

Endoscopy

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In the last 20 years, endoscopy has become a routine component of veterinary internal medicine. Endoscopes allow for minimally invasive visualization of body cavities and even more importantly provide a means by which biopsies can be obtained. There are also an increasing number of therapeutic applications for endoscopy such as PEG tube placement and endoscopic-assisted gastropexy. Rhinoscopy, pharyngoscopy, esophagoscopy, gastroduodenoscopy, colonoscopy, and cystoscopy are routine in our practice. In the diagnostic work-up of diseases for which each of these procedures may be indicated, there are other tests that should often precede endoscopy. Such testing should be determined by the specific details of each case. This lecture will discuss some of the testing that can be done at your practice before referral for endoscopy. I will also discuss the utility of endoscopy by providing examples of unique cases. Management of a few common diseases for which endoscopy is performed will also be discussed.

My medicine ideology...

...as explained by Kent Allen (equine DVM, lameness guru): **“Without a diagnosis, surgery is trauma and medicine is poison...”**

...as explained by Chris Berman (ESPN commentator): “That’s why they play the game.”

Vomiting versus regurgitation versus coughing with a terminal retch:

Vomiting: premonition, abdominal contractions, act of vomiting is not silent, contains yellow gastric fluid, variable temporal relationship to eating. Vomiting arises from the stomach. Vomiting may be due to metabolic diseases, gastric disease, small intestinal disease, or pancreatic disease.

Regurgitation: no premonition, it is often silent (owners may have never witnessed an episode or don’t wake up for it), fluid is commonly stringy and is usually clear but when frothy it appears to be white, ingesta appears undigested, most commonly occurs shortly after eating. Regurgitation arises from the esophagus.

Coughing with a terminal retch: the “vomiting” is always preceded by coughing, owners often confuse this with “trying to cough something up” out of the stomach. Coughing with a terminal retch is due to tracheal and/or bronchial disease.

Regurgitation:

Etiologies: esophagitis (D > C, may accompany or follow vomiting), esophageal stricture (D after foreign body, C after doxycycline, both after anesthesia), foreign body (D, C), neoplasm (D, C), myasthenia gravis (D, C?), hypoadrenocorticism (D > C), idiopathic megaesophagus (D, C?), hiatal hernia (D > C), Botulism (D > C), vascular ring anomaly (puppy), peripheral neuropathies?, hypothyroidism?, SLE?, lead toxicosis?.

Testing to consider before scoping: Thoracic radiographs, ACTH stimulation test, acetylcholine receptor antibody titer, thyroid panel (at least T4 and TSH). Contrast esophagrams can be performed but are generally not recommended because of the risk of aspiration in patients that are frequently regurgitating. In patients with esophageal disease, esophagoscopy is generally a safer procedure than a positive-contrast esophagram.

Therapeutic trials: H₂-antagonists (famotidine, ranitidine), proton-pump inhibitors, sucralfate slurry, and upright feeding (*Bailey chair*) to try to avoid aspiration pneumonia. Prokinetics can be tried if a physical obstruction has been ruled-out.

Chronic vomiting (when CBC and chemistry panel are unremarkable)

Etiologies: Inflammatory bowel disease of stomach or small intestine (D, C), neoplasia of stomach or small intestine (D, C), Helicobacter gastritis (D, C), parasitism (D, C), nonobstructive or only partially obstructive foreign body (D, C), pancreatitis (D, C), pancreatic neoplasia (D, C), hypoadrenocorticism (D > C), gastrinoma (D > C), hiatal hernia (D > C), intussusceptions (D > C), motility disorders (gastric atony, GI myopathy, dysautonomia).

Testing to consider before scoping: CBC, chemistry panel, urinalysis, fecal exam, abdominal radiographs, abdominal ultrasound, ACTH stimulation test, +/- PLI, +/- thoracic radiographs, +/- T4 (cats). Urease breath tests and fecal tests for Helicobacter have not performed well in dogs and cats and are not helpful in diagnosing Helicobacter gastritis.

Therapeutic trials: H₂-antagonists, hypoallergenic (hydrolyzed-protein) diet, pyrantel, +/- fenbendazole.

Chronic diarrhea: small intestinal versus large intestinal

Characteristics of small intestinal diarrhea: normal to increased volume, very malodorous, two to four bowel movements per day, may be accompanied by decreased appetite, vomiting, weight loss, panhypoproteinemia, or ascites.

Characteristics of large intestinal diarrhea: decreased volume, increased frequency, tenesmus, urgency, hematochezia, mucus, normal chemistry panel.

Chronic small intestinal diarrhea

Etiologies: Inflammatory bowel disease [IBD] (D, C), small cell lymphoma (C>D), lymphangiectasia (D>C), parasitism (D>C), exocrine pancreatic insufficiency (D>C), hypoadrenocorticism (D>C), small intestinal bacterial overgrowth [SIBO] (D, C), infectious (Histoplasma, Giardia, Prototheca, others). IBD is most commonly characterized by lymphoplasmacytic inflammation but other forms exist (granulomatous, eosinophilic) and treatment differs for these conditions. SIBO is rarely a primary disease. It usually resolves on its own when the primary disease is treated. In the rare cases when SIBO occurs alone it is referred to as antibiotic-responsive diarrhea.

Testing to consider before scoping: Minimum data base (CBC, chemistry panel, urinalysis), fecal exam, Giardia and Crypto ELISAs, folate & cobalamin levels, TLI (particularly if it is a young dog or diabetic cat), ACTH stimulation test (particularly if young to middle aged dog), infectious disease screening (younger animals), abdominal ultrasound, +/- thoracic radiographs.

Therapeutic trials: hypoallergenic diet, ultra-low-fat diet, Probiotics, fenbendazole (5 to 7 days), cobalamin, +/- metronidazole. Cobalamin may be low in many small intestinal diseases and is an indicator of small intestinal bacterial overgrowth. Cobalamin deficiency does not cause small intestinal disease or SIBO and cobalamin supplementation will not affect small intestinal disease or SIBO. Cobalamin deficiency may contribute to lack of general well-being, decreased immune-function, and anemia of chronic disease; supplementation may improve these conditions.

The cat dilemma: small cell lymphoma versus lymphoplasmacytic(LP) inflammatory bowel disease(IBD).

These two diseases seem to represent more of a continuum than a dichotomy. There is marked inter-pathologist variation in criteria for malignancy. Additional testing (immunohistochemistry, PCR for clonality, flow cytometry) can be done to help make these diagnoses more dichotomous. One study showed that full thickness biopsies were superior endoscopic biopsies (J Am Vet Med Assoc. 2006 Nov 1;229(9):1447-50) for diagnosing small cell lymphoma in cats. This study did not utilize immunohistochemistry, PCR for clonality, or flow cytometry. Furthermore, this observed difference may be more or less significant with different pathologists. Does it matter if we make this differentiation between small cell lymphoma and LP IBD? Absolutely, the treatment for the two diseases is not the same. Small cell lymphoma is very effectively treated with chlorambucil and prednisone; the doses are not tapered unless problems are encountered. LP IBD is treated with steroids and diet initially. The steroids should be tapered to the minimum effective dose (try to use budesonide instead of prednisone then taper the budesonide). Additional immunosuppressive medications (chlorambucil or cyclosporine) can be added if the steroids cannot be tapered. Chlorambucil is a very safe drug but it is

chemotherapy; it is hard to justify using this medication at a chemotherapeutic dose without a histological diagnosis of lymphoma; conversely, it would be a shame to treat a patient as if it had IBD when in fact it has lymphoma and not provide the most effective treatment possible. Histopathology solves this dilemma.

Chronic large intestinal diarrhea

Etiologies: Inflammatory bowel disease (D, C), neoplasia (D, C), parasitism (D > C), *Tritrichomonas foetus* (C), *Clostridium* (D), *Campylobacter* (D), *Salmonella* (C > D), Histoplasmosis (D), Histiocytic colitis (Boxer dogs), fiber-responsive diarrhea (D, rare).

Testing to consider before scoping: fecal exam, Giardia and Crypto ELISAs, fecal cytology, *Tritrichomonas* culture or PCR, +/- abdominal ultrasound, +/- Idexx PCR panels for diarrhea.

Therapeutic trials: hypoallergenic diet, fiber supplementation, fenbendazole, metronidazole

Chronic nasal disease (nasal discharge, sneezing, reverse sneezing, stertorous breathing)

Etiologies: Foreign body (D > C), neoplasia (D, C), aspergillosis (D), cryptococcosis (C), lymphoplasmacytic rhinitis (D, C), eosinophilic rhinitis (D > C), nasal mites (D), polyps, (C > D), Herpes virus (C). A primary bacterial etiology is very rare, secondary bacterial infections are very common; *Bordetella*, *Mycoplasma*, and *Pasteurella* are rare exceptions; nearly all bacterial infections will resolve when the primary disease is treated; nearly all bacterial infections will recur if the primary disease is not treated.

Testing to consider before scoping: Skull radiographs are generally unrewarding, dental radiographs can be helpful if there is reason to suspect tooth root abscess, cross-sectional imaging (MRI or CT) is the best option, cultures are not very helpful (they show secondary infections, not the primary etiology), thoracic radiographs, *Cryptococcus* Ag titer (very good sensitivity, excellent specificity), *Aspergillus* Ab AGID (lacks sensitivity and specificity).

Therapeutic trials: Antihistamines (not usually helpful), +/- ivermectin (or Revolution) if reverse sneezing primary complaint.

Urinary incontinence

Etiologies: Urinary tract infection (urethritis), idiopathic / hormone-responsive incontinence, ectopic ureters, prostatic disease, urethral (or trigonal neoplasia), lower-motor-neuron disease, pelvic bladder?.

Testing to consider before scoping: urinalysis, urine culture, work-up for polyuria if urine is dilute (polyuria commonly exacerbates otherwise mild incontinence), abdominal radiographs, +/- abdominal ultrasound.

Therapeutic trials: +/- diethylstilbestrol (DES) and/or phenylpropanolamine (PPA). Even some dogs with ectopic ureters will respond to these medications if the ectopic ureter enters urethra near cranial urethra. But in a young dog it is important to ask if it is worth it to give life-long meds if there is a surgery that could fix the problem.

Chronic coughing (or coughing with a terminal retch)

Etiologies: collapsing airways, sterile / allergic / immune-mediated / steroid-responsive tracheobronchitis, infectious tracheobronchitis, heartworm disease, lung worms, eosinophilic infiltrates, pulmonary fibrosis, neoplasia, left atrial enlargement causing mainstem bronchi compression, foreign body.

Testing to consider before scoping: thoracic radiographs, heartworm test, Baermann fecal exam for lungworms, pro-BNP.

Therapeutic trials: fenbendazole, enalapril and/or furosemide (if there is left atrial enlargement) +/- doxycycline.