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FELINE TRIADITIS: INFLAMMATORY DISEASES OF THE LIVER, PANCREAS AND SMALL INTESTINE

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Abstract
Cats often have two or three inflammatory diseases concurrently, in the liver, pancreas and small intestine. This condition is called “feline triaditis”. Therefore, it is important to search for other illnesses even though a single disease is diagnosed. Also it is very important to control vomiting in cats since vomiting may aggravate the condition.

What is triaditis?
Triad means a combination of three, such as in “portal triad” meaning a structure inside the liver consisting of a bile duct, a portal vein, and an artery. The postfix “itis” of course means inflammation. In medical terminology, there is “triaditis” but it means an inflammatory disease with characteristic three signs. In veterinary medicine, however, especially in feline medicine, triaditis is a newly formed term, and it means inflammatory diseases involving three specific organs, namely the liver, pancreas and small intestine. Therefore, a caution must be taken when translating this term into other languages, so that it does not mean “inflammation with three specific signs” but it means “inflammation in three specific organs”.

The common inflammatory diseases in the liver include acute and chronic cholangiohepatitis. But some people also tend to include hepatic lipidosis although it is not an inflammatory disease in nature. However, it is true that prolonged fasting in cats with chronic pancreatitis may increase the risk of hepatic lipidosis in some animals. The inflammatory disease in the pancreas is pancreatitis, and that in the small intestine is inflammatory bowel disease (IBD).

The reason why inflammatory diseases commonly occur in those three organs in cats is that they are in proximity connected in the duodenum. Especially in the cat, the bile duct and the pancreatic duct opens into the duodenum through one opening. Also, it should be noted that the feline duodenum reportedly contains 100 times more bacteria than in the canine duodenum, and that vomiting caused by a single organ abnormality may give rise to a reflux of the bacteria-rich duodenum juice into the two duct systems to the liver and pancreas. Chronic vomiting is commonly seen in the cat with triaditis, so it may be also possible to define the triaditis as...
inflammatory diseases with three specific signs such as “vomiting on white carpet, vomiting on a couch, and vomiting on the owner’s bed”. Chronic small bowel diarrhea may also be seen with IBD.

**Diagnostic approach**

The individual disease can be diagnosed separately, but it should be noted that any combination of the three diseases occur concurrently. Vomiting is a sign noted in both intestinal disease and hepatic disease. Jaundice may be prominent in the hepatic disease but inflammation around the bile duct may involve the pancreatic duct. Also, bacterial infection in the gut may cause a mild jaundice in the cat. Vomiting is not a hallmark of the feline pancreatitis, but loss of appetite is seen very frequently with this disease.

The initial screening consists of CBC, UA, fecal and chemistry, but they do not generally diagnose pancreatic or intestinal disorders. Additional testings such as Spec-fPL and biopsies are frequently necessary. It is not right to diagnose cholangiohepatitis without biopsy, but it can be suspected when the patient has elevated ALT, GGT and TBil. Ultrasonography and FNA cytology of the liver may be used to rule out lipidosis. Acute and chronic cholangiohepatitis can be crudely differentiated with fever, neutrophil left shift and toxic changes. Presence of many small lymphocytes in the liver FNA may indicate chronic inflammation, but is not conclusive. Especially, distinction between low-grade lymphoma, simple lymphocytic infiltration in the portal triad and chronic cholangiohepatitis is not possible. For diagnosing IBD, either full thickness or endoscopic biopsy of the duodenum and jejunum is necessary. But cat owners usually resist the biopsy, and symptomatic therapies are carried out frequently for IBD.

**Cholangiohepatitis**

There are a number of diseases in the feline liver, and they include hepatic abscess, bile sludge with infection, cholangiohepatitis, hepatic bile duct cysts, hepatic lipidosis, hepatocellular carcinoma, hepatic lymphoma, extrahepatic bile duct obstruction, and portosystemic shunt. For unknown reasons, cholangiohepatitis is more frequently diagnosed than hepatic lipidosis in cats of Japan. The cats after the World War II in Japan are mostly American and European in origin, and there should be no great genetic difference. The only difference may be a high consumption of fish, but cat food products from the U. S. or from France are also very popular. Although carnitine deficiency is suggested as a part of possible pathogenesis for hepatic lipidosis, it is not known whether most cats in Japan are fed with carnitine-rich cat food.

Cholangiohepatitis is divided into two categories. One is acute or purulent cholangiohepatitis with bacterial infections. The term cholangiohepatitis means that the bile duct epithelium is involved, and thus histopathology is necessary to reach a correct diagnosis. Once diagnosed, it is necessary to initiate antibacterial therapy usually employing two antibiotics, metronidazole and ampicillin, and the therapy must be continued for 2 to 3 months. Even with this acute form, sometimes prednisolone at 5 mg/cat po bid to sid needs to be added to have a successful outcome. Also ursodeoxycholic acid at 10-15 mg/kg/day may be added. Administration of s-adenosyl methionine (SAMe) is also helpful.

The other form is chronic cholangiohepatitis, and both chronic bacterial infection and an autoimmune destruction of the bile duct epithelium are suggested as pathogenesis. It should be remembered that it is necessary to distinguish chronic cholangiohepatitis and lymphocytic portal hepatitis, because the latter is a simple incidental finding with accumulation of lymphocytes around the portal bile duct and requires no treatment according to the WSAVA's specialist recommendation. Upon histopathologic confirmation, preferably, a long term corticosteroid and antibacterial therapy is instituted. The same antibiotics are used for a period of 2
to 6 weeks, and prednisolone is administered at 1-2 mg/kg po bid initially with a gradual decrease. In some severe cases, a high dose prednisolone at 4-6 mg/kg may be necessary for a few weeks, with a gradual decrease to a final dosage of 1-3 mg/kg eod after 3 months. Ursodeoxycholic acid is also helpful.

When oral corticosteroid preparations are used in cats, both prednisone and prednisolone are available. It is said that there is no difference in bioavailability between the two. Prednisone is metabolized in the liver to give prednisolone, and some people say that the metabolism in the feline liver is not as efficient as in the dogs. Especially when the liver is damaged to some extent, it may be safer to select prednisolone in cats, or we may be able to achieve the same successful result with a lower dosage. When administered once daily, it seems more effective if given in the evening as determined by decreases in lymphocyte subpopulations. This may be related to the fact that the cat is nocturnal but the exact mechanism is unknown.

Pancreatitis

Acute necrotic pancreatitis is uncommon in cats, and the clinical signs are different from those in dogs. Vomiting is seen in only a half of the cats. Clinical pathology may reveal neutrophilia and hypocalcemia, but serum amylase and lipase are of no value. The only reliable diagnostic parameter is Spec-fPLI offered by IDEXX Laboratories. Once diagnosed, NPO for a short period if vomiting, iv fluid, plasma transfusion, and antiemetic therapy are initiated. Calcium supplementation, H1 and H2 blockers, and low dose dopamine may be considered. Food should be started as soon as possible to promote the flow of the pancreatic juice to the duodenum. Also, prolonged fasting may increase the risk of hepatic lipidosis. In order to suppress the colonization of intestinal bacteria in the necrotic tissue, cefotaxime at 50 mg/kg im q8h can be given.

About 90% of feline pancreatitis is chronic. Most of the affected cats are not bright, are dehydrated, and lose appetite, but these symptoms are nonspecific. Vomiting is only seen in about one third of the cases. Fluid and antiemetic therapies are usually initiated, and corticosteroid may also be helpful. Prednisolone is given at 2 mg/kg po sid initially, and decreased to sid or eod in 6 to 8 weeks with a successful outcome in most of the cases.

IBD

The inflammatory bowel disease (IBD) is an inflammatory disease in the intestines with unknown etiology, but hypersensitivities against food or bacterial antigens are suggested as pathogenesis. The clinical signs include chronic vomiting and diarrhea with weight loss. It is important to rule out other causes before reaching the diagnosis. Histopathologic findings of intermediate to severe infiltration of inflammatory cells in the lamina propria with blunting villi can be suggestive but not diagnostic. Therefore, it is a clinician’s role to rule out other diseases such as lymphoma or simple infections. In order to rule out some bacterial infections, Giardia, Cryptosporidium and Tritrichomonas foetus, a PCR intestinal panel offered by IDEXX Laboratories is cost-effective. Once diagnosed, a dietary therapy with a novel protein or hydrolysed protein, antibiotics, and probiotics are used. Addition of Loperamide and Cerenia may be helpful. As an anti-inflammatory therapy, prednisolone can be used at 5 mg/cat po bid for 2 weeks, then sid for another 2 weeks, and finally tapered to eod in 4 to 10 weeks. Chrolambucil at 2 mg/cat po every 4 days may be necessary in intractable cases.