ULTRASOUND DIAGNOSIS

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History

A thirteen-year-old, spayed female, Shih-tzu dog was presented at the Chulalongkorn University, Small Animal, Veterinary Teaching Hospital for an evaluation of a progressive abdominal enlargement with an increasing liver enzyme for more than a year. The dog had recently showed clinical signs of polyuria, polydipsia and polyphagia. Physical examination revealed pink mucous membranes and a pendulous abdomen without pain on palpation. A routine blood work, urinalysis and radiographic examination were performed. Abnormal clinical values included elevation of serum ALT (225 IU) and ALP (1,431 IU). Survey abdominal radiographs demonstrated hepatomegaly. Ultrasonography of the liver and adrenal glands was performed to obtain more specific information.

Ultrasonographic Findings

Sagittal and transverse scans of the liver showed enlargement with rounding of the caudoventral edge. The overall liver was isoechoic to the spleen and hyperechoic to the kidneys and falciform fat (Fig. 1A and 2A). The echogenic portal vein margin appeared less prominent compared with the hepatic parenchyma. There were multifocal, hypoechoic, circumscribed, 3-25 mm in diameter scattered throughout the liver. The right and left adrenal glands measured 5 and 7 mm in thickness, respectively. The upper normal limit of the left adrenal size together with the clinical findings and laboratory work-up in this dog were consistent with a hyperadrenocorticism. Ultrasonography of other abdominal organs appeared normal in echotexture. A fine needle aspirate was taken and a cellular diagnosis of hydropic and fatty degeneration-related steroid hepatopathy was suggested.

Diagnosis

Ultrasonographic diagnosis —A steroid hepatopathy.

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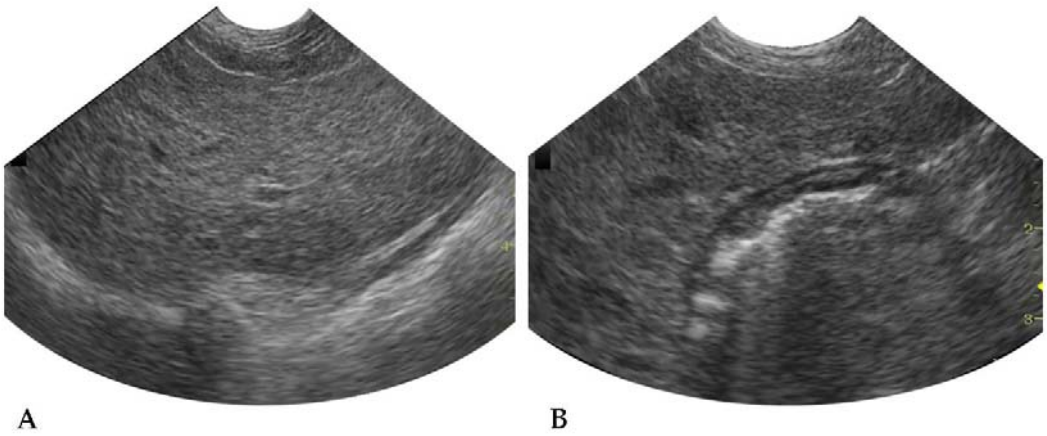

Figure 1 Ultrasonographic images of a thirteen-year-old, spayed female, Shih-tzu dog, in dorsal recumbency. The increased echogenicity of overall liver was hyperechoic to the falciform fat. The echogenic portal vein wall was less prominent due to the relative increase in hepatic parenchymal echogenicity. Multifocal hypoechoic nodules of variable size were diffuse throughout the liver.

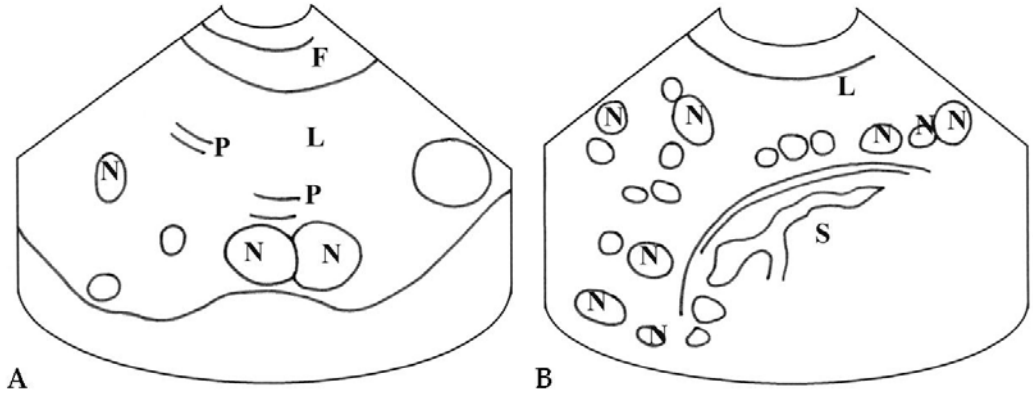

Figure 2 Schematics of the relative positions of the structures scanned in figure 1. L: liver, F: falciform fat, P: portal vein, N: nodule, S: stomach.

Comments

Ultrasonography is a valuable method for evaluating the hepatic parenchymal abnormalities in animals. Diffuse disorders are more difficult to detect than focal processes because they cause less distortion of normal hepatic architectural landmarks. The ultrasonographic evaluation of liver size is usually based on subjective assessment. Hepatomegaly is generally easier to image, has a large volume between the diaphragm and stomach, extends ventrally to the stomach and has rounding of the ventrocaudal margin. Hepatic lipidosis, steroid hepatopathy, lymphosarcoma and hepatitis are more common in a hepatomegaly (d' Anjou, 2008).

Diffuse parenchymal hepatic disease appears ultrasonographically as a change in overall hepatic echogenicity. It can be increased, reduced or unaffected. At the same scanning depth and instrument gain settings, echogenicity of liver is considered increased if the echogenicity of the hepatic parenchyma is greater or similar to the spleen and greater than the renal cortex and falciform fat. The margins of portal veins may be less prominent owing to increased hepatic echogenicity. Diseases that commonly cause an increase in hepatic echogenicity include fatty change, steroid hepatopathy and cirrhosis (Biller et al., 1992). Fatty infiltration of the liver may cause a fine, diffusely increased echogenicity and hepatomegaly. Steroid hepatopathy can cause both hepatomegaly and diffusely increased echogenicity in the liver. These changes have been noted with both hyperadrenocorticism and iatrogenic Cushing's disease.

Limitations of ultrasonography include lack of specificity for focal or multifocal hepatic lesions and insensitivity for diffuse disease. A more definite diagnosis is usually based on information obtained from the history, clinical signs, physical examination, laboratory data, ultrasonography and cytological or histopathological results.

References

Biller D.S., Kantrowitz B. and Miyabayashi T. 1992. Ultrasonography of diffuse liver disease: A review. J Vet Int Med. 6(2): 71-76.

d' Anjou, M.A. 2008. Liver In: Atlas of Small Animal Ultrasonography. D. Pennink and M.A. d' Anjou (eds.) Ames: Blackwell Publishing. 244-261.