

# LIVER DISEASE

## About Liver Disease

The liver is a very important organ that has a wide range of functions including: the regulation of fat, carbohydrate, and protein metabolism, the production of blood proteins such as clotting factors and albumin, and the metabolism of drugs and toxins among other functions. Any damage or disruption to the liver function will affect the entire body since the liver plays such a critical role of metabolism in the body. The liver can be damaged by viral and bacterial infections (hepatitis), ingested toxins (ibuprofen), altered blood flow to the liver (blood shunt), sudden starvation or anorexia (especially overweight cats), infiltration of cancer, gall bladder obstructions and many other causes.

## Congenital Liver Disorders- Several breeds of dogs are susceptible to liver disease

- Bedlington terriers and West Highland White terriers are prone to copper storage disease where they lack a crucial enzyme needed to eliminate excess copper from the liver leading to high concentrations and liver disease.
- Yorkshire Terriers, Maltese, and other toy breeds have a high incidence of liver shunts. Affected pups are born with a greatly decreased blood flow to the liver due to the the largest blood vessels bypassing the liver. During the first weeks to months of life, the pups appear normal, but as the animal gets older, clinical signs start to develop as toxins, which the liver usually eliminates, build up in the blood. The most common toxin is ammonia (which the liver normally converts to BUN which the kidney then eliminates in the urine. With a liver shunt, the blood bypasses the kidney leading to high blood ammonia levels which in turn cause severe neurologic signs.

## General Symptoms of Liver Disease

- Anorexia (lack of appetite)
- Weight loss
- Lethargy, depression
- Jaundice (yellow gums, skin, whites of eyes, insides of ears)
- Vomiting
- Dark colored urine (yellow, orange, brown)
- Ascites (build up of water-like fluid in the belly that is often mistaken for weight gain)- due to low protein production in the liver
- Neurologic signs- head pressing, mentally out of it- due to high blood ammonia levels
- Bleeding disorders (small cuts do not clot and continues to bleed, bleeding from nostril, bruising easily)

## Diagnosis

- **Physical exam-** the liver can either feel normal, enlarged (inflammatory or infiltrative liver disease) or small (chronic or cyrotic liver disease). Most commonly, the the mucous membrane (gums), skin, whites of eye, and inside of the ears are often yellow colored (icteric or jaundice) due to an accumulation of bilirubin- a breakdown product of red blood cells that is processed by the liver. Urine can also be a dark yellow almost an orange color due to elevated bilirubin as well. With severe liver disease, ascites will develop. Ascites is a fluid accumulation in the abdomen secondary to low blood protein (seen often in photos of human famine victims with the distended bellies). Often the owner mistakes the fluid or swollen abdomen for weight gain. With a chronic liver disorder, the animal is often very thin, dehydrated, weak, and debilitated.
- **Blood chemistry** shows an elevation of the liver enzymes correlating with liver cell damage, elevated bilirubin and ammonia due to decreased elimination, and low cholesterol, blood urea nitrogen (bun), albumin, and sometimes even low glucose or blood sugar when the liver is in complete failure. Some pets suffer seizures due to very low blood glucose (sugar) levels.
- **Bile acids test** is the best test to **measure liver function**.
- **Radiographs (X-rays)** will show the size and position of the liver in the abdomen.
- **Ultrasound** is extremely useful for evaluating the structure and composition of the liver. With ultrasound, masses and blood vessel patterns can be examined within the liver, and the basic architecture and structure of the liver tissue can be evaluated. Ultrasound is also be used to image the liver during biopsy procedures which allows for a safer and more diagnostic specimen to be collected.
- **Liver biopsy-** is the ultimate diagnostic tool. The biopsy can be collected via ultrasound guidance using a needle biopsy device through the skin, or biopsies can harvested during an exploratory surgery where the surgeon can visually examine the liver, feel all of the surfaces of the liver lobes, and collect representative samples for biopsy.

## Treatment

**The treatment of liver disease has four basic goals;**

- Identify and eliminate the inciting cause (anorexia in fat cats, toxins, infection etc.)
- Minimize the effects of the insult
- Encourage healing of the liver
- Supportive care for the patient during the recovery period (IV fluids, plasma, antibiotics, nutrition etc.)

**Surgery-** is indicated for pups with liver shunts if the abnormal vessels can be identified either by ultrasound or contrast study during surgery.

**Nutritional therapy-** a copper restricted diet is indicated for dogs with copper storage disease.

## Prognosis

**Highly variable depending on the cause, duration, and severity of liver disease.**

**Hepatitis** has guarded to fair prognosis depending on the initial cause, duration, and the severity of the disease.

Dogs with **liver cancer** have a grave prognosis and poor short term survival even with aggressive care.

Severely icteric or jaundiced animals due to **primary liver disease** rarely survive, but can do well if the jaundice is secondary to hemolytic anemia (large red blood cell destruction), then the liver usually recovers with therapy.

Cats with **fatty liver syndrome** (hepatic lipidosis) have a fair prognosis with aggressive care.

Dogs with **congenital liver shunts** can live a normal healthy life if treated with surgery.

Dogs with **genetic "storage diseases"**