

Pancreatic insufficiency-- Exocrine

Exocrine pancreatic insufficiency (EPI) is the inability to properly digest food due to a lack of digestive enzymes made by the pancreas. This disease is found frequently in dogs. EPI is also found in humans afflicted with cystic fibrosis and Shwachman-Diamond Syndrome. EPI is caused by a progressive loss of the pancreatic cells that make digestive enzymes. Most commonly in dogs, this is caused by pancreatic acinar atrophy. The atrophy in turn can be caused by previous infections, a blocked pancreatic duct, or genetics. Chronic pancreatitis is the most common cause of EPI in humans and cats, but it is an uncommon cause in dogs. Loss of digestive enzymes leads to maldigestion and malabsorption of nutrients.

EPI in humans

Causes

In humans, the common causes of EPI are Cystic Fibrosis, which is a hereditary recessive disease of Europeans and Ashkenazi Jews involving a chloride channel called CFTR, and chronic pancreatitis. Shwachman-Diamond Syndrome is the second most common cause of pancreatic insufficiency in humans.

EPI is also fairly common in diabetes - both type 1 and type 2. Studies have shown that about 35% of type 2 diabetics and 50% of type 1 diabetics exhibit symptoms and characteristics of EPI.

However, treatment is normally only initiated once the patient complains of problems with steatorrhea, bulky stools, abdominal pain, and/or flatulence. Some clinicians refer to this phenomenon as 'diabetic diarrhea', however this term is rarely explained as a symptom of EPI possibly because it could also be linked to GI motility problems. Limited and preliminary studies have indicated that treatment of EPI with products such as Pancrelipase have an effect on glucose control. Also, there have been only small

differences in the fat soluble vitamin status of diabetics treated with products such as Pancrelipase, as steatorrhea can lead to a decrease in the absorption of fat soluble vitamins.

Treatment

Often this is treated with Pancreatic Enzyme Products (PEPs), such as pancrelipase, that are used to breakdown fats (lipases), proteins (proteases) and carbohydrates (amylases) into units that can be digested by those with EPI.

EPI in animals

Pathogenesis

In dogs, EPI is most common in young German Shepherd Dogs, and Rough Collies in Finland, in which it is inherited. In the German Shepherd Dog the method of inheritance is through an autosomal recessive gene. In these two breeds, at least, the cause appears to be immune-mediated as a sequela to lymphocytic pancreatitis. The German Shepherd Dog makes up about two-thirds of cases seen with EPI. Other breeds reported to be predisposed to EPI include terrier breeds, Cavalier King Charles Spaniels, Chow Chows and Picardien Shepherd.

Symptoms of EPI

In animals, symptoms of EPI are not present until 85 to 90 percent of the pancreas is unable to secrete its enzymes. In dogs, symptoms include weight loss, poor hair coat, flatulence, increased appetite, coprophagia, and diarrhea. Feces are often yellow-gray in color with an oily texture.

Diagnosis and treatment

The most reliable test for EPI in dogs and cats is serum trypsin-like immunoreactivity (TLI). A low value indicates EPI. Fecal elastase

levels may also be used for diagnosis in dogs, but low levels may be found in dogs without EPI.

In dogs, the best treatment is to supplement its food with dried pancreatic extracts. There are commercial preparations available, but chopped bovine pancreas from the butcher can also be used (pork pancreas should not be used because of the rare transmission of pseudorabies). Symptoms usually improve within a few days, but lifelong treatment is required in most cases. A rare side effect of use of dried pancreatic extracts is oral ulceration and bleeding.

Because of malabsorption, serum levels of cyanocobalamin (vitamin B12) and tocopherol (vitamin E) may be low. These may also be supplemented. Cyanocobalamin deficiency is very common in cats with EPI because about 99 percent of intrinsic factor (which is required for cyanocobalamin absorption from the intestine) is secreted by the pancreas. In dogs this figure is about 90 percent, and only about 50 percent of dogs have this deficiency. There may be Vitamin K deficiency in cats. If there is bacterial overgrowth in the intestine, antibiotics should be used, especially if treatment is not working.

In dogs, failing to gain weight or continuing to show symptoms, modifying the diet to make it low fiber and highly digestible may help. Despite previous belief that low fat diets are beneficial in dogs with EPI, more recent studies have shown that a high fat diet may increase absorption of nutrients and better manage the disease. However, it has been shown that different dogs respond to different dietary modifications, so the best diet must be determined on a case by case basis.