

# ULTRASOUND DIAGNOSIS

**Phiwipha Kamonrat\***

## History

An eight-year-old, female, domestic, short-haired cat was referred to Chulalongkorn University, Small Animal, Veterinary Teaching Hospital for ultrasound diagnosis of a chronic liver problem. The cat was anorectic and had been vomiting for three months. At the start, serum Alanine Aminotransferase (ALT) was very high (946 IU/L) and the platelet count was very low (153,000 platelets/ $\mu$ l). After treatment for the blood parasite, *Haemobartonella felis*, the ALT and platelet count distinctly changed and returned to the normal level of 70 IU/L and 272,000 platelets/ $\mu$ l, respectively. However, the cat remained depressed, vomiting, with weight loss, leukocytosis ( $2.14 \times 10^4$  white blood cells/ $\mu$ l, 85% neutrophils, 1% band cells, 1% eosinophils, 12% lymphocytes, 1% monocytes) and anemia ( $4.80 \times 10^6$  red blood cells/ $\mu$ l, 7.4 g/dl hemoglobin, and 28% hematocrit). The blood morphology showed anisocytosis and poikilocytosis. Total and direct bilirubin were also elevated (16.3 and 8.9 mg%, respectively). A physical examination revealed icteric mucous membranes, cachexia

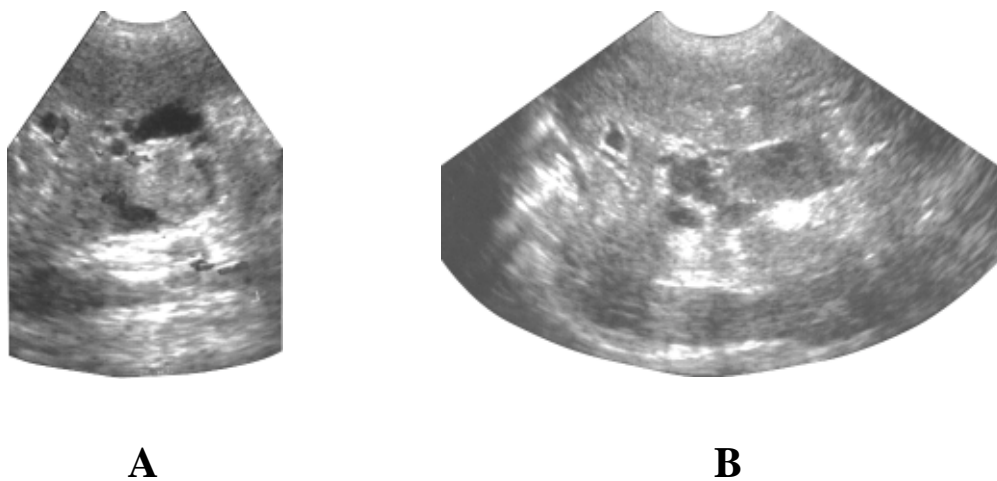
and dehydration. Abdominal radiographs were within a normal limits with no evidence of hepatic abnormality.

## Ultrasonographic Findings

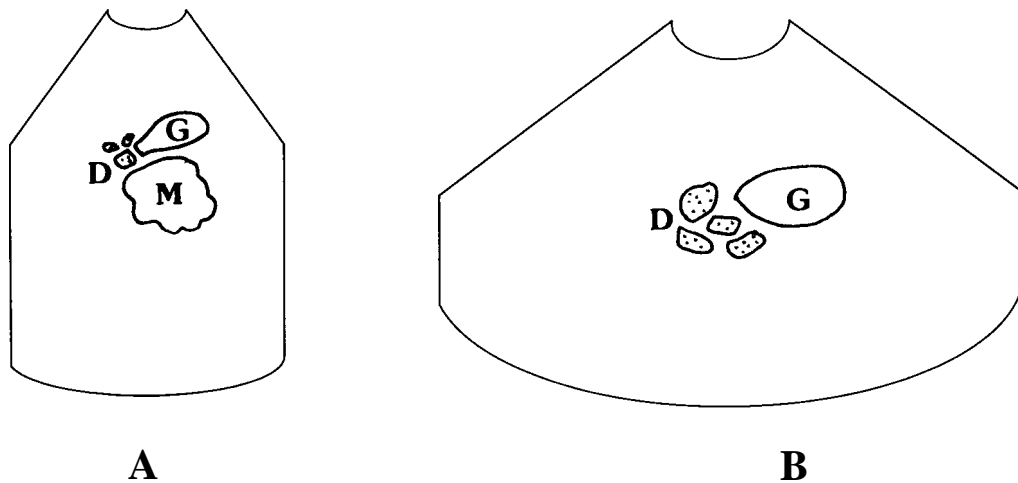
Transabdominal ultrasonography examination was performed using a real-time scanner with an 8-5 MHz broadband, convex, phased array transducer. Three, hypoechoic, masses, 1-3 cm in diameter, were detected in the right and left hepatic lobes. Another mass, 1.5 cm in diameter, was found adjacent to gall bladder neck (Figures 1A and 2A). This mass had an irregular margin and appeared more echogenic than the other hepatic lesions. This may be the result of an acoustic enhancement artifact, normally presented distal to the anechoic gall bladder, superimposed on the mass. The anechoic gall bladder was distended and a large number of dilated, extrahepatic, biliary ducts were seen near the neck of the gall bladder (Figures 1B and 2B). These ducts showed no sign of blood flow with Doppler mode of ultrasonography. Other abdominal organs appeared normal.

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\*Department of Surgery, Faculty of Veterinary Science, Chulalongkorn University, Bangkok 10330 Thailand



**Figure 1** Ultrasonographic images of the liver, of an eight-year-old, domestic short-haired cat, in dorsal recumbency. A. A 1.5 cm, hyperechoic mass, with an irregular margin, was demonstrated adjacent to the gall bladder neck. B. A large number of dilated, extrahepatic, biliary ducts were seen near the gall bladder neck.



**Figure 2** Schematics of the relative positions of the structures scanned in figure 1. M -a hyperechoic mass; G -a gall bladder; D -a large number of dilated, extrahepatic, biliary ducts.

## Diagnosis

Ultrasonographic diagnosis — A dilation of extrahepatic biliary ducts.

## Comments

Ultrasonography is a valuable method for distinguishing biliary obstruction from hepatocellular disease in icteric animals when the clinical or biochemical findings are not distinctly different. The early indications of obstruction are marked gall bladder distention and common bile duct enlargement, followed by dilation of the extrahepatic duct (Nyland and Gillett, 1982). The common bile duct is best seen ventral to the portal vein in a right, transverse, intercostal view. Its diameter in normal cats is 4 mm or less. The extrahepatic, biliary ducts are more easily visualized in normal cats than in dogs (Leveille et al., 1996). After biliary obstruction, the dilated, extrahepatic ducts may appear as a cluster of

anechoic structures near the gall bladder neck. The wall of dilated ducts is echogenic, similar to that of portal veins, but they can be differentiated from portal veins by the use of Doppler ultrasonography.

The liver, biliary tract, pancreas, gastrointestinal tract and lymph nodes at the porta hepatis should be examined to determine the cause of biliary obstruction. The dilation of the extrahepatic bile duct, presented in this cat, may be caused by a mechanical obstruction caused by the adjacent mass found in the liver and the bile duct.

## References

- Leveille R., Biller D.S. and Shiroma J.T. 1996. Sonographic evaluation of the common bile duct in cats. J. Vet. Intern. Med. 10:296-299.
- Nyland T.G. and Gillett N.A. 1982. Sonographic evaluation of experimental bile duct ligation in the dog. Vet. Radiol. 23:252-260.