

Liver Disease in Dogs

A dog's liver is located just behind his diaphragm. It is a large organ that has many responsibilities in the normal function of the body. Some of these important jobs are:

- **Cleaning the blood.** The liver detoxifies the body by removing harmful substances from the bloodstream.
- **Contributing to digestion.** The liver manufactures bile and other substances that aid in digestion. Bile is stored in the gallbladder after it is produced by the liver, then it's secreted into the gastrointestinal tract. Bile helps with the breakdown of fats during digestion.
- **Converting sugars to glycogen** and storing them until they are needed.
- **Removing and destroying old red and white blood cells.** Blood cells wear out and need to be removed from circulation. The liver handles this important task.
- Producing substances that are necessary to **promote proper blood clotting.**

When the liver isn't working properly, there are a plethora of canine bodily functions that may suffer. You may also hear the terms *hepatic disease*, *liver failure*, or *hepatic failure* used interchangeably with the term *liver disease*.

Causes of Canine Liver Disease

Liver disease in dogs occurs when a large number of liver cells are damaged and the organ can no longer perform its tasks adequately. This can be the result of a number of different processes. Some of these conditions result in acute, or sudden, liver dysfunction while others cause chronic, or long-term and progressive liver disease. Below are some of the most common causes of liver disease in dogs.

- **Toxic hepatopathy** is liver failure caused by ingestion of toxic compounds. There are many substances that are toxic or even poisonous to dogs and may cause liver disease. Some of the more common ones are:
 - **Xylitol:** A natural sugar substitute found in a huge variety of human products, including gums, toothpastes, candies, and drinks, xylitol causes a dangerous dip in blood sugar in dogs. At higher dosages, it causes liver failure that may be fatal.
 - **Human medications:** Some medications that humans take aren't metabolized the same way by dogs and can result in liver disease. Some of the most common of these are Tylenol and Motrin.
 - **Canine medications:** A dog may develop liver failure from prescription medications that are prescribed to him. Some drugs are more likely to cause problems, especially over time. Ask your veterinarian whether liver damage may occur with the medications your dog is taking. Other potential causes can be a dog getting into the medication and eating a lot at once, or having a sensitivity to that drug. Some medications associated with liver

problems are phenobarbital (an anti-convulsant) and NSAIDs such as Rimadyl and Deramaxx.

- **Infections** can cause liver disease in dogs. One common bacterial infection that often results in liver failure is *leptospirosis*. This bacteria can also cause illness in humans.
- **A chemical toxin**, such as *aflatoxins* in some wild mushroom species, can result in liver disease in dogs.
- **Copper accumulation disorders** occur when excessive copper builds up in a dog's system. This may be caused by a genetic inability to process copper or it can occur secondarily to another liver-damaging disease process.
- **Pancreatitis** is a serious inflammation of the pancreas gland whereby digestive enzymes from the pancreas begin to harm the surrounding digestive tract. This can cause damage to the nearby liver.
- **Portosystemic shunt** is a congenital condition in which intestinal blood bypasses the liver and its toxin-removal system. Poisons build up in the blood because they aren't properly removed by the liver.
- **Trauma** such as being hit by a car can result in the death of liver cells and liver failure.
- **Chronic inflammatory or autoimmune conditions** can result in liver disease that is termed *chronic hepatitis*.
- **Cancer** can affect the liver in dogs, resulting in liver failure. These cancers may be primary (beginning in the liver) or secondary (traveling to the liver from another part of the body).

Signs of Liver Disease in Dogs

The liver can function properly even with the loss of function of up to 75% of its cells. Therefore, signs of illness are not usually seen until liver disease is quite advanced. Below are some of the signs of dog liver disease:

- **Decreased appetite** is commonly seen in dogs with liver disease. This may occur suddenly or develop slowly over time.
- **Weight loss** is another common sign in dogs with liver disease.
- **Lethargy**, or a decrease in activity level, may be seen as toxins that aren't being processed properly by the liver build up in the dog's system.
- **Vomiting and diarrhea** both occur at an increased frequency in dogs with liver disease. Vomit and feces may both appear black and tarry due to blood loss into the gastrointestinal tract.
- **Increased water consumption and increased urination (PU/PD)** is another common sign that dog-owners notice when their pet is afflicted with liver disease.
- **Jaundice (Icterus)** is a yellowing of the skin, whites of the eyes, or gum tissue that is commonly seen in dogs with liver failure.
- **Ascites**, or fluid accumulation in the abdomen, occurs in the later stages of liver disease in dogs due to an increased pressure in the veins leading to the liver and a decrease in the

production of a protein called albumin. Albumin helps keep fluid in the blood vessels; when it is low, the vessels may leak fluid into the body's cavities.

- **Dark urine**, caused by an increase in the bilirubin level in the dog's body, is seen in advanced cases of liver disease. It is commonly misinterpreted as bloody urine by many dog owners.
- **Bruising** may be seen on the skin of dogs with liver failure. Another common finding is the appearance of pinpoint or patchy spots of blood in the whites of the dog's eyes, on the gums, or on the skin. This occurs because the dog's liver normally produces blood clotting factors that are low when liver disease is present.
- **Seizures** can occur in the end stages of liver failure in dogs. This is due to *hepatic encephalopathy*, which means that increased toxins in the bloodstream are affecting the dog's neurological system.

Diagnosis of Hepatic Disease in Dogs

If your dog is showing any of the above signs of illness, your veterinarian will need to determine whether the cause is liver disease or something else. Many of the signs of liver disease can occur with other diseases. He or she will begin by taking a thorough history of your dog's illness from you and doing a physical examination. The exam may reveal clues pointing toward liver disease, such as yellow skin, an enlarged or "lumpy" liver, or a tight, full abdomen. Your veterinarian is likely to run further tests to confirm liver disease. Some of these diagnostics include:

- **General blood work:** There are certain changes that are commonly seen in the blood results of dogs with liver disease. These include the following:
 - Increased liver function values, especially alanine aminotransferase (**ALT**) and alkaline phosphatase (**Alk Phos**).
 - Decreased blood urea nitrogen (**BUN**) level.
 - Decreased **albumin** may be present in dogs with liver disease because the liver isn't able to produce a normal amount of this protein.
 - Increased **bilirubin** may be present in the bloodstream as liver disease progresses in dogs. Bilirubin is a byproduct of the normal destruction of red blood cells in the body. The liver normally removes excess bilirubin from the body. An increase in bilirubin levels signals that the liver isn't able to clear these byproducts out like it normally would. Increased bilirubin is responsible for the jaundice, or yellowing of the skin and whites of the eyes, that is commonly seen in dogs with advanced liver disease. It also causes the dark urine that may occur (see signs of liver disease above).
 - Increased **cholesterol** may be present in dogs with liver disease.
- **Bile acids test:** This specialized test may be ordered by your veterinarian if he or she suspects liver disease but your dog's blood work does not show an increase in bilirubin. It is a common test to run when a portosystemic shunt is suspected. Your dog will stay at the veterinary clinic for part of the day. Blood samples will be taken before and after your dog is given a fatty

meal. These samples will be evaluated at the laboratory. Increased bile acids usually indicate a liver problem.

- **X-rays:** X-rays may be ordered by your veterinarian to evaluate the size and shape of your dog's liver, whether there is fluid present in the abdomen, and whether any other cause for your dog's signs may be determined.
- **Abdominal ultrasound:** Ultrasound may be a more sensitive test than X-rays for finding irregularities in a dog's liver tissue.
- **Fine needle aspirate:** This test may be performed to help your veterinarian diagnose the cause of your dog's liver disease. A needle is inserted into the liver, with the help of an ultrasound, and some cells are removed and examined microscopically.
- **Biopsy:** A biopsy is sometimes necessary to determine the exact cause of a dog's liver disease. A piece of liver tissue is removed during an abdominal surgery. This tissue may then be examined microscopically to aid in the diagnosis of liver disease.

Treatment of Hepatic Disease in Dogs

The treatment of canine liver disease depends on the cause. Some or all of the following therapies may be utilized by your veterinarian:

- Portosystemic shunts may be **surgically corrected**.
- **D-Penicillimine and trientine** are chelating drugs that may be used in the treatment of copper accumulation disorders.
- **Antibiotics** may be required for bacterial infections such as leptospirosis.
- **Corticosteroids** such as prednisone may be used to treat hepatitis. Steroids have immune and inflammatory suppressing actions, although use of steroids must be weighed against potential liver damage when used long term.
- **Supportive therapies** are often necessary to help dogs with liver disease. *Intravenous (into a vein) or subcutaneous (under the skin) fluids* are extremely valuable for flushing out toxins that the liver isn't handling normally as well as helping to achieve normal hydration levels when the dog isn't eating or drinking well. *Antacids, anti-nausea medications, appetite stimulants, and stomach protectant medications* may all be used for supportive care of a dog with liver disease.
- **Ursodiol** is a bile acid that can be given orally to dogs with liver disease. It helps improve the flow of bile out of the liver, can behave as an anti-oxidant to mitigate further liver cell damage, and also has anti-inflammatory effects.
- **Vitamin B12 and Vitamin K** may be supplemented in a dog with liver disease.
- **Vitamin E** is an anti-oxidant that can help protect the liver from further damage. It is especially useful in dogs with copper accumulation disorders.
- **Special diets** may be recommended in certain situations for dogs with liver disease. *Low copper diets* may benefit dogs with copper accumulation disorders. *Low protein diets* may ease some stress on dysfunctional livers.

Questions to Ask Your Veterinarian If Your Dog Is Diagnosed with Liver Disease

- **What is the prognosis for my dog?** The liver is a highly-regenerative organ. It can restore up to 75% of its function if a disease condition is diagnosed and treated aggressively. The prognosis for your specific dog will vary depending on the cause of the liver disease, how advanced it is, and what other organ systems may be involved.
- **Are there any holistic treatment options that we can explore for treating liver disease in my dog?**
 - **S-adenosylmethionine (SamE)** is a supplement that can be given to dogs with liver disease. It is converted to *glutathione* in the dog's body, and it is a powerful anti-oxidant to help prevent further liver cell damage. It improves bile flow from the liver, as well. SamE is also present in a product called **Denamarin**, where it is paired with **silybin**, which is a derivative of milk thistle (see below).
 - **Milk thistle** is an herb that has strong effects to help regenerate liver cells. Milk thistle contains **silymarin**, which may be able to block the entry of toxins into the liver and remove them from the body, mitigating further liver cell damage.
 - **Other herbs** that may be helpful in liver disease include choline, carnitine, arginine, boswellia, burdock, dandelion root, licorice, nettle, Oregon grape, red clover, turmeric, yellow dock, and maitake mushrooms. Consult your holistic veterinarian for information on these.
 - **Acupuncture and chiropractic care** may be used as part of a holistic approach to supporting a dog with liver disease.
 - **Omega 3 Fatty Acids from a Marine Source**--these are natural anti-oxidants and anti-inflammatory. Omega 3 fatty acids help with fat regulation in the blood and naturally decrease toxins protecting the liver from damage.
 - **Home made diets** - Dietary therapy is important in the treatment of the pet with liver disease. High quality and highly digestible carbohydrates are recommended to supply energy for the pet. Lower quality carbohydrates are not digested and are fermented by the colonic bacteria. This increases the colonic bacteria which in turn increases the breakdown of protein and increases ammonia produced. This is absorbed by the body and contributes to toxicity in pets with liver disease. Frequent feedings of high quality simple carbohydrates such as white rice and potatoes are recommended. Vegetables act as a source of complex carbohydrates and provide fiber; the fiber helps bind intestinal toxins and promotes bowel movements to remove these toxins (by-products of protein digestion and bacterial fermentation of undigested foods) from the body. Proteins provided by the diet must be of high biological value to reduce the production of ammonia, a by-product of protein digestion. Many commercial foods contain proteins that are not of high biological value and may also contain excess vitamin A, copper, and bacterial endotoxins, all of which contribute to the clinical

signs in pets with liver disease. Unless your doctor recommends protein restriction normal amounts of protein should be fed as protein is needed by the liver during repair.

by Dr. Jan Huntingford - Monday, July 22, 2015

<http://www.petwellbeing.com/blog/dogs/liver-disease-in-dogs>