

Ultrasound Diagnosis

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History

A thirteen-year-old, male, Cairn Terrier dog was referred to the Chulalongkorn University, Small Animal, Veterinary Teaching Hospital with a one-year duration of intermittent vomiting. The dog had also been treated for heart problem. At the time of presentation, the dog had clinical signs of a depression, decreased appetite and regurgitation right after food. Physical examination revealed pink mucous membranes, heart murmur and crackle lung sounds. The results of haematological and serum biochemical analyses were within normal limits with the exception of a mild elevation of serum alkaline phosphatase (190 units). Plain thoracic radiography showed a mild cardiomegaly and a discrete mass, about 5x7 cm in diameter, of soft tissue opacity, located in the mid-caudal thorax. The mid thoracic esophagus was dilated with gas content just cranial to the mass. Endoscopic examination of the upper gastrointestinal tract was further obtained to exclude esophageal mass. A caudal segment of the thoracic esophagus was deviated and narrow, probably because of compression by an adjacent mass. These findings suggested the possibility of an extramural mass of esophagus or mass of caudal mediastinum or accessory lung lobe. An ultrasonography was performed to differentiate the echo-characteristic and origin of the mass.

Ultrasonographic Findings

Real-time, ultrasonographic images were obtained using an 8 MHz microconvex, phased array transducer. The dog was scanned in dorsal recumbency using intercostal and subcostal approaches of the caudal thorax and cranial abdomen. With a subcostal approach using liver as an acoustic window, a heterogeneously hypoechoic mass, measured 5x9x8 cm, was detected adjacent to aerated lung of accessory lobe, close to the esophagus (Figures 1 and 2). The diaphragm appeared as a hyperechoic line separating hypoechoic mass from the liver. Gliding sign of lung motion independent of the mass was absent, confirming the mass location of lung rather than mediastinum or esophagus. This mass was well-defined and slightly irregular margined. A region of intense hyperechogenicity of comet-tail artifacts was seen in the far field, radiating from the interface between the mass and the normally aerated lung. There was no evidence of free fluid surround the mass or within the thoracic cavity.

Diagnosis

Ultrasonographic diagnosis – A pulmonary mass.

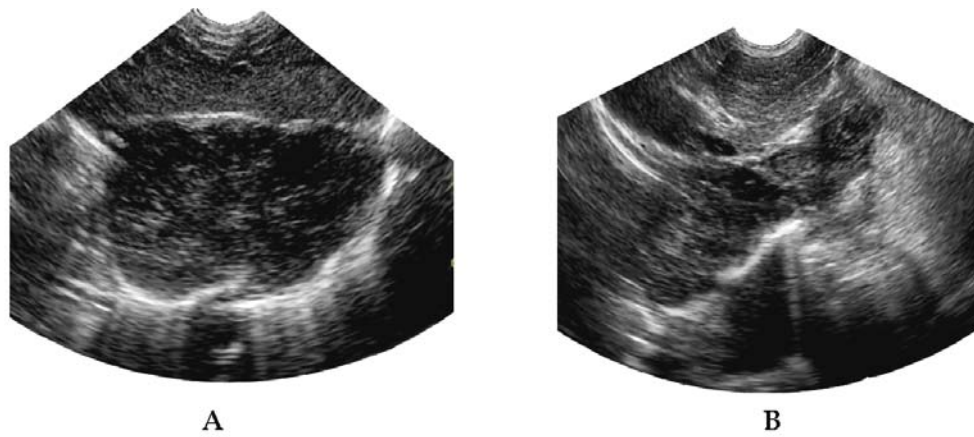


Figure 1. Transverse (A) and sagittal (B) ultrasonograms of the caudal thoracic cavity of a thirteen-year-old, male, Cairn Terrier dog. A subcostal approach with use of the liver as an acoustic window showing a heterogeneously hypoechoic pulmonary mass. The mass was slightly irregular margined distally and demonstrated comet-tail artifacts in the far field, radiating from the interface between the mass and the normally aerated lung.

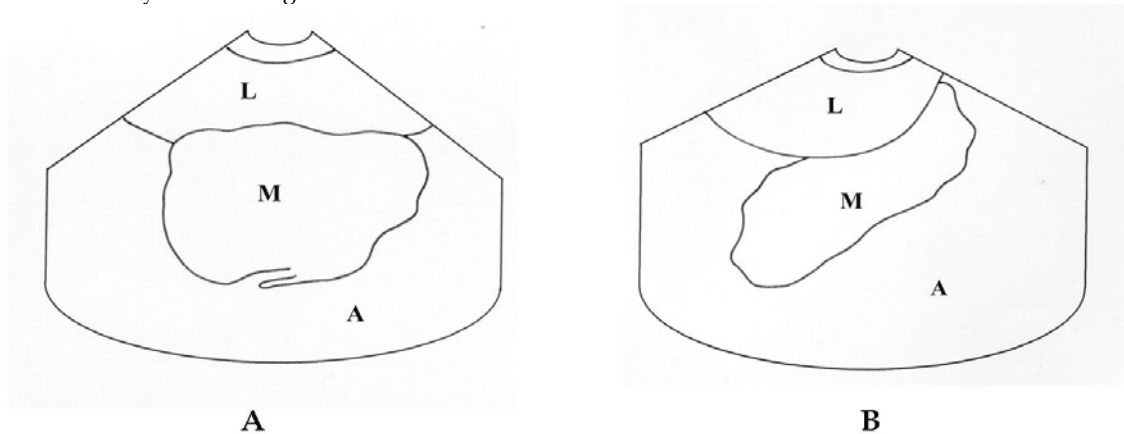


Figure 2. Schematics of the relative positions of the structures scanned in Figure 1. L: liver, M: mass, A: aerated lung

Comments

Ultrasound examination has limited use within the lung because the total inhibition of transmission of ultrasound beam through air prevents evaluation of lesions surrounded by aerated lung. It is generally used to detect pulmonary pathology located peripherally, with little or no air between the lesion and the thoracic wall. The location or type of disease found on thoracic radiographs usually guides the appropriate site to begin the ultrasonographic examination, using parasternal, intercostal or subcostal approaches. In this case, the lesion located in the accessory lung lobe, made it difficult to be imaged through an intercostal window because of aerated lung between the transducer and the mass. The only way to image this lesion is a subcostal approach with use of the liver as an acoustic window into the thorax.

Only the visceral pleural surface of normal lung can be ultrasonographically imaged. It appears as a hyperechoic smooth line that represents the pleural lung interface. Reverberation artifacts created at the surface of normally aerated lung are seen as a series of parallel hyperechoic lines (Mattoon and Nyland, 2002). Sonographic appearances of pulmonary lesions vary. The majority of pulmonary

masses in dogs and cats are neoplastic and appear solid, homogeneous and hypoechoic relative to adjacent aerated lung (Reichle and Wisner, 2000). The deep border of the neoplasm is smooth and regular, whereas most cases of non-neoplastic pulmonary consolidation show irregular borders. When the deep margins of the lesions are irregular, comet-tail artifacts will be seen radiating from these irregularities. The heterogeneous lung lesion with irregular margin, as presented in this dog is associated with either inflammatory disease or neoplasia. An ultrasound-guided, tissue core biopsy of the mass, while being minimally invasive with rare complication, should be obtained for a histopathological examination to make a definitive diagnosis.

References

- Reichle, J.K. and Wisner, E.R. 2000. Non-cardiac thoracic ultrasound in 75 feline and canine patients. *Vet. Radiol. Ultrasound* 41(2): 154-162.
- Mattoon, J.S. and Nyland, T.G. 2002. Thorax. In: *Small Animal Diagnostic Ultrasound*. 2nd ed. T.G. Nyland and J.S. Mattoon (eds.) Philadelphia: W.B. Saunders Company. 325-353.