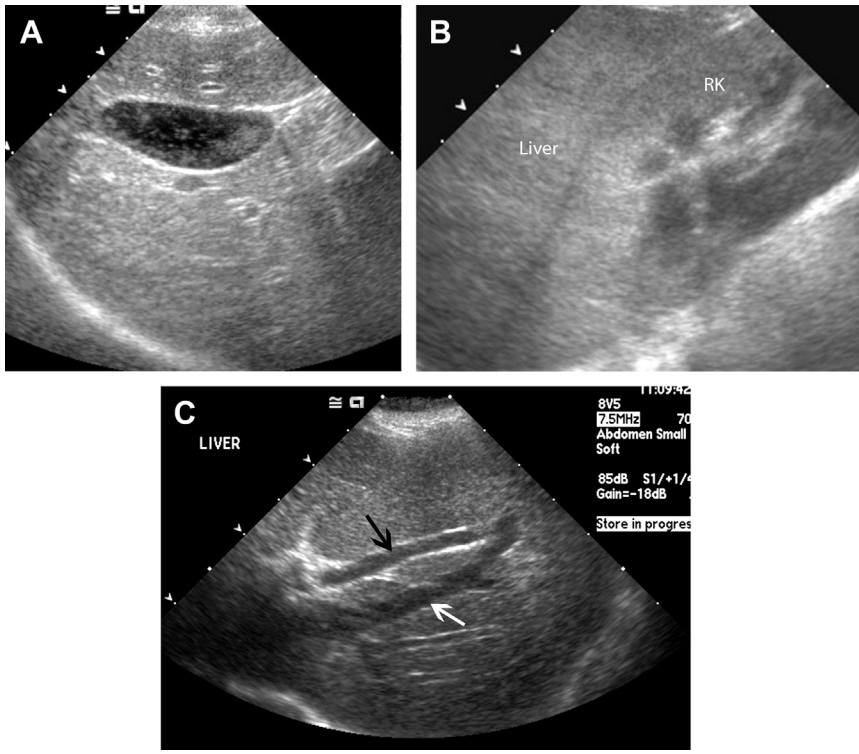

Fig. 1. (*A*) Longitudinal image of the normal right portion of the liver. The parenchyma is coarsely echogenic and broken up only by vessels and gallbladder. (*B*) Cranial pole of the right kidney (RK) is noted in the renal fossa of the caudate liver lobe. The echogenicities of the right renal cortex and liver parenchyma are very similar. (*C*) Transverse image of the left liver. The left portal vein (*black arrow*) extends toward the hepatic periphery. The left hepatic vein (*white arrow*) is located more dorsally.

and hypoechoic to the spleen. Normal cats can deposit large amounts of fat in the renal cortex, which can result in an apparent hypoechoic liver.[1] Alternatively, obese cats can have a moderately hyperechoic liver without pathologic hepatic lipidosis.[2–4] Because assessment of echogenicity is highly subjective, mild changes should be considered with caution, and correlated with serum chemistries, signalment, and clinical signs.

Hepatic size is also a subjective assessment. With microhepatia, the gallbladder may appear large relative to hepatic volume, and cranial displacement of the stomach limits the imaging window. An enlarged liver may extend well beyond the rib cage, often with rounded margins. Hepatic and portal veins course through the hepatic parenchyma; portal veins are characterized by their more echogenic margins, with color Doppler flow toward the hepatic periphery (potentially toward the transducer). Hepatic veins (less echogenic margins) extend toward the hilus and caudal vena cava (usually away from the transducer) (**Fig. 1**C). The caudal vena cava travels through the dorsal aspect of liver, with the portal vein located immediately ventral. At the hepatic hilus, the portal vein branches into a larger left and smaller right branch.