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Ultrasound Diagnosis

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ULTRASOUND DIAGNOSIS

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History

A five-year-old, intact male, Jack Russel dog was presented at the Chulalongkorn University, Small Animal, Veterinary Teaching Hospital because of the acute persistent vomiting and less appetite. The dog was otherwise clinically normal. A physical examination revealed pink mucous membranes and about 7% dehydration. There was no evidence of an abdominal cramp. Haematological and biochemical profiles showed normal ranges. No blood parasite was found. Abdominal radiographs revealed a discrete, rectangular, approximately 1.5 by 3 cm foreign material with soft tissue opacity was found within the pylorus. There was also an increase of soft tissue opacity in the left caudal quadrant of the abdominal cavity, just cranial to the feces-distended colon. After defecation, abdominal ultrasonography was performed to differentiate the gastrointestinal lesions.

Ultrasonographic Findings

Real-time, ultrasonographic images were obtained using an 8 MHz microconvex, phased array transducer with the dog in dorsal recumbency. Two structures were found in the gastrointestinal lumen. One presented within the lumen of the stomach was 1.5 by 3 cm in diameter and oval in shape with a smooth surface (Figure 1A and 2A). Another one presented within the segment of the descending colon was rounder with an irregular surface and 2 by 3.5 cm in diameter (Figure 1B and 2B). They appeared as poorly echogenic structures, with capsule-like hyperechoic lines and bright curved interface in the near field, associated with moderate acoustic shadowing. These structures were surrounded by a small amount of gas and luminal content. The gastric and colonic walls adjacent to these structures could be fully evaluated only in the near field. These findings were highly suggestive of foreign bodies. Ultrasonography of other abdominal organs including the rest of the gastrointestinal tract appeared normal in echotexture.

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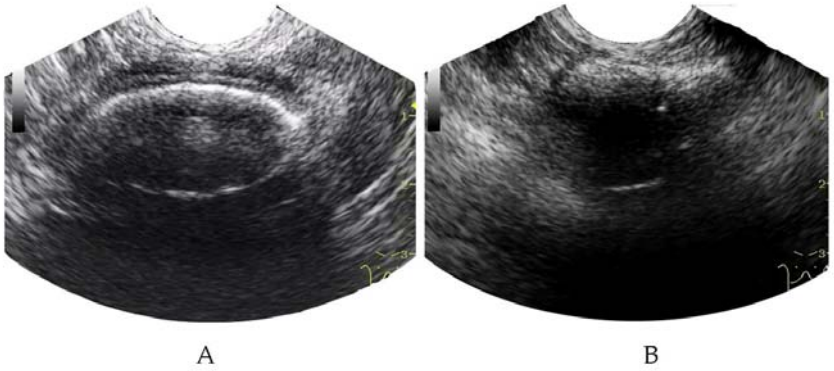

Figure 1 Ultrasonographic images of the gastrointestinal segment of a five-year-old, intact male, Jack Russel dog in dorsal recumbency. Two poorly echogenic structures appeared as bright curvilinear interface in the near field, associated with moderate acoustic shadowing were found in the lumen of the stomach (A) and the descending colon (B).

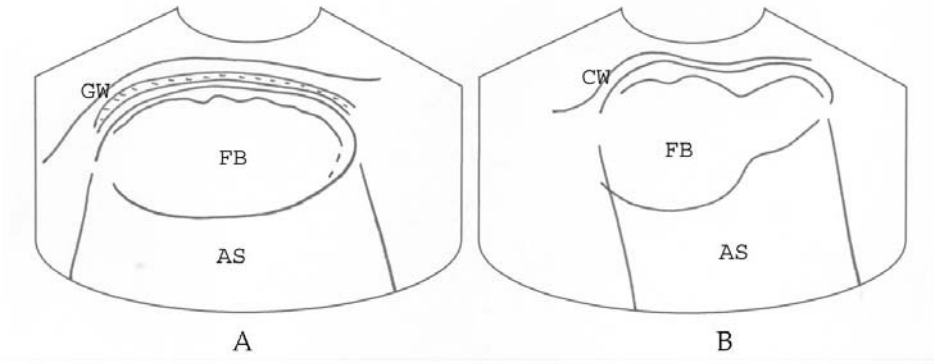

Figure 2 Schematics of the relative positions of the structures scanned in figure 1. FB –foreign body, AC –acoustic shadowing; GW –gastric wall; CW –colonic wall.

Diagnosis

Ultrasonographic diagnosis – Gastrointestinal foreign bodies (two pieces of rubber toys).

Comments

Ultrasonographic and radiographic studies compliment each other to confirm the presence and location of foreign body within the gastrointestinal tract. Due to the presence of intraluminal gas, a foreign body can easily be missed on an ultrasound alone. Ultrasonography has aided in the identification of a number of different types of foreign bodies within stomach and intestine. They have variable ultrasonographic appearances depending on size, shape and physical property of the materials and the degree to which they attenuate or transmit the ultrasound beam (Tidwell and Penninck, 1992). Those objects that transmit the sound beam are more accurately represented by their ultrasonographic images while those attenuate the sound beam produce the acoustic shadow beyond their bright initial interface, which may prevent full visualization of the object surface in the far field. A bright interface associated with strong shadowing is considered highly suggestive of a foreign body. However, intraluminal gas in a gastrointestinal tract can create a similar image that may mimic a foreign body. The acoustic shadow produced by a soft tissue-bone or soft tissue-foreign body interface is "clean", whereas the shadow produced by a soft tissue-gas interface is "dirty" from the reverberation artifacts occuring within the shadow (Laing, 1983).

A foreign object in the stomach may increase or decrease peristalsis. A gastrointestinal object can be more difficult to identify in the absence of intraluminal fluid. The identification of stomach or part of the intestinal tract distension with fluid or gas may signify mechanical obstruction. When present, a foreign material that may be causing the obstruction should be carefully searched. Some specific foreign bodies, such as balls, are easily identified by ultrasound because of their recognizable shape and characteristic bright curvilinear interface, associated with strong, uniform and "clean" acoustic shadowing. String foreign objects often present as bright linear interfaces with acoustic shadowing and associated with bowel wall thickening and plication (Penninck, 2009).

References

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