Parramatta Veterinary Hospital

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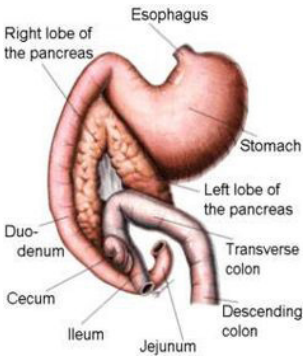
PANCREATITIS

(Adapted from Veterinary Information Network www.vin.com)

The normal Pancreas and what it does

We eat food, chew it up into slurry, and swallow it. It travels down the esophagus to the stomach where it is ground up further and enzymes are added to begin the breakdown of dietary nutrients (digestion). When the food particles are small enough, they are propelled into the small intestine for further digestive treatment and ultimately nutrient absorption.



The small intestine has three portions: the duodenum that connects to the stomach and the jejunum and ileum below. The jejunum and ileum are mostly involved in absorption but the duodenum, being so close to the stomach, is the site of further digestion.

There are two ducts that enter the duodenum near where the stomach contents enter. One duct is for bile, squirted in directly from the liver's gall bladder. The bile serves to neutralize the acid that the stomach had added to emulsify (or dissolve) dietary fats for absorption later in the tract, and also to excrete some toxins. The other duct is the pancreatic duct, which squirts in more digestive enzymes so as to break down starches and continue the breakdown of protein.

The pancreas is a pale pink glandular organ that nestles cozily just under the stomach and along the duodenum. As a glandular organ, the pancreas is all about secretion and it has two main jobs: the first job is the secretion of digestive enzymes to help us break down the food we eat, the second job is the secretion of insulin and glucagon (to regulate sugar metabolism). The digestive enzymes are the part of the story that concerns us in pancreatitis.

Pancreatitis is inflammation of the Pancreas

In pancreatitis, inflammation disrupts the normal integrity of the pancreas. Digestive enzymes that are normally safely stored in granules are released prematurely where they digest the body itself. The result can be a metabolic catastrophe. The living tissue becomes further inflamed and the tissue damage quickly involves the adjacent liver. Toxins released from this orgy of tissue destruction are released into the circulation and can cause a body-wide inflammatory response. If the pancreas is affected so as to disrupt its ability to produce insulin, diabetes mellitus can result; this can be either temporary or permanent.

Specific Pancreatitis disasters

Specific disasters include the disruption of surfactants in the lung tissue that normally keep the tiny air-filled alveoli from collapsing after each exhaled breath. Without surfactants, the alveoli close up and respiratory failure results. Also, there is a syndrome called Weber-Christian syndrome where fats throughout the body are destroyed, which has painful and disastrous results.

Pancreatitis is one of the chief risk factors for the development of what is called disseminated intravascular coagulation, or DIC, which is basically a massive uncoupling of normal blood clotting and clot dissolving mechanisms. This uncoupling leads to abnormal simultaneous bleeding and clotting of blood throughout the body.

Pancreatic encephalopathy (brain damage) can occur if the fats protecting the central nervous system become digested.

The good news is that most commonly the inflammation is confined to the area of the liver and pancreas but even with this limitation pancreatitis can be painful and life-threatening.

Pancreatitis can be acute or chronic, mild or severe.

What causes Pancreatitis

In most cases we never find out what causes it but we do know some events that can cause pancreatitis:

- Reflux of duodenal contents into the pancreatic duct. The pancreas has numerous safety mechanisms to prevent self-digestion. One mechanism is storing the enzymes it creates in an inactive form. They are harmless until they are mixed with activating enzymes. The strongest activating enzymes are made by duodenal cells; the digestive enzymes do not activate until they are out of the pancreas and mixing with food in the duodenum. If duodenal fluids backwash up the pancreatic duct and into the pancreas, enzymes are prematurely activated and pancreatitis results. This is apparently the most common pancreatitis mechanism in humans, though it is not common in veterinary patients.
- Concurrent hormonal imbalance predisposes a dog to pancreatitis. Such conditions include: diabetes mellitus, hypothyroidism, and hypercalcemia. The first two conditions are associated with altered fat metabolism, which predisposes to pancreatitis, and the second condition involves elevated blood calcium that activates stored digestive enzymes.
- Use of certain drugs can predispose to pancreatitis (sulfa-containing antibiotics such as trimethoprim sulfa, chemotherapy agents such as azathioprine or L-asparaginase, and the anti-seizure medication potassium bromide). Exposure to organophosphate insecticides has also been implicated as a cause of pancreatitis. Exposure to steroid hormones have traditionally been thought to be involved as a potential cause of pancreatitis but this appears not to be true, though steroids are able to cause an increase in lipase blood tests.
- Trauma to the pancreas that occurs from a car accident or even surgical manipulation can cause inflammation and thus pancreatitis.
- A tumour in the pancreas can lead to inflammation in the adjacent pancreatic tissue.

Miniature Schnauzers are predisposed to pancreatitis as they commonly have altered fat metabolism.

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Signs of Pancreatitis

The classical signs in dogs are appetite loss, vomiting, diarrhea, painful abdomen, and fever. Dogs can present from mildly affected (i.e. off their food and a bit flat) to severely ill.

Making the Diagnosis

A new test called the SPEC cPL (specific canine pancreatic lipase) test has come to be the test of choice. This test is a newer generation immunological test for canine pancreatic lipase and can be run overnight by a reference lab. This test is able to detect 83% of pancreatitis cases (the test is 83% sensitive) and excludes other possible diseases in 98% of cases (i.e. the test is 98% specific for pancreatitis). There is no comparable test for cats at this time.

Radiographs can show a widening of the angle of the duodenum against the stomach, which indicates a swelling of the pancreas. Most veterinary hospitals have the ability to take radiographs but this type of imaging is not very sensitive in detecting pancreatitis and only is able to find 24% of cases.

Ultrasound, on the other hand, detects 68% of cases and provides the opportunity to image other organs and even easily collect fluid from the belly. Since pancreatitis can be accompanied by a tumor near the pancreas, ultrasound provides the opportunity to catch such complicating factors.

In some cases, surgical exploration is the only way to make the correct diagnosis.

Treatment

The passage of food through the duodenum is a strong stimulus to the pancreas. In the treatment of canine pancreatitis we do not want any stimulation of the pancreas; we want the pancreas to rest. This means no food and no water for at least 24 hours (IV fluid support prevents dehydration).

Fluid support will generally require potassium supplementation because potassium depletes in pancreatitis. Blood pH must be tracked as well. A critical patient with pancreatitis may need 24 hour care and blood test monitoring several times a day. A plasma transfusion represents a specific type of fluid therapy and helps provide certain proteins that inhibit pancreatic enzymes. Whether or not the protection afforded by plasma is real or theoretical is still being worked out, but since it is difficult to go wrong with a plasma transfusion, do not be surprised if your veterinarian uses this approach.

Pancreatitis is a painful condition and pain management is not only humane but important in recovery. Untreated pain affects the immune system and increases mortality. Injectable pain medications, fentanyl patches, and even continuous drips can be used effectively to control pain. Additional medication to control nausea is also commonly used. Antibiotics are often used because even though pancreatitis is not a bacterial disease, bacterial invasion from the diseased intestine is a common occurrence.

Once the patient has started to eat again, a low fat diet, such as one of the prescription high fiber diets, is important to minimize pancreatic stimulation. Since there is potential for the pancreas to always have a chronic smoldering bit of inflammation, long-term use of a low fat diet is likely to be recommended.