

Intraoperative Ultrasound for Precise Biopsy and Resection of Transabdominally Detected Intestinal Lesions in 3 Cats.

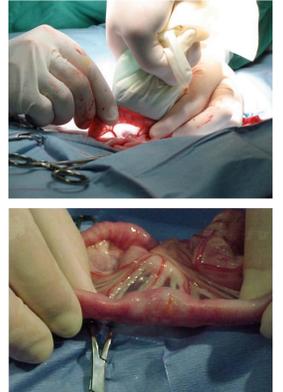
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The purpose of this study was to preliminarily evaluate the utility of intra-operative ultrasound to enhance the sonographer/surgeon symbiotic precision in obtaining representative histopathology that corresponds with the transabdominal sonographic findings.

Material and Methods: We performed intra-operative intestinal sonograms on 3 different feline patients that demonstrated focal loss of mural intestinal detail across the submucosal layer of the small intestine during their transabdominal sonograms. These lesions were localized with a 12 MHz linear probe and surgically resected in each patient. Random samples were subsequently obtained in areas selected by the surgeon and were more sonographically consistent with simple inflammatory bowel disease, without loss of mural detail, and regions that maintained well-defined curvilinear wall layering during intra-operative sonographic examination. Sterile technique was utilized by means of a double layered surgical glove partially filled with acoustic gel. The intestinal tissue was bathed in physiologic solution during the procedure to maintain acoustic coupling while the surgeon extended portions of the intestine to be imaged intra-operatively. When the precise lesions with loss of mural detail were identified, the intestinal pathology was surgically resected and placed in separate formalin jars.



Intra-operative Ultrasound & Surgeon's Macroscopic Perspective of the Intestinal Presentation.

Results:

CASE 1—"Buddy": 16YR MN DSH	CASE 2—"Tigger": 14 YR FS DSH	CASE 3—"JJ": 15YR MN DSH
<p>Case 1, Image 1: Transabdominal Sonogram</p>	<p>Case 2, Image 1: Transabdominal Sonogram</p>	<p>Case 3, Image 1: Transabdominal Sonogram</p>
<p>Case 1, Image 2: Intra-operative Sonogram, Sonographer's Bx. Target</p>	<p>Case 2, Image 2: Intra-operative Sonogram, Sonographer's Bx. Target</p>	<p>Case 3, Image 2: Intra-operative Sonogram, Sonographer's Bx. Target</p>
<p>Case 1, Image 3: Intra-operative Sonogram, Surgeon's Bx. Target</p>	<p>Case 2, Image 3: Intra-operative Sonogram, Surgeon's Bx. Target</p>	<p>Case 3, Image 3: Intra-operative Sonogram, Surgeon's Bx. Target</p>

DISCUSSION CASE 1:

Intra-operative sonographic assessment of the transabdominally detected intestinal lesion allowed for differentiation between intestine affected by lymphoplasmacytic gastroenteritis (surgeon choice, Image 3) and that affected by intestinal lymphoma (sonographer choice, Image 2). The loss of mural detail noted by the sonographer was the target to be relied upon for selecting the tissue for biopsy. No appreciable differences were present and visible macroscopically between the two samples at surgery and complicated by peristalsis and intestinal contraction as a response to tissue handling.

DISCUSSION CASE 2:

Intra-operative sonographic assessment allowed for differentiation between a less definitive diagnosis of "mucosal lymphocytic infiltrative disease" and "intestinal lymphoma" in this cat.

The definitive factor that led the pathologist to diagnose lymphoma on the sonographer-selected sample were the "islands of lymphoid clusters" that crossed the layers of the intestine involving mucosae, submucosae and muscularis in the sonographer-selected sample (Image 2). This finding was not present in the random surgeon-selected sample (Image 3). These changes of "lymphoid islands" were visible sonographically manifested by the loss of mural detail in the tissue selected for biopsy by the sonographer (Images 1 & 2). This presentation was focal and localized to this portion of intestine.

DISCUSSION CASE 3:

Simple mixed inflammation and mural enteritis was present in the random surgeon-selected and sample (Image 3). However, the sonographer intraoperatively located the focally thickened portion of intestine (Image 2) that was seen transabdominally (Image 1) which resulted in a diagnosis of "severe pyogranulomatous inflammation suspect for feline infectious peritonitis with ulceration". Macroscopic changes were minimally different at surgery. Some local serosal inflammation was macroscopically visible to the surgeon when examining the sonographer selected portion on intestine.

Histopathology Results:

- 16YR MN DSH: Surgeon selected sample (stomach and small intestine): Mild chronic lymphoplasmacytic gastroenteritis. Focal lesion identified with intra-operative ultrasound (ileum): Low grade lymphosarcoma.
- 14YR FS DSH: Surgeon selected sample (jejunum): mucosal lymphocytic infiltrative disease. Focal lesion identified with intra-operative ultrasound (jejunum): Low-grade lymphosarcoma with lymphoid clusters observed in submucosa and muscularis. Muscular hypertrophy.
- 15YR MN DSH: Surgeon selected sample (small intestine): mild mixed inflammation and mural enteritis. Focal lesion identified with intra-operative ultrasound (small intestine): Severe, segmental pyogranulomatous mural enteritis with focal ulceration. Suspect for feline infectious peritonitis.

Conclusion: In this pilot study population of 3 cats, it was found that intra-operative ultrasound may be utilized to identify transabdominally detected focal lesions and delineate the extent for resection at laparotomy when serosal pathology is not evident to serve as a landmark for the surgeon. These findings merit a more thorough study with a larger study population to detect the usefulness of intra-operative ultrasound.