Practical Management of Diarrhea

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Diarrhea is a common problem in clinical practice, likely representing one of the most common acute and chronic problems. As with most disease processes, it is helpful to characterize the progression into acute or chronic disease. Further characterization can affect our diagnostic considerations and differential diagnoses list. Additional classification of diarrhea can be made into small, large or mixed bowel disease.

Acute disease	< or = 2 weeks
Chronic disease	> 2 weeks

Characteristic	Small Bowel	Large Bowel
Volume	Markedly increased	Normal to increased
Mucus	Rare	Common
Hematochezia	Rare	Common
Melena	Can be present	Absent
Steatorrhea	Can be present	Absent
Color	Variable	Rarely variable
Undigested food	Can be present	Absent
Weight loss	Can be present	Rare
Halitosis	Can be present	Absent
Flatulance/Borborygmus	Can be present	Absent
Urgency	Absent unless severe	Common
Tenesmus	Absent unless severe	Common
Frequency	2-3 times normal	> 3 x normal
Dyschezia	Absent	Common
Mixed bowel disease generally has some features of both		

Acute management of diarrhea can likely be managed by many different approaches with general principles including dietary restriction and the provision of a highly digestible diet. The principles include reducing osmotic agents that contribute to osmotic diarrheas. These include indigested food stuffs (ie. fatty acids, bile acids) that exert an osmotic effect at the colonic region. These effects are minimally effective in secretory diarrhea. Additionally, while these tenants have long been accepted, they are likely unnecessary in the majority of cases.

Many causes of acute gastroenteritis or colitis exist. These include but are not limited to dietary intolerances, dietary indiscretion, modification of diet, viral infectious, ingested pre-formed toxins and foreign bodies. Regardless of the etiology, the vast majority of cases will spontaneously resolve with reconstitution of the gastrointestinal epithelial lining, barrier function and local immunologic mechanisms. It should be noted that many disruptions in intestinal function and structure can result in secondary alterations in motility and/or changes in microbiome. This dysbiosis can exacerbate diarrhea and likely is one of the primary reasons for antibiotic efficacy in cases of diarrhea. The knee jerk reaction of using antimicrobials is likely unnecessary in the majority of cases of acute onset diarrhea and should be reserved for cases where primary infectious etiologies are suspected and/or the clinical signs have a delayed resolution.

Because of the multitude of causes, the focus is on providing supportive care, as dictated by the patient's clinical signs and not on diagnostic testing. The long list of potential causes of "acute non-specific gastroenteritis" could result in exhaustive testing with inability to confirm the etiology in many cases and difficulties in interpretation. However, the major caveat is that a complete physical examination is performed and does not reveal sources of discomfort, palpable abnormalities and/or any other concerning features. Symptomatic therapy is reserved for cases with a relatively innocuous physical examination.

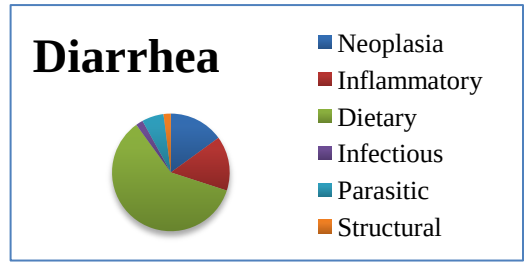
When the clinical history is progressive or persistent, then consideration to more chronic conditions and/or more serious acute conditions should be made. The shift in symptomatic therapy and more extensive diagnostics is recommended.

Symptomatic therapy for acute diarrhea

Feeding alterations	Food restriction for 12-24 hours
Dietary manipulations	Highly digestible diets Fat restricted diets
Microbiome manipulation	Antibiotics Probiotics Prebiotics???
Considerations for symptomatic therapy	Moderate – marked diarrhea volume → fluid therapy (hospitalization) Hemorrhagic diarrhea??? → microbiome manipulation Alterations on fecal cytology → selective therapies Delayed resolution of signs → microbiome manipulation
Recommendations for further workup	Severe clinical signs Abdominal pain Hypotension Progressive or protracted signs Concurrent vomiting?? Weight loss

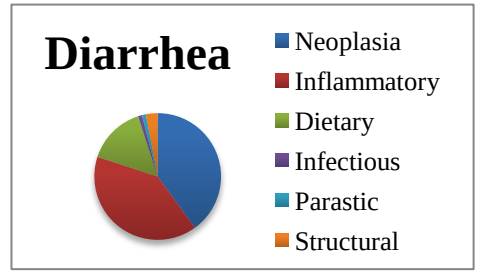
When the problem becomes more chronic in nature, then a shift in thinking, towards more extensive workup is necessary. Prior to handling the animal, one should consider the following: 1) geographic area 2) clinical history 3) signalment 4) progression of disease. Utilizing this information can help to formulate more specific questions during you history and prioritize differential diagnoses.

Estimated chronic diarrhea

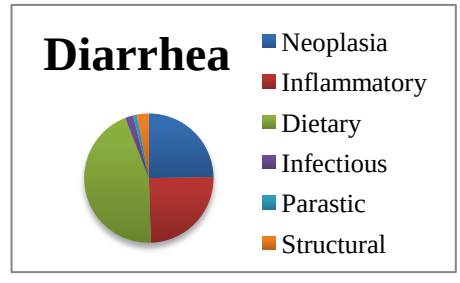


This chart is an estimation in my practice. It is important to note that many of the these patients have dietary related causes of disease and not an overwhelming number when compared to the whole population have inflammatory/neoplastic disease. The point of this, is to illustrate the frequency of dietary related disease as a cause of diarrhea (see below).

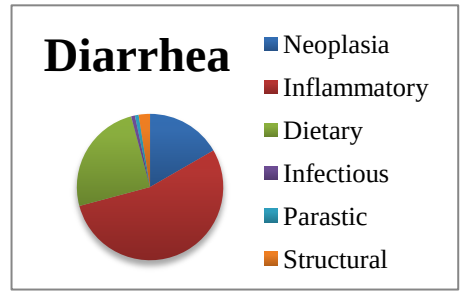
Now, if we use signalment and geographic distribution the relative frequencies of disease may change. An 15 year old, indoor, solitary DSH in NYC presents with poor muscle mass, weight loss, vomiting and small bowel diarrhea. The table may change considerably see below.



Ok, now the same cat but without weight loss or poor muscle mass



Ok, same case but dog with weight loss and poor muscle mass.



So you can see the influence of the species and history on prioritizing our differential diagnoses. This influences our relative need to do further diagnostic testing and which ones we should perform.

Some common associations are listed below (not intended to be complete)

Young patients	Parasitic Dietary Endocrine (hypocortisolism) Structural Infectious (geographic influences)
Older patients	Inflammatory Neoplastic (C>D) Dietary Endocrine (hyperthyroidism)

What influences the my tendency to perform additional diagnostic testing is the presence or absence of urgency markers. These findings imply more severe processes and the need for more timely/aggressive workup/intervention. When these findings are present, I am inclined to pursue a diagnostic workup, rather than considering additional therapeutic trials.

Urgency Markers
Rapid weight loss
Severe clinical signs (unrelenting diarrhea, vomiting)
Hypoproteinemia
Hypocobalaminemia, Hypofolatemia
Inappetance
Physical examination changes

When urgency markers are not present. The approach should include a good detailed history with emphasis on potential exposure to infectious etiologies that would otherwise not be expected (ie. travel history, fellow cats in household with FIP, etc), dietary variability, previous dietary trials and/or potential parasitic disease (exposure, prevention, etc).

A good physical examination should be performed complete with a rectal and retinal examination. Notation of abdominal discomfort, masses, intestinal thickening and slippery intestines should be made. Evaluation of muscle mass is important with careful observation over the spinous processes. One feature that generally is seen in case with malabsorption/maldigestion is the presence of a lackluster poor hair coat. This finding is often not appreciated by the owners and may be more sensitive than other features.

If the physical examination is unremarkable, then consideration will be made to the following.

Parasitic disease elimination: • Fecal testing (centrifugation, direct cytology, Antigen testing) • Empirical therapy for intestinal parasite
Dietary manipulation • Highly digestible diets • Low fat diets • Novel protein diets • Hydrolyzed diets

• Low CHO diets • Fiber supplemented diets
Blood work evaluation • Baseline diagnostic testing • Cortisol (baseline), ACTH stimulation • Thyroid evaluation • TLI (cats vs. dogs) • Cobalamin/folate testing Abdominal imaging • Abdominal radiographs (suspected foreign material, obstruction?) • Abdominal ultrasound Complimentary testing • Alpha 1 Protease Inhibitor • Thymidine kinase evaluation? *These tests should be performed in the context of your history, signalment and physical examination
Histopathologic assessment • Endoscopic • Full thickness

Dietary manipulation is not as simple as one diet is better than another diet. We need to start looking at what makes up the diet and start to appreciate the interactions of substrates together and there influences on the specific dog.

Many dietary factors can influence the presence of intestinal disease. Dietary factors can directly exacerbate disease by triggering allergic reactions, creating osmotic forces for water secretion, direct mucosal injury, alterations in motility and manipulation of bacterial populations. Dietary allergies are defined as a direct immune reaction to a dietary substrate (generally the protein source), whereas dietary intolerances are defined as dietary factors that result in the generation of intestinal dysfunction by non-immune mechanisms. Some dietary factors that may contribute to intestinal dysfunction include the dietary digestibility, fat content, protein source, fiber content, carbohydrate content and/or presence of gluten.

Many gastrointestinal disorders arise from dietary factors that result in transient or persistent changes in the intestinal function or integrity. Manipulation of diet can result in stabilization of clinical signs in many patients in lieu of doing invasive diagnostic tests. Additionally, dietary manipulation can play a major role in management of other well-defined conditions (ie. EPI, "IBD", lymphangectasia, etc.) and may contribute to successful management.

In order for dietary trials to be effective, the diet must be fed exclusively without additional treats, human food or other dietary sources. Without strict compliance, clinical signs may persist and additional diagnostics may be recommended. The duration of each food trial is different and dependent on the reason for the dietary trial to begin with. In general, dietary allergies will generally require longer dietary trials (2-4 weeks) as compared to dietary intolerances (~2 weeks).

Dietary preferences

Small bowel diarrhea	Highly digestible diets /Low fat diets Low carbohydrate diets (cats) Novel protein/hydrolyzed
Large bowel disease	High fiber diets/fiber supplemented diets Novel protein/hydrolyzed Highly digestible diet/low fat diets
Mixed bowel	Similar to small bowel diets
"Inflammatory bowel disease"	Single protein source Hydrolyzed diets
Protein losing enteropathies	Fat restricted Hydrolyzed diets Elemental diets
Antibiotic responsive diarrhea	High fiber diets/fiber supplemented diets
Exocrine pancreatic insufficiency	Variable diets

It is important to remember that sometimes we ask too much of our therapies with expectations that probiotics alone or antibiotics alone or dietary manipulation and immunomodulation are going to be effective. And it is easy to assume that a therapy has no value in treatment of a given case because it was ineffective at one time. I believe that we need to look at optimizing everything in a given case

that may be playing a role in altering gastrointestinal function. It is often times the synergism of medications that may help to achieve clinical control. Additionally, some treatments may not be effective at initial control but may be effective following resolution of signs as preventative therapy (ie. diet and fiber in chronic intermittent colitis that is antibiotic responsive).

In tough cases we need to ask, how can I manipulate the following

- Diet
- Microbiome
- Motility
- Inflammation

When do I consider antibiotic therapy?

- When it has historically been effective
- Large bowel diarrhea
- Neutrophilic enteritis
- Primary pathogenic organisms isolated
- Hypocobalaminemia without other urgency signs
- Animals with "stagnant loops" or hypomotility on imaging
- Breeds with historical antibiotic responsive diarrhea (ie. GSD, histiocytic colitis)
- Animals with EPI that are not responsive to medical management alone

When do I consider probiotic therapy?

- Any patient that you may consider antibiotic therapy
- Microbiome stabilization with dietary transitions
- Juvenile patients that have chronically loose stools
- Complimentary therapy for inflammatory bowel therapy?
- Future considerations include manipulation of systemic inflammatory conditions

When do I consider fiber supplementation?

- Large bowel diarrhea
- Antibiotic responsive diarrhea

Pharmacologic interventions

Antibiotics	Antibiotic responsive diarrhea (other indications) • Metronidazole 10-15 mg/kg q 12 • Tylosin 10-20 mg/kg/day PO with food • Broad spectrum? Campylobacter enteritis • Erythromycin 10-20 mg q 8 x 5-7 days • Flouroquinolones: 5-10 mg/kg q 24 x 5-7 days • Tylosin (see above) • Chloramphenicol 40-50 mg/kg q 8 Clostridial enteritis? • Metronidazole (see above) • Amoxicillin 22 mg/kg PO q 12 • Clindamycin Histiocytic (Boxer) colitis: • Enrofloxacin 10-20 mg/kg PO q 24 for 30 days, based on response and clinical signs Tritrichomonas • Ronidazole 30 mg/kg q 12 -24 x 14 days
Antiparasitic agents	Fenbendazole 50mg/kg q 24 x 5, repeat in 3 weeks, 3 months Metronidazole 25mg/kg q 12 for
Antiinflammatories	Chronic enteropathy (IBD) • Prednisone(olone): 1-2 mg/kg q 12 with gradual taper based on clinical signs Refractory chronic enteropathies • Cyclosporine 5mg/kg q 24
Fiber	Metamucil (see large intestinal disease notes)