SMALL INTESTINAL BACTERIAL OVERGROWTH (SIBO)

BASICS

OVERVIEW

- A clinical syndrome caused by an increase in number of bacteria in the small intestine or a shift in types of bacteria in the small intestine
- Currently, no consensus has been reached on the definition and diagnostic criteria for small intestinal bacterial overgrowth (SIBO)
- Small intestinal bacterial overgrowth (SIBO) differs from infection of the intestinal tract by known disease-causing bacteria (such as *Salmonella*, *Campylobacter jejuni*, toxigenic *Clostridium perfringens*, or others)
- Two other conditions, "antibiotic-responsive diarrhea" and "tylosin-responsive diarrhea," may refer to the same syndrome as small intestinal bacterial overgrowth (SIBO); however, all three conditions are defined using different sets of diagnostic criteria

GENETICS

- No genetic basis for small intestinal bacterial overgrowth (SIBO) has been established
- Some breeds (such as the German Shepherd dog and Chinese shar pei) appear to be at an increased risk of developing SIBO, compared to other breeds
- A genetic susceptibility for an abnormality in cell-mediated immune response to normal intestinal bacteria is suspected in people and also may occur in dogs; however, this has not been proven

SIGNALMENT/DESCRIPTION of ANIMAL

Species

- Dogs
- Cats may develop small intestinal bacterial overgrowth

Breed Predilections

- Subjectively, German Shepherd dogs and Chinese shar peis appear to have an increased incidence of small intestinal bacterial overgrowth (SIBO) compared to other breeds

Mean Age and Range

- Unknown
- Can be diagnosed in dogs of any age (age range, less than 1 year of age to greater than 8 years of age)

SIGNS/OBSERVED CHANGES in the ANIMAL

- Signs of small intestinal disease
- Long-term (chronic) loose stools or diarrhea—common
- Weight loss, despite a reasonable appetite—common
- Rumbling or gurgling sounds caused by movement of gas in the intestinal tract (known as "borborygmus") and excessive gas formation in the stomach or intestines (known as "flatulence")—common
- Vomiting—occasional/variable
- Poor body condition
- Clinical signs of the underlying disease process may be seen in secondary small intestinal bacterial overgrowth (SIBO)
- Intestinal thickening is not typical unless small intestinal bacterial overgrowth (SIBO) is secondary to a disease characterized by infiltration of abnormal cells into the intestinal tissue
- Clinical signs may vary in intensity (they may increase and decrease over time [known as a "waxing and waning" course]) or be continuous
- Generalized (systemic) signs of infection (such as fever and depression) usually do not occur

CAUSES

- Unknown cause (so called "idiopathic disease") or primary small intestinal bacterial overgrowth (SIBO)
- "Secondary small intestinal bacterial overgrowth" (SIBO) in which the increase in number of bacteria occurs due to an underlying intestinal problem—more common
- Abnormal small intestinal anatomy—may be an inherited abnormality or an acquired (condition that develops sometime later in life/after birth) abnormality; examples of abnormal small intestinal anatomy include partial blockages or obstructions of the small intestines; cancer; foreign body; folding of one segment of the intestine into another segment (known as "intussusception"); abnormal narrowing of the small intestine (known as a "stricture"); presence of scar tissue that binds areas of the small intestines together (known as "adhesions") and presence of a pouch or sac-like opening from the intestines (known as a "diverticulum")
- Decreased intestinal motility (such as occurs with inadequate levels of thyroid hormone [known as "hypothyroidism"] and with disorders of the autonomic nervous system [known as "autonomic neuropathies"]); the "autonomic nervous system" is involved in the control of muscles in the heart, blood vessels, gastrointestinal tract, and other organs

• Exocrine pancreatic insufficiency ("EPI;" a syndrome caused by inadequate production and secretion of digestive enzymes by the pancreas)—approximately 70% of dogs with EPI have coexistent small intestinal bacterial overgrowth (SIBO)
• Abnormally low levels of hydrochloric acid in the stomach (known as "hypochlorhydria") or lack of hydrochloric acid in the stomach (known as "achlorhydria")—may occur spontaneously or may be related to medical treatment (such as treatment using H_2-blockers to decrease stomach acid)
• Inability to develop a normal immune response (known as "immunodeficiency")
• Pre-existing intestinal disease

RISK FACTORS

• Suspected immunoglobulin A (IgA) deficiency; immunoglobulin A is an immune protein, found in the intestines; it functions as a protective barrier to prevent antigens (substances to which the immune system is responding and producing antibodies) and disease-causing microorganisms from entering the body through the intestines
• Intestinal disease (such as inflammatory bowel disease [IBD], adverse food reactions, parasite infestation) that affects local intestinal defense mechanisms

TREATMENT

HEALTH CARE

• Outpatient medical management
• Results/improvement may take a few days to several weeks
• Supportive care for emaciated pets or pets with low levels of albumin, a type of protein, in their blood (condition known as "hypoalbuminemia")

ACTIVITY

• Unrestricted

DIET

• Highly digestible diet
• Diet containing fructo-oligosaccharides is the only diet that has been shown to be beneficial in dogs with small intestinal bacterial overgrowth (SIBO)

SURGERY

• Indicated for some underlying causes of small intestinal bacterial overgrowth (SIBO), such as partial blockages or obstructions of the intestines, tumors, or the presence of a pouch or sac-like opening from the intestines (diverticulum)

MEDICATIONS

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive.

• Broad-spectrum antibiotics administered by mouth; antibiotics effective against both bacteria that can live and grow in the presence of oxygen (known as "aerobic bacteria") and bacteria that can live and grow in the absence of oxygen (known as "anaerobic bacteria") are preferred
• Tylosin—primary antibiotic choice in the United States; usually a powder administered in the food; can be used long-term; for small dogs the drug should be reformulated into capsules; for larger dogs the dose can be approximated by using a teaspoon and administering the drug in food, as directed by your pet's veterinarian
• Oxytetracycline—antibiotic with limited availability in the United States; do not administer with food (calcium in the diet binds with oxytetracycline and makes it ineffective)
• Metronidazole—antibiotic and antiprotozoal drug used to treat small intestinal bacterial overgrowth (SIBO) because of its activity against anaerobic bacteria; also may have effects to modify the immune response (known as "immunomodulatory effects"); possibly useful in treating inflammatory bowel disease (IBD)
• Dogs with small intestinal bacterial overgrowth (SIBO) may be cobalamin (vitamin B_{12}) deficient; therefore, supplementation of vitamin B_{12} by injection is indicated; blood tests to evaluate serum cobalamin and folate concentrations should be performed a month after the last dose of vitamin B_{12}
• Dogs with coexistent exocrine pancreatic insufficiency ("EPI;" a syndrome caused by inadequate production and secretion of digestive enzymes by the pancreas) and small intestinal bacterial overgrowth (SIBO)—treatment for SIBO is indicated only if pancreatic enzyme replacement therapy (for EPI) alone does not resolve the diarrhea and/or lead to weight gain

FOLLOW-UP CARE

PATIENT MONITORING

• Body weight

• In pets with low levels of albumin (a type of protein) in their blood (condition is hypoalbuminemia), blood work to evaluate serum albumin concentration
• Diarrhea also should resolve
• If diarrhea persists despite improved body weight and/or increased serum albumin concentration, diagnostic investigation for other intestinal disease is indicated

EXPECTED COURSE AND PROGNOSIS

• Primary small intestinal bacterial overgrowth (SIBO) without complicating factors (such as inflammatory bowel disease [IBD], intestinal cancer [lymphoma])—prognosis with appropriate antimicrobial therapy is usually good
• Prognosis for secondary SIBO depends on underlying disease

KEY POINTS

• Some pets show clinical improvement within days
• Some pets require weeks of therapy before demonstrating improvement—treat for 2 to 3 weeks before concluding that therapy is ineffective
• Any coexistent or predisposing diseases (such as partial blockage or obstruction of the intestines, intestinal cancer, exocrine pancreatic insufficiency [EPI], inflammatory bowel disease [IBD], or dietary intolerance/allergy) also must be treated
• Continual or repeated treatment often is required