Protein-Losing Enteropathy: Pearls and Pitfalls
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Introduction: Protein Losing Enteropathy (PLE) is a syndrome associated with abnormal loss of albumin through the gastrointestinal mucosa. It is most often seen secondary to Inflammatory Bowel Disease (IBD), alimentary lymphoma, and intestinal lymphangiectasia (IL). Loss of protein is independent of molecular weight so panhypoproteinemia.

Breeds at risk for PLE: Norwegian Lundehund, Rottweiler, Maltese, Yorkshire Terrier, Chinese Shar Pei

Clinical Presentation: Dogs with PLE generally present with chronic, relapsing GI signs largely consisting of diarrhea, vomiting, weight loss, and inappetance. Edema or cavitary effusions is common due to albumin loss and decreased oncotic pressure. Isolated pleural effusion may be the only abnormality found, thus PLE should be considered in hypoalbuminemic dogs even in absence of gastrointestinal signs.

Diagnosis: Common clinicopathologic findings are hypoalbuminemia, hypoglobulinemia, hypercholesterolemia, hypocalcemia (total and ionized), hypomagnesemia, and lymphopenia. Other causes of hypoalbuminemia must be ruled out including protein losing nephropathy, synthetic liver failure, and third spacing with cavitary effusions. A urinalysis with urine protein: creatinine ratio, paired bile acids, and fluid analysis with cytology should be pursued as indicated. Protein loss through the GI tract can be difficult to confirm. Fecal alpha-1 proteinase inhibitor is the same size as albumin and also synthesize in the liver. It is neither actively absorbed or secreted in the normal gut and is resistant to hydrolysis within the gastrointestinal tract. Increased amounts in feces would be indicative of protein loss. Measurement should be performed on freshly voided feces from 3 consecutive days that have been frozen and shipped overnight.

Measurement of serum cobalamin can assess need for supplementation. D-dimers can be measured as a marker of thromboembolic disease. Abdominal ultrasound classically reveals hyperechoic striations in the intestinal mucosa. Biopsies can be obtained endoscopically or via exploratory laparotomy. WSAVA criteria should be applied when interpreting histopathology to evaluate cytoarchitectural changes in addition to the type and severity of inflammatory cells.

Management of PLE: Nutritional management is a mainstay of treatment for PLE. An ideal diet would be high energy, low fat, high carb. Novel protein or hydrolyzed diets are often recommended due to association of IBD with PLE. Purina HA is hydrolyzed and fat restricted making it an ideal diet. Royal Canin GI low fat is very fat restricted but is not antigen restricted. Elemental diets (Nestle Vivonex Plus) can be considered in severe or non-responsive cases. A low fat, home cooked diet could be considered under the supervision of a veterinary nutritionist.

Immunomodulatory drugs are used to reduce inflammation from IBD and prevent granuloma formation. Prednisolone (1 mg/kg/day) orally can be used in mild-moderate cases. Severe cases may require parenteral administration of dexamethasone SP (0.1mg/kg/day x 1 week, then 0.1mg/kg/every 48 hours). A second drug can be considered for dogs that may be intolerant to steroid effects or severe cases of PLE. Azathioprine, Chlorambucil, and
Cyclosporine are all options with various pros and cons. Metronidazole or Tylosin should be considered to help ameliorate inflammation secondary to dysbiosis.

**Complications:** Hypercoagulability is a common sequelae of PLE leading to potentially fatal thromboembolic events. Administration of low dose aspirin (0.5-1mg/kg/day) or clopidogrel (1-5 mg/kg/day) should be considered.

Hypocalcemia is usually mild and does not require treatment. Severe or symptomatic hypocalcemia may require intravenous calcium supplementation and oral calcitriol/calcium supplementation until the underlying disease process goes into remission.

**Prognostic Factors:** The prognosis is guarded because the response to treatment is unpredictable and relapses may occur. Continuous or intermittent lifelong treatment is required. The prognosis is more guarded in Yorkshire Terriers and Rottweilers.

**Selected References:**


