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ULTRASOUND DIAGNOSIS

Phiwipha Kamonrat

History

A thirteen-year-old, intact-male, Fox Terrier dog was presented at the Chulalongkorn University, Small Animal, Veterinary Teaching Hospital following an acute vomiting and depression. One and a half years ago, the dog had a routine health check and ultrasonographic findings revealed a mild hyperplasia of left adrenal gland, a hepatic cyst, hepatic and splenic nodules, and a benign prostatic hyperplasia. Physical examination revealed pink mucous membranes, normal heart and lung sound and a slightly tense abdomen on palpation. Hematological and serum biochemical profiles indicated a leukopenia (3,850 white blood cells/ μ l, 62% neutrophils, 4% eosinophils, 30% lymphocytes and 3% monocytes) and elevated alkaline phosphatase (ALP) (168 IU/Ls). Blood parasite was not found. Survey radiographic examination of thorax and abdomen were performed. The heart and lung fields were within a normal limits. The detected abnormalities included a splenomegaly and a prostatomegaly. An abdominal ultrasonography was performed to obtain more specific information.

Ultrasonographic Findings

Real-time, ultrasonographic images were obtained using an 8 MHz microconvex, phased array transducer with the dog in dorsal recumbency. There was a distinct mass, measuring 2.3 x 4.6 cm in diameter, located craniomedial to the left kidney, in the normal region of the left adrenal gland. This mass was heterogeneously hypoechoic to surrounding fat, with irregular margins (Fig 1 and 2). A moderately echogenic structure, measuring approximately 1 x 4 cm in diameter, was present within the lumen of the adjacent caudal vena cava, consistent with thrombosis. This thrombosis caused a partial obstruction of the caudal vena cava, which was confirmed with use of color Doppler imaging, showing turbulent flow surrounding the intraluminal filling defect created by the thrombus. The normal appearance of the left adrenal gland was not evident in the normal location. The right adrenal gland was within normal limits for echotexture, shape and size, which was 6.5 mm in diameter at the caudal pole. The splenic parenchyma appeared normally hyperechoic, relative to hepatic and renal tissue, compared at approximately the same depth. There were unremarkable changes of the hepatic cyst, hepatic and splenic nodules, and benign prostatic hyperplasia, as previously diagnosed on the first ultrasound examination.

Ultrasonographic Diagnosis

Left adrenal mass with caudal vena cava thrombosis

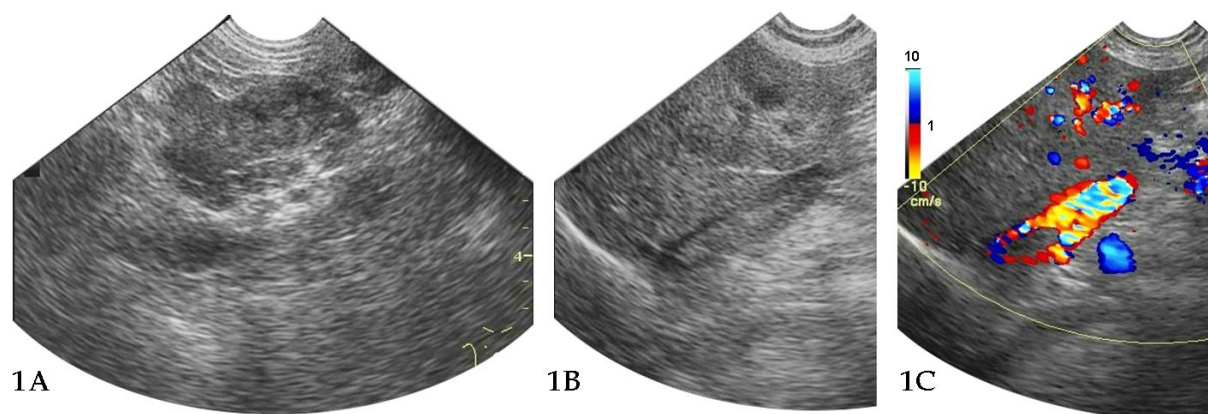


Figure 1 Ultrasonographic images of the left adrenal gland (A) and caudal vena cava (B and C) of a thirteen-year-old, intact male, Fox Terrier dog in dorsal recumbency. A. The left adrenal gland appeared as a large hypoechoic mass with irregular margins. B. A hypoechoic thrombus was present within the lumen of the caudal vena cava. C. Color Doppler sonogram showed turbulent caudal vena cava flow surrounding the intraluminal filling defect created by the thrombus.

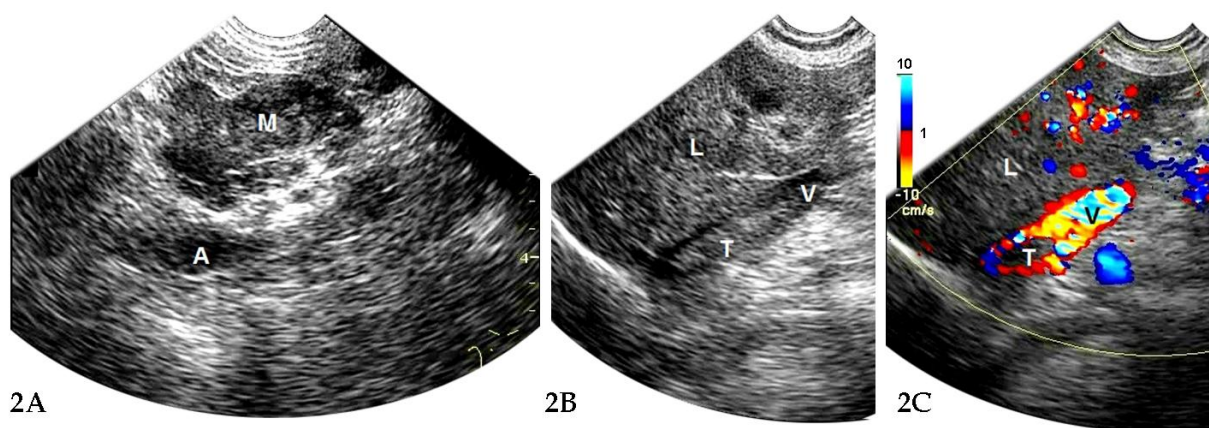


Figure 2 Schematics of the relative positions of the structures scanned in figure 1. M: left adrenal mass, A: abdominal aorta, L: liver, V: caudal vena cava, T: thrombus.

Comments

Adrenal ultrasonography is a non-invasive and sensitive method used to determine location and extension of adrenal masses (Besso et al., 1997). However, it is not specific for differentiating the mass type, which includes hyperplasia, primary adrenal tumors (cortical adenoma, cortical adenocarcinoma and pheochromocytoma) and secondary metastasis to the adrenals. A malignant tumor is more likely amorphous or irregularly shaped, exceeds 4 cm in diameter and infiltrates local vessels, including the caudal vena cava, renal veins, adrenal veins and phrenicoabdominal vessels, and adjacent tissues such as the ipsilateral kidney, epaxial musculature and lumbar spine (Bouayad et al., 1987). Thrombi within the vessels can be diagnosed on a B-mode ultrasound examination, which usually produce increased intraluminal echogenicity. A color Doppler evaluation is helpful for assessment of the degree of vascular obstruction by identification of turbulent flow surrounding the intraluminal filling defect created by the thrombus. Vascular extension or the presence of a venous thrombus next to an adrenal mass is highly suggestive of a malignancy. In this dog, a malignancy

of the left adrenal mass was confirmed by a CT scan performed 8 months later. The lesion appeared as a large, heterogeneously enhanced, irregularly marginated, soft tissue mass, that invaded the adjacent caudal vena cava and extended into the left lumbar spinal musculature.

References

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- Bouayad H, Feeney DA, Caywood DD and Hayden DW 1987. Pheochromocytoma in dogs: 13 cases (1980-1985). *J Am Vet Med Assoc*. 191: 1610-1615.