

Managing Diseases of the Large Intestines

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Large intestinal disease is common in veterinary medicine and often times associated with dramatic clinical signs that result in emergency room visitation. Understanding management of acute and chronic large intestinal disease can be helpful to minimize recurrence in those patients that have recurrent signs.

Diagnosis

Differentiation of large bowel diarrhea from small bowel diarrhea is critical. Below is a table illustrating the differences.

Small bowel	Large bowel
Minimal to no urgency	Commonly associated with urgency
No evidence of tenesmus	Tenesmus is common
Hemorrhagic stools uncommon	Hematochezia is common
Often watery, large volume	Often small volumes
No evidence of mucus	Frequently associated with mucus
May have concurrent vomiting	Less commonly vomiting is observed (usually event associated, cats>dogs)
Often associated with inappetence	Less commonly associated with inappetence
Weight loss may be present	Weight loss is rarely present

It is important to note that grey zones exist when characterizing the type of diarrhea with some patients exhibiting mixed bowel signs (concurrent small and large bowel). Additionally, it should be noted that some animals have fresh blood in the stool from small bowel disease, when transit times are increased or ileocolic junction is disrupted.

Additionally, when evaluating a patient with large bowel signs consideration to giving symptomatic therapy/empirical decisions vs. more aggressive diagnostics should be based on the clinical severity and the presence of “urgency signs”.

Anorexia
Concurrent severe small intestinal signs (weight loss, hypoalbuminemia)
Presence of tenesmus OR fresh blood without diarrhea
Image abnormalities

It is not uncommon to see a patient with large bowel localizing signs (ie. blood, tenesmus) without diarrhea. Structural changes should be considered, imaging and/or colonic evaluation should be considered.

Rarely, other conditions can be associated with overlapping clinical signs and need to be considered in a given case. See below for some of the more common disease processes.

Constipation/obstipation
Extraluminal compression (prostatic disease, regional lymphadenopathy, bony compression, etc)
Perianal fistulas
Perineal hernias

Diagnostics available

Fecal cytology

Currently, it is accepted that clostridial disease cannot be reliably documented via fecal cytology. The presence of sporulated organisms does not correlate well with clinical disease. Additionally, campylobacter organisms cannot be reliably distinguished from other more common spirochetes/motile organisms based on their cytologic appearance. The presence of an etiologic organism in the feces via culture, cytology or molecular based testing does not definitively prove a causative nature (as these may be found in many normal animals). Cytology does however offer information at times that may prove valuable.

Diagnosis of dysbiosis???

- Clostridial organisms?
- Monomorphic population

Knowledge about mucosal integrity
Consideration for culture, molecular diagnostics

Fecal scraping

Will help to get exfoliation of cells and may help to identify etiologic agents that may not otherwise been seen on routine fecal smears. This should be performed in any patient whereby large bowel signs are present and geographic or clinicopathologic or examination changes may suggest histoplasmosis, protothecosis. Additionally, this can be performed on any palpable lesion on rectal examination.

Wet mounts

Provides information regarding motility of fecal flora. Normal feces may have spirochetes and tritrichomonas that result in observed motility. Campylobacter has a characteristic darting, “swarm of bees” motility pattern. Additionally, Tritrichomonas or giardia may be observed and differentiated with different motility pattern, the absence of a concave disk, a single nucleus, and the presence of an undulating membrane. Tritrichomonas is associated with a more forward motion whereas Giardia has a more “falling leaf”/rolling motility. A small amount of feces is mixed with one drop of 0.9% NaCl. Apply a coverslip and evaluate for motile organisms by examining it under 100X magnification.

Fecal centrifugation

Will allow the identification of large bowel parasites including whipworms. Sugar centrifugation will increase the yield from many parasites, however, zinc sulfate is the ideal solution of giardia. It should be noted that all patients should be treated for parasitic disease when possible, as these diagnostic tests are not 100% sensitive due to the prepatency of some parasites.

Abdominal ultrasound

This diagnostic test will allow for information regarding the colonic wall, however, this does not identify distal intrapelvic lesions. Additionally, fecal material, intraluminal gas and operator skill can limit observation of lesions. Small lesions can result in massive clinical signs without any image abnormalities.

Colonoscopy

This diagnostic test can help to characterize histopathology, identify structural lesions and evaluate the distal small intestine. Occasionally, interventional therapies can be implemented at the time of the procedure. Common errors in colonoscopy include inadequate patient preparation and creation of iatrogenic lesions (secondary to enemas).

Colonic barium series

This test can be performed in many practices to highlight mucosal filling defects. Ideally this procedure requires that the patient be fasted and residual fecal material evacuated. This procedure can be performed by installing a red rubber catheter into the colon and providing approximately 8-10 ml/pound of 30% barium solution. Barium adhering to fecal material and mucus may produce radiographic entrapments that must be differentiated from colonic lesions. A complete positive contrast evaluation of the large bowel is achieved by performing a barium enema. Because of the exacting technical requirements for this two-stage procedure, the barium enema has been replaced in veterinary practice by colonoscopy.

Pneumo-cologram

This diagnostic test is generally reserved for documentation of intraluminal lesions or further clarification of suspected small intestinal over distension.

New disease processes

Colonic torsion

Rare condition, whereby the colon spontaneously rotates on its mesenteric root. This condition is most commonly reported in large breed dogs, however it has been rarely reported in smaller dogs and extremely rarely in cats. The clinical signs of this condition are variable but generally are associated with an acute onset of vomiting or tenesmus. Other common clinical signs include anorexia or abdominal pain. Many patients have a palpable mass on abdominal palpation or have moderate discomfort on examination/palpation. Traditional radiography will commonly reveal gas distension of the colon with displacement in some cases. Less commonly, the colon will be shown to be distended with fecal material with abrupt termination. It is not uncommon for the dilated colon to not be clearly delineated on radiographs. Complimentary testing with barium enema has been shown to be helpful in some cases, however, exploratory surgery is considered the definitive diagnostic test. This condition is deemed a surgical emergency, as the colonic vascularity can be affected as the colon is twisted at the root of the mesentery.

Colonic strictures

Colonic strictures are an uncommon problem noted occasionally in veterinary medicine whereby the colonic wall becomes stenotic as a result of a locally aggressive process. This is most commonly observed with colonic neoplasia. Less commonly, chronic inflammation (colitis) results in circumferential fibrosis and stricture formation. This condition is rare but unreported in veterinary medicine. This condition is associated with recurrent colonic obstruction, pain on defecation and/or tenesmus. The clinical signs may be slightly progressive as the stricture forms. Additional signs can be observed, as dictated by the underlying etiology. A differential diagnosis includes extraluminal obstructions of the colon or local colonic disease without stricture formation. Diagnosis requires direct visualization of the stricture and concurrent histopathology when appropriate to rule out secondary strictures. Occasionally, the origin of the strictures cannot be determined. Following elimination of other pathologies, ballooning of the stricture may be performed with or without direct visualization. Experience with ballooning is critical, as bowel wall compromise is possible. Repeat ballooning procedures may be necessary in some cases, however, this is considered less likely than with esophageal strictures. Ballooning can be performed under direct visualization with fluoroscopy, adjacent/through the scope or guided by digital palpation.

Colonic compromise

Colonic compromise following iatrogenic causes or exogenous foreign material have been observed at the author's hospital with enema procedures and foreign bodies being the most common causes. The clinical history is important in this case with clues regarding the etiology in some cases. These patients often present with signs of generalized illness characterized by lethargy, anorexia and fever. Physical examination rarely reveals a palpable lesion. A diagnosis can be achieved with acquisition of a good history and imaging revealing hyperechogenic tissue or fluid in the peri-colonic region. Rarely, fluid filled structures consistent with an abscess have been seen. Complimentary diagnostics may reveal evidence of infection (leukocytosis, etc). Surgery to facilitate drainage of an abscess may be needed, however, many cases may respond to systemic antibiotics and supportive care.

Colonic polyps

Polyps are a relatively common cause of rectal bleeding and/or tenesmus. As with many mass lesions in the colon, the tip off is the lack of diarrhea with concurrent tenesmus or bleeding. These lesions are superficial mucosal proliferations that can be solitary or multifocal throughout the colon. However, it should be noted that more distal colonic/rectal localization is more common. Little is known about the pathogenesis of these polyps, their potential for malignant transformation (seems relatively uncommon) and potential avenues for prevention in recurrent cases. It does appear that some animals have recurrent disease over months to years. Surgical removal when possible via rectal pull through procedures will provide appropriate margins, limit potential local recurrence and provide adequate tissue for biopsy. However, subjective assessment of the lesions or patients with "typical" appearing polyps with historical disease may be addressed locally with the use of local interventional endoscopic techniques. The author has utilized non-steroidal anti-inflammatories (piroxicam 0.3 mg/kg q 24) in patients with recurrent polyps.

Fiber responsive colitis

This is an incredibly common condition characterized by chronic daily or intermittent large bowel diarrhea. Fiber has been shown to provide local colonic nutrition through production of SCFA, influence colonic water resorption, improve colonic motility and act as a prebiotic. This is a diagnosis of exclusion, requiring normal histopathology, absence of other structural changes on imaging and response to therapy. However, when appropriate therapeutic trials with fiber, in lieu of diagnostics is recommended.

Multiple types of fiber exist including soluble and insoluble forms. Insoluble forms of fiber include those fibers that do not absorb water and pass through the colon relatively unchanged. They are generally associated with a laxative effect and add bulk to the diet, helping to prevent constipation. Insoluble fibers are mainly found in whole grains and vegetables. Whereas, soluble fibers attract water and form a gel, which slows down digestion. Common sources of soluble fiber include oatmeal, oat cereal, lentils, apples, oranges, pears, oat bran, strawberries, nuts, flaxseeds, beans, dried peas, blueberries, psyllium, cucumbers, celery, and carrots. It is important to note that the response to fiber is highly variable with some patients showing a better response to soluble and others to insoluble. Mixed quantities of fiber may be helpful in some patients. It should be also noted that the addition of fiber can exacerbate diarrhea in some patients.

Psyllium (soluble fiber; Metamucil)	1 tablespoon per can of food 1 Tbsp (small patients), 2 Tbsp (medium patients), 3 Tbsp (large patients), 4 Tbsp (giant patients) *Titrate to effect
Wheat bran (insoluble fiber)	Supplement with food in comparable volumes to above
Wheat dextrin (insoluble fiber; Benefiber)	
Weight loss diets (fiber based)	Adjusting diets to those that have higher fiber ratios can be helpful in some cases *Often use as a transition when responsive to fiber

Tritrichomonas foetus

This is a relatively common infectious cause of chronic, large intestinal diarrhea of cats. The condition is characterized by continued diarrhea in juvenile patients with the majority of the patients occurring less than 2 years of age. Additionally, it appears to be over represented in cats that exposure to the shelter, catteries or cat shows with a slight predisposition for pure breed cats. This protozoal infection has historically been refractory to all forms of therapy with minimal effect of many antibiotics. Diagnosis of this condition is accomplished with PCR testing of stool and less commonly on direct saline mounts on fresh stool. Fecal culture is available but not commonly performed due to labor intensiveness. Fecal cytology has a reportedly low sensitivity, however, acquisition of a ultra fresh sample (from butt to slide) can increase yield and recently a 100% sensitivity was reported in one study. The use of a "colonic lavage" technique may provide excellent samples for cytologic evaluation of trophozoites. Treatment of this condition is with Ronidazole at 30mg/kg q 12-24 x 14 days. This medication can cause fatal neurotoxicity in some patients and SID dosing may reduce the likelihood of this toxicity. It should be noted that Ronidazole resistance has been documented in patients with treatment failure. No other medications have shown repeatable efficacy (ie. Tonidazole, Metronidazole, Azithromycin). Following therapy, retesting with PCR will help to document clearance of the organism.

Inflammatory bowel disease

This is a relatively uncommon diagnosis with the aforementioned disease processes being more common. This condition characterized by chronic inflammation on colonic biopsies without an underlying cause and failed responses to diet, antibiotics and fiber supplementation. The etiology of this condition is uncertain but may involve a dysbiosis and alteration in local immunoregulation.

Therapeutic interventions for this condition include:

1. 5-aminosalicylic acid drugs (ie. sulfasalazine, mesalamine)
2. Systemic corticosteroids
3. Locally active steroids (steroid enemas)
4. Immomodulatory antibiotic therapy (ie. metronidazole, tylenol)

Titration of the above therapies with simultaneous manipulation of dietary fiber, dietary substrates and probiotics may help with management. Symptomatic therapy with loperamide or other anti-spasmodics may be necessary in severely affected cases.

Histiocytic colitis

This form of colitis is associated with an Enteroinvasive *E. coli* that invades into the colonic wall and results in marked histiocytic inflammation. The infection results in severe inflammation and ulceration of the colonic mucosa. This condition is diagnosed via biopsy and confirmation of *E. coli* within the colonic mucosa using FISH. This condition historically has responded very poorly to immunomodulation and more recently has been treated with antibiotic therapy effectively (ie. fluoroquinolones). It should be noted that this condition can rarely affect the terminal ileum, causing mixed clinical signs. Additionally, it should be noted that multidrug resistant forms have been observed more recently. Fresh tissue can be cultured at Cornell Veterinary School for antibiotic sensitivity testing. Tissue samples are placed into blood culture media for culture. In-vitro susceptibilities may offer drugs with intrinsic activity (ie. aminoglycosides), however, there penetration of tissue may be poor in these cases and treatment failure is becoming more common. Very aggressive systemic antibiotic therapy has been used in multidrug resistant cases.

Dietary intolerance/food allergy

Dietary related disease is common. The diagnosis of this condition may be difficult as imaging and histopathologic findings are nonspecific in many cases with inflammation. Differentiation of dietary responsive disease from true "IBD" like disease is not possible when evaluating biopsies. Therefore, appropriate dietary trials are necessary to rule out disease. Many forms of colonic disease may respond to modification of dietary factors. Some common dietary trials include 1) High fiber diets (see above) 2) Highly digestible diets and 3) Elimination diets.

Using a highly digestible diet can reduce dietary substrates that can lead to osmotic factors stimulating colonic water loss or colonic irritation. Many commercially diets are available that fill these criteria, however, it should be noted that these diets can vary in fiber content. Generally speaking, these represent the more commonly prescribed "gastrointestinal diets". Generally, dietary trials of 2 weeks are adequate for response with highly digestible diets.

Exclusion diets with either hydrolyzed or novel protein sources must be considered. It is important to take a good dietary history, as "novel" protein sources are common in novelty pet food stores. These dietary trials are generally extended for 2-4 weeks for response. In my experience, complete failure of response by 2 weeks is unlikely to benefit from a longer trial, whereas, partial response may benefit from continued dietary exclusion.

Clostridial enterocolitis

This condition is a poorly defined syndrome in veterinary medicine at this time, as the clear correlation between clinical signs and the presence of the bacteria on cytology, culture or molecular based testing does not always seem to exist. It is currently believed that *C. perfringens* enterocolitis is commonly associated with a secondary disruption of the intestinal microenvironment that allows for proliferation and sporulation the commensal organism. This may be brought about by many causes of gastrointestinal disruption. The clinical signs can be solely large or small bowel, while others may be mixed in nature.

Diagnostics combining the evaluation for CPE via ELISA (*Clostridial perfringens*'s enterotoxin) and the *cpe* gene (that encodes the enterotoxin) via PCR are currently thought to be the most reliable diagnostic testing when compared to traditional diagnostics. It appears that the presence of these findings may correlate better with clinical disease, however, it should be noted that normal animals can have positive tests (thus confirming a common resident population). Cultures are limited, in that normal animals may culture positive unless further characterization of outbreaks wish to be performed. Traditional fecal cytologic evaluation has been proven to be ineffective and should no longer be performed. Therapy for suspected clostridial disease generally includes metronidazole, amoxicillin or tylosin. Tetracycline drugs have been discouraged.