Nutritional management of gastrointestinal disease is a broad topic incorporating both acute and chronic diseases of the stomach, small intestines, pancreas, gallbladder, and colon. As such, this article introduces the types of gastrointestinal diets available to help the clinician decide which one is best based on their nutritional components.

**TYPES OF GASTROINTESTINAL DIETS**

There are 4 broad categories of diets for managing gastrointestinal disease: low-residue, fiber-enhanced, low-fat, and hypoallergenic. Homemade diets can also be used for managing disease, but vary tremendously based on their formulation.

**Low-residue Diets**

Low-residue diets can be defined as having protein digestibility >87% and fat and carbohydrate digestibility >90%. These diets typically have refined ingredients and are low in fiber (<3-5% on a dry-matter basis). The benefits of low-residue diets are they can speed movement of food through the stomach and ease absorption in compromised intestine.

**Fiber-enhanced Diets**

Fiber-enhanced diets may be designed for gastrointestinal disease or diabetes mellitus. Fiber can be categorized based on its solubility in water or its ability to be fermented by intestinal bacteria. Soluble fiber sources dissolve in water to form a thick, viscous gel, which will slow the movement of ingesta through the intestines. Soluble fiber sources also tend to be fermentable and can produce gases and physiologically active byproducts within the intestine. Insoluble fibers do not dissolve in water and tend to have low fermentability. Thus, they can be viewed as metabolically inert and provide bulking of stool and water absorption as they move through the intestine. Insoluble fibers tend to stimulate colonic stretch receptors, which can cause diarrhea. Ideally, fiber-enhanced diets would contain a combination of both soluble and insoluble fibers to provide a balanced effect. Too much of either type of fiber could result in soft stools, constipation, or excessive gas. Also, note that crude fiber listing on the guaranteed analysis of pet food labels do not capture the soluble fiber fraction of the diet and may underestimate total dietary fiber (TDF).
Low-fat Diets

Low-fat diets typically have fat contents between 18-25 g/1000 kcal. Lower fat diets can be useful for reducing pancreatic stimulation and speeding movement through the stomach in vomiting animals. Low-fat diets are not appropriate for weight loss because they are not fortified with nutrients to offset low-calorie intake. Weight loss diets are also typically lower in fat than standard diets, but the fiber content and calorie density may not be appropriate for animals with poor appetites or vomiting. In addition, weight-loss diets usually are not restricted as low in fat as the gastrointestinal low-fat diets.

Hypoallergenic Diets

Diets designed to reduce symptoms of food allergies can be placed into 2 broad categories: novel protein or hydrolyzed. Novel protein diets use uncommon protein and carbohydrate ingredients to lessen the chance of exposure and a subsequent allergic response. In humans, most food allergens are glycoproteins that range in size from 14,000 to 40,000 Da. Proteins within range are large enough to activate B and T cells, but small enough to pass through mucosal membranes and interact with the immune system. Hydrolyzed proteins are low molecular weight peptides (<18,000 Da) with reduced antigenic potential because they are too small to bind with immunoglobulins. As a result, they are less likely to elicit a response from the dog’s immune system. Free amino acids are not allergenic but cannot be used due to their bitter taste and high osmolarity. There are many of hypoallergenic diets on the market. Novel protein diets are available over-the-counter (OTC) or by veterinary prescription. OTC tend to have a higher likelihood of contamination with common pet food proteins as compared to veterinary therapeutic diets.

Specific Types of Gastrointestinal Disease

Vomiting

Vomiting is the most common clinical sign of gastrointestinal disease. Dietary goals for vomiting are to minimize gastric irritation, promote gastric emptying, normalize motility and prevent gastroesophageal reflux. Fat and fiber delay gastric emptying, so choosing a lower fat, low-residue diet is usually ideal to manage vomiting and reflux. For acute, frequent vomiting food may be withheld for 24 hours. Small, frequent meals (3-6 per day) can also speed passage of food through the stomach.

Small Intestinal Disease

Acute small intestinal (SI) diarrhea with or without vomiting will often benefit from a low-residue diet. As normal digestion and absorption may be compromised. Small, frequent meals are recommending and early feeding for the intestines are best.

Inflammatory bowel disease (IBD) is described as a group of chronic, idiopathic inflammatory disorders of the gastrointestinal tract. Severity can vary from mild- to life-threatening protein losing enteropathy (PLE). Clinical signs depend on section of bowel affected. Key nutrition factors for IBD include:

- Avoid excessive dietary protein to minimize antigens that elicit an immune response (PLE is an exception and requires high protein)
- Feed a low-residue diet as absorption may be impaired
- Utilize a novel protein and/or hydrolyzed protein diets
- Feed small, frequent meals

Protein losing enteropathies such as lymphangiectasia require a low-fat diet. Long chain triglycerides, the most common form of dietary fat, stimulate lymph flow and increase protein leakage through the lymphatic vessels. Lymphangiectasia can be primary, but is often secondary to IBD. A low-fat, high-protein, low-residue diet is desired for these cases. Our nutrition practice usually assumes cases of lymphangiectasia are secondary to IBD unless proven otherwise, and also utilize hydrolyzed or novel protein diets for management. A low-fat, low-residue diet that is hypoallergenic and high protein is difficult to obtain. Our practice often utilizes Purina Feline HA for our canine patients as it meets most of these criteria. A portion of the fat from this diet comes from medium chain triglycerides (MCT) that passively diffuse from the GI tract to the portal system and partially bypass the lymphatic system. Thus, calorie density is maintained while lowering long chain fatty acids.

Short Bowel Syndrome develops from massive resection of the small intestine and may result in malabsorption due to lack of surface area. Cobalamin deficiency may occur if ileum is resected. These cases benefit from low-residue diets. Moderate-to high-fat, energy-dense foods that are low to moderate in fiber are ideal. Supplementation of fat soluble vitamins and cobalamin may be needed and patients should be fed small, frequent meals.
Dysbiosis of bacterial flora in the intestines can lead to diarrhea and may be present in 50% of dogs with diarrhea. Dysbiosis is often associated with exocrine pancreatic insufficiency (EPI). Laboratory evaluation involves a normal high trypsin-like immunoassay (TLI) with a low B12 and high folate. These patients may do best on either a low-residue or fiber-enhanced diet. Additional probiotics, prebiotics, and antimicrobial therapies may also be needed.

Pancreatic Disease

Pancreatitis is the most common disease of the pancreas and can be acute or chronic in nature. Patients with acute pancreatitis will benefit from early enteral nutrition. Unless vomiting is uncontrollable with antiemetics, small amounts of nutritional support should be given as soon as possible. Typically a nasoenteral feeding tube is used and a liquid product enteral product is used. For chronic pancreatitis in dogs the main nutrient of concern is fat. A low-fat diet is best and the degree of fat restriction will be dependent on case severity. Protein can also stimulate the pancreas, so high protein diets should be avoided. Cats with acute pancreatitis can be treated similar to dogs with a low-fat, moderate protein diet. Cats with chronic pancreatitis typically do not require diet changes as diet does not appear to be a factor in their disease progression or outcome.

The exocrine pancreas secretes numerous enzymes to digest fats, proteins, and carbohydrates. Animals must lose approximately 90% of their functional capacity before exocrine pancreatic insufficiency (EPI) produces clinical signs. EPI characterized by chronic small bowel diarrhea with steatorrhea and voluminous diarrhea. Patients also have ravenous appetite with weight loss. The best treatment for EPI is supplementation with pancreatic enzymes. Diet modification doesn’t appear to make much difference in these cases. However, absorption of fat-soluble vitamins (A, D, E, and K) may be impaired and cobalamin may need to be supplemented until clinical signs are well controlled.

Large Intestinal Disorders

Colitis is a common disorder with many causes. In general, high-fiber diets are helpful with colitis to support the growth of beneficial bacteria and to help with water balance. If a high-fiber diet does not improve large bowel diarrhea, a low-residue diet may be used to minimize nutrients reaching the colon. Finally, if the diarrhea is not responsive to fiber or high digestible diets a low-allergen diet may be used in case there is an immune-mediated component to the disease.

Flatulence is an annoyance to pet owners and the dietary goal is to reduce intestinal gas production. Low-residue diets with a fat content lower than their current diet may be helpful. Highly fermentable carbohydrate sources should be avoided (beans, cruciferous vegetables). Alpha-galactosidase (Beano) may also decrease flatulence by improving digestion of carbohydrates. Outdoor exercise may also help expel gases in a less offensive environment.

Prebiotics and Probiotics

Prebiotics are starches and fibers resistant to digestion. Examples include: Fructooligosaccharides (FOS), Mannanoligosaccharides (MOS), Galactooligosaccharides (GOS), Fermentable fibers. Indications for prebiotics include antibiotic-associated diarrhea, traveler’s diarrhea, gastroenteritis, normalizing bowel function, colitis, and irritable bowel problems. According to the food and agricultural organization (FAO) and the world health organization (WHO), probiotics are defined as “Live microorganisms which when administered in adequate amounts confer a health benefit on the host.” Ideally probiotics should originate in the species being treated, be nonpathogenic, be resistant to digestion by gastric acid and intestinal enzymes, able to adhere to the intestinal epithelium, and be capable of influencing host immune responses. Probiotics can promote normalized microflora and may have role in allergies. They can also help to inhibit binding of pathogenic bacteria. Many products may not contain the numbers of viable bacteria they claim. TVP

References

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