Ultrasonography of the Feline Abdomen: A Focus on Gastrointestinal Diseases

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While radiography remains to 1st line diagnostic imaging modality of choice when evaluating patients with gastrointestinal disease, it is limited by superimposition of abdominal organs, and limited contrast resolution. Abdominal ultrasonography offers cross-sectional imaging in an infinitely variable number of planes with contrast resolution that allows for distinction between intestinal layers, specific intestinal segments, and separation of soft tissue and fluid structures.

Ultrasonography is useful in the evaluation of all abdominal organs, and can offer significant insight into the underlying etiology of gastrointestinal diseases.

Objectives

- 1. Briefly review ultrasonographic anatomy of the gastrointestinal tract
- 2. Develop a systematic review process for the evaluation of the gastrointestinal tract
- 3. Recognize the ultrasonographically visible intestinal layers
- 4. Understand the value in assessing intestinal layering for alteration or complete absence

Key points

- 1. Understanding gastrointestinal anatomy is necessary for localization of disease to the specific intestinal segment
- 2. A systematic review of the gastrointestinal tract based on anatomy is necessary for thorough investigation
- 3. Intestinal layers are present in each gastrointestinal segment, although alterations in thickness of each layer are present dependent on location
- 4. Alterations in intestinal wall layering, including increased the dorsal echogenicity, muscularis layer thickening, and complete loss of layering are helpful in generating differential diagnoses

Ultrasonography of the feline gastrointestinal tract has been described and normal anatomy, including the thickness of each gastrointestinal segment, has been reported. Within each gastrointestinal segment, layering is present, with all segments showing alternating hyper and hypoechoic regions that correspond to serosa, muscularis, submucosa and mucosa. These 4 layers are accompanied by a 5th, sonographically recognize layer that represents the luminal interface with the mucosal surface.

In dogs, there have been multiple studies investigating the association of intestinal wall thickening and loss of intestinal layering with gastrointestinal neoplasia. This strong correlation of thickening and loss of intestinal layering with neoplasia is also true in cats, although there are other, less common underlying etiologies for intestinal loss of layering, including ulceration, infarction, pythium and feline gastrointestinal eosinophilic sclerosing fibroplasia. In some cases of thickening secondary to neoplasia, intestinal layering is merely altered, with the layers becoming thick and ill-defined.

In addition, many diseases cause an alteration in the normal wall layering, though it may remain present. Specifically, a relationship between muscularis layer thickening and gastrointestinal lymphoma has been established. Other differentials for this relationship include inflammatory bowel disease and chronic hypermotility. An recent report describes a linear, well-defined hyperechoic region oriented parallel to the mucosal interface suggestive of fibrosis, and also correlated with inflammatory bowel disease in some cases.

Conclusion

Ultrasonography provides improved contrast resolution, allowing for the evaluation of intestinal layers and the detection of intestinal wall thickening. These distinctions are more difficult to make with routine radiography without using positive contrast media. Even with the use of positive contrast media, superimposition of soft tissue structures as well as the presence of peritoneal effusion or lack of peritoneal fat can make radiographic interpretation difficult. Abdominal radiography and abdominal ultrasonography using combination provides the greatest amount of information, and may be most useful in the evaluation of the vomiting, and inappetent, or lethargic patient with evidence of weight loss. In addition, ultrasound affords an opportunity to acquire fine-needle aspirates, as most findings remain nonspecific and require cytologic confirmation.

Disadvantages of abdominal ultrasonography include expense, and significant operator variability.

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