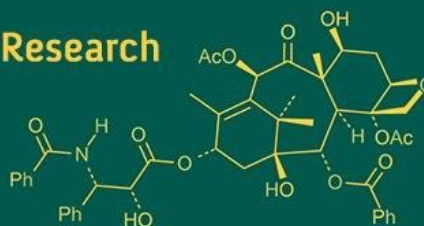


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Exocrine pancreatic insufficiency in 4 dogs and management with commercial pancreatic extract (Vital)

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Abstract

This study summarizes the clinical trial performed during the last one year in diagnosis and therapeutic management of exocrine pancreatic insufficiency (EPI) in four dogs. Pancreatic acinar atrophy is by far the most common cause for the maldigestion signs of canine EPI. Exocrine pancreatic insufficiency (EPI) 4 is characterized by inadequate production of pancreatic digestive enzymes by the decreased exocrine pancreatic acinar cells which results in a syndrome of maldigestion/ malabsorption of nutrients (1) Diagnosis of exocrine pancreatic dysfunction is based on typical findings in clinical histories and clinical signs and is confirmed with pancreatic function tests. The measurement of serum canine trypsin-like immunoreactivity has become the most commonly used pancreatic function test to diagnose canine EPI. Serum trypsin-like immunoreactivity measurement is species- and pancreas-specific. When clinical maldigestion signs of EPI appear, enzyme replacement therapy is indicated. In dogs, the highest enzyme activity in the duodenum has been obtained with nonenteric-coated supplements: raw chopped pancreas or powdered enzymes. Aside from dietary enzyme supplements, dietary changes are often made to improve clinical response. The management of EPI is lengthy and includes supplementing with pancreatic enzyme extracts, feeding a highly digestible diet, and giving, an antibiotic treatment to control small intestinal bacterial overgrowth (SIBO) for longer durations. Medications for treatment of gastrointestinal tract signs are used in such dogs with EPI. The present study elaborates the management of EPI in four dogs by using the commercially available pancreatic extract available in the market for long term remission of the symptoms of EPI and minimizing the decrementation of the body weight.

Keywords: Exocrine pancreatic insufficiency (EPI), canine EPI, pancreatic acinar atrophy

Introduction

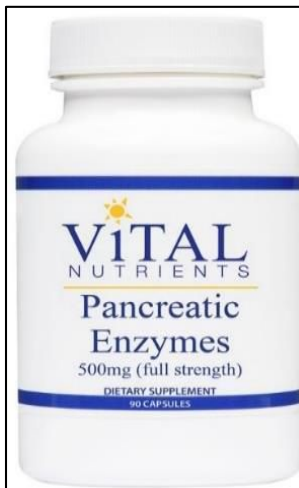
Exocrine pancreatic insufficiency (EPI) is impaired exocrine pancreatic excretion that results from severe progressive atrophy or inflammatory destruction of pancreatic acinar cells [7]. Thereby leads to Inadequate production of digestive enzymes-amylase, lipase, and proteases of digestion and causes a syndrome of maldigestion and malabsorption [1, 4]. classical clinical signs of EPI are weight loss leading to wasting hide bound condition as the disease progresses, diarrhea, voluminous feces, steatorrhea, and polyphagia are commonly seen [3, 4, 6]. Feces shows light color, loose texture, and is malodorous [7]. EPI is relatively common in dogs, [3, 4]. Pancreatic acinar atrophy (PAA) being the most important, chronic relapsing pancreatitis, and pancreatic neoplasia are also reported to be the causes of EPI in dogs [2, 4, 5, 6]. EPI is diagnosed by clinical signs and pancreatic function tests, like circulating trypsin-like immunoreactivity.

Materials and Methods

Dogs Four male German Shepherd dogs, 5.0–9.0 y of age, body weight 32–40 kg, which were presented to the clinic with known to be suffering from EPI based on history, clinical signs, indirect pancreatic function test (1) (1 dog), and serum canine TLI (2 dogs, 0.88 and 2.5 mg/L, respectively, normal for the laboratory ¼ 5.4–32 mg/L), were included in this study. At the time of presentation 1 dog had liquid diarrhea and the remaining 2 dogs had soft feces. Two dogs were lean [body condition score (BCS) of 2 on a scale of 5] and 1 dog did not reach fully its optimal body condition (BCS: 2.5/5).

Results

Four dogs which were male German Shepherds of 4.0–6.0 y of age, body weight 32–40 kg, which were presented to the hospital diagnosed to be suffering from EPI based on owners history, clinical signs, pancreatic function tests (1), and serum canine TLI (0.88, 0.99, 1.96 and 2.5 mg/L, respectively, normal for the laboratory $\frac{1}{4}$ 5.4–32 mg/L), were taken up for the trial of giving the pancreatic supplement. These dogs also showed signs like liquid diarrhea and soft feces. Three dogs were lean [body condition score (BCS) of 2.5 on a scale of 5] and 1 dog was having body condition (BCS: 2.0/5). After receiving the pancreatic extract supplement for 7 days, all 4 dogs produced well-formed feces (score of 4 on a scale of 5; Table 1) and diarrhea also subsided over the 3month follow-up (Table 1). Within 1 month, 3 dogs reached optimal body condition (BCS 3/5) after gaining 4–5 kg body weight. The skin lesions also subsided along with drastic decrease in the pruritus (pruritus score 0/5) the signs of skin disease completely subsided in 3 of the 4 dogs and markedly improved in the remaining dog after 2 mo. In this latter case, a mild pruritus persisted (pruritus score 1/5), as well as a few focal lesions of erythema and plaque with crusts and mild hyperpigmentation persisted.



Discussion

All four dogs included in this case report had been diagnosed with EPI for several years before their presentation for skin disease. As it is often the case in the long-term management of EPI, the gastrointestinal signs (soft feces, flatulence, diarrhea) of those 4 dogs improved but did not completely resolve after pancreatic enzymes replacement, highly digestible, and/or novel ingredient diets, as well as with repeated antibiotic treatment for small intestinal bacterial overgrowth [6]. Moreover, 2 dogs remained lean and 2 dog never reached its optimal body condition (BCS ,3). Within 1 wk on the high-fat soy hydrolysate-based diet and for the duration of the study, owners noticed a substantial improvement in fecal quality (fecal score of 4/5) and a disappearance of the episodes of diarrhea. Within 2 mo, the 4 dogs had gained from 4 to 10 kg. Feeding dogs moderate- to low-fat (30–10% of the calories) and highly digestible diets is usually recommended in the management of EPI [11, 12]. The rationale behind lowering fat intake is that bacteria metabolize unabsorbed fat to hydroxyfatty acids, which will in turn stimulate secretion of fluids in the distal portion of the small intestine

and colon [12]. The diet used in this case report provided 40.8% of its calories from fat. In a canine model of EPI, animals fed 43% of their calories as fat, absorbed protein, fat, and carbohydrate more efficiently than when fat represented 18 or 27% of their calories [13]. A better preservation of exogenous pancreatic enzymes, especially lipase, would explain this observation [13]. A study in 21 EPI dogs, to evaluate the benefit of feeding a low-fat (13% of calories) and low-fiber diet failed to show any significant benefit compared to their usual diets [12]. Those findings suggest that high-fat (40% of the calories; 20–22% fat on a dry matter basis) and highly digestible diets not only are not contra-indicated, but could be more efficient in the management of EPI. Moreover, as most EPI dogs are underweight at the time of presentation, those high-fat diets could promote a more rapid restoration of optimal body weight as illustrated in this case report. Aside from fat, rice that is one of the most digestible sources of carbohydrate [11], as well as soy hydrolysate, a source of predigested protein, probably contributed to the tolerance of the diet. All 4 dogs were presented to a dermatology specialty practice for severe pruritus and various signs of skin disease compatible with adverse reactions to food. Adverse reactions to food are abnormal responses to the ingestion of certain foodstuffs that will result in the appearance of clinical signs [11]. The signs are usually dermatological (pruritus, erythema, self-induced trauma, pyoderma, otitis, etc.) or gastrointestinal (vomiting, diarrhea, flatulence, abdominal discomfort). Appearance of dermatological signs during the long-term follow-up of EPI dogs is common, especially in German Shepherds [6]. Poor digestibility of proteins, a defective mucosal barrier, and increased mucosal permeability would explain this sensitivity. Diets based on protein hydrolysates have recently become available for the management of adverse reaction to food in dogs. Hydrolysates are produced by enzymatic proteolysis of native proteins that results in an array of peptides, small enough so that they would no longer be recognized by, or trigger a reaction by, the immune system [11]. These peptides are also highly digestible, therefore reducing their retention time in the lumen of the intestine. Soy hydrolysates have been used extensively in the prevention of food sensitivity in babies and in calves [14, 15]. Preliminary results in the management and the diagnosis of adverse reaction to food in dogs are encouraging [16]. Pruritus and the associated self-trauma, erythema, seborrhea, and pyoderma in the 4 dogs of this study responded well to the dietary and 30-d antibiotic treatments.

Conclusion

The study demonstrated that pancreatic enzyme supplementation, combined with a high-fat soy hydrolysate-based diet, was effective in managing exocrine pancreatic insufficiency (EPI) in four German Shepherd dogs. After seven days of treatment, all dogs showed significant improvement in fecal consistency, and within two months, they gained 4–10 kg in body weight. Skin lesions and pruritus improved substantially, with three dogs achieving complete remission. While gastrointestinal symptoms of EPI improved, they did not fully resolve, emphasizing the need for ongoing dietary and medical management. The findings highlight the benefits of high-fat, highly digestible diets in promoting weight gain and better management of EPI symptoms in dogs.

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