ULTRASOUND DIAGNOSIS

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History

A twelve-year-old, intact female, Golden Retriever dog was presented at the Chulalongkorn University, Small Animal Teaching Hospital following the recent onset of a mild depression. The dog was otherwise clinically normal. A physical examination revealed pink mucous membranes. A firm mass was palpated in the left mid abdomen. Hematological examination showed a mild leukocytosis (20,200 white blood cells/µl, 78% neutrophils, 7% band cells, 5% eosinophil, 7% lymphocytes and 3% monocytes). The result of a biochemical examination showed normal ranges. No blood parasite was found. Survey radiographs of the thorax and abdomen revealed normal heart and lung. A discrete, circular, approximately 6 cm lesion with soft tissue opacity was found in the left mid quadrant of the abdominal cavity, just craniomedial to the left kidney. Most of bowel loops were displaced to the right abdomen. Ultrasonography of the mass lesion and the entire abdomen was performed.

Ultrasonographic Findings

Real-time, ultrasonographic images were obtained using an 8 MHz microconvex, phased array transducer with the dog in dorsal recumbency. A mid soft-tissue mass seen on radiographs was ultrasonographically well-defined, heteroechoic, solid, 4.9 by 6.7 cm in diameter, with a slightly irregular margin (Figure 1A and 2A). It contained amorphous calcification, as seen as hyperechoic foci, 3-6 mm in diameter, with distal acoustic shadowing, (Figure 1B and 2B). This mass located dorsal to the spleen and craniomedial to the left kidney and appeared hyperechoic to the adjacent renal cortex. There was no evidence of adjacent vascular invasion. The left kidney was still normal in echotexture, with a good corticomedullary definition. There were multifocal, hypoechoic, circumscribed nodules, 0.2-2.2 cm in diameter, diffused in the splenic tail. Ultrasonography of other abdominal organs including the right adrenal, right kidney, urinary bladder and abdominal lymph nodes appeared normal in echotexture.

Diagnosis

Ultrasonographic diagnosis —
An adrenal solid mass (adrenocortical adenoma).

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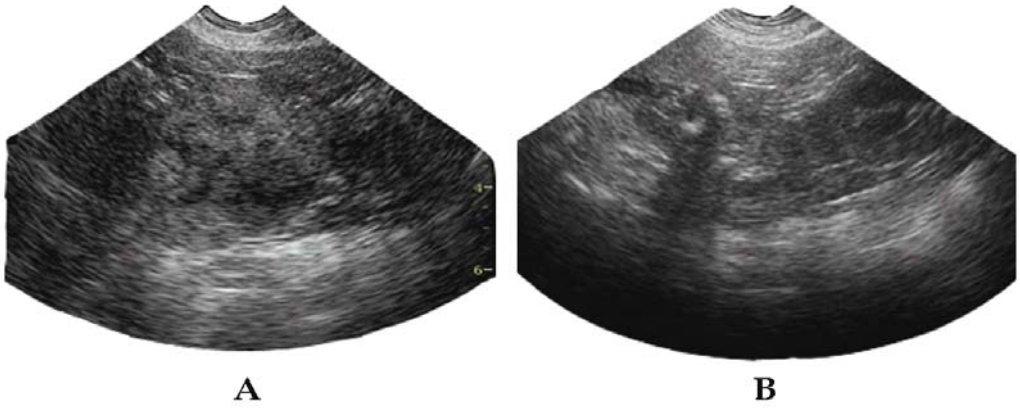

Figure 1 Ultrasonographic images of the left mid abdominal mass, of a twelve-year-old, intact female, Golden Retriever dog in dorsal recumbency. This mass was well-defined and heterogeneously solid (A). It located dorsal to the spleen and craniomedial to the left kidney and appeared hyperechoic to the adjacent renal cortex (B). Note the hyperechoic foci with distal acoustic shadowing, suggestive of calcification of this mass.

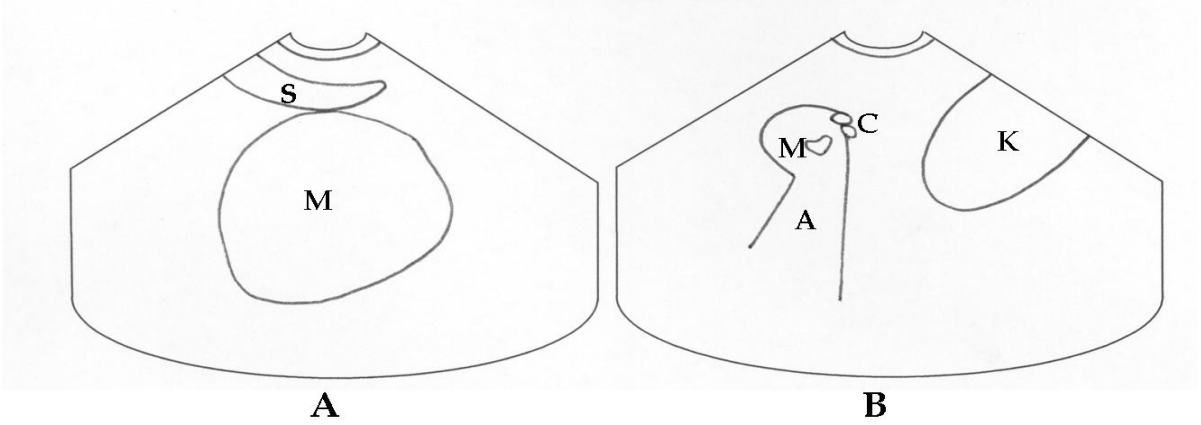

Figure 2 Schematics of the relative positions of the structures scanned in figure 1. S: spleen; M: adrenal mass; C: calcification; A: distal acoustic shadowing; K: left kidney.

Comments

Round masses found cranial to the kidneys may be caused by adrenal or lymph node diseases. In this dog, a large mass, without vascular invasion, had replaced the left adrenal gland, as confirmed during surgery. After surgical removal, this mass was histopathologically diagnosed as an adrenocortical adenoma.

The ultrasonographic appearance of enlarged adrenal glands may be useful to differentiate adrenocortical tumors from pituitary-dependent hyperadrenocorticism, although with some limitations. A nodule of mass causing unilateral enlargement, with the short-axis diameter exceeds 2 cm and without vascular invasion, is usually seen in adrenocortical tumors (Besso et al., 1997). If the mass is amorphous or irregularly shaped and diameter exceeds 4 cm, malignant tumor is more likely. Ultrasonographic appearance of adrenal tumors are varied from solid to complex. The existence of hyperechoic foci with distal acoustic shadowing, representing mineralization, within an adrenal mass is highly suggestive of an adrenocortical tumor, which is more typical of the malignancy (Graham, 2008). Adjacent tissues and structures, abdominal lymph nodes, and other organs should be ultrasonographically evaluated for locally invasion or metastasis to help differentiate benign from malignant tumors.

The differential diagnosis for adrenal masses includes hyperplasia, primary adrenal tumors (cortical adenoma, cortical adenocarcinoma and pheochromocytoma) and secondary metastasis to the adrenals. A definitive differentiation of these lesions cannot be made using ultrasound alone since their ultrasonographic features are not specific. Moreover, ultrasound-guided fine-needle aspiration or tissue-core biopsy may not be able to give a final cytological diagnosis of these lesions. However, adrenal ultrasonography is a non-invasive and sensitive method used to determine location and extension of adrenal tumors (Besso et al., 1997).

References

Besso, J.G., Penninck, D.G. and Gliatto, J.H. 1997. Retrospective ultrasonographic evaluation of adrenal lesions in 26 dogs. Vet. Radiol. Ultrasound. 38(6): 448-455.

Graham, J. 2008. Adrenal glands. In: Atlas of Small Animal Ultrasonography. 1st ed. D.G. Penninck and M.A. Anjou (eds.) Ames: Blackwell Publishing. 385-396.