

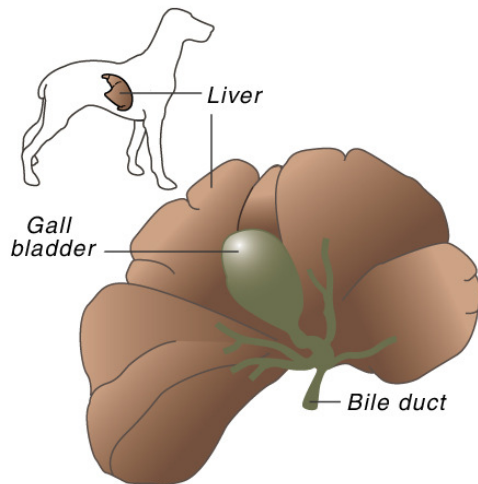
ICTERUS IN DOGS AND CATS

What is icterus?

Icterus is also known as jaundice or yellow jaundice, and is a sign of serious illness. It means that a yellow pigment is found in the blood and tissues. When icterus persists for any length of time, it will discolor many tissues and will be visible on most body surfaces, including the skin. Since most of your pet's skin is covered by fur, jaundice is most easily seen in the gingivae (gums), the sclerae (white part of the eyes), and the pinnae (ear flaps). If these tissues normally have a dark color, icterus will be difficult to see in these pets.

What causes icterus?

Risk factors for icterus may include the presence of fleas or ticks, infection of a cat with feline leukemia virus (FeLV) or feline infectious peritonitis virus (FIP), residence in or travel to areas endemic for liver flukes or fungal diseases, prolonged lack of food intake in a cat, ingestion of drugs or toxins, or disease carried by a tick, flea or other parasite.



The causes of icterus fall into three major categories:

Destruction of red blood cells. The process of red cell destruction is known as *hemolysis*. It can occur within blood vessels (*intravascular hemolysis*) or in the spleen and liver (*extravascular hemolysis*).

Liver disease. Any disease that causes destruction of liver cells or causes bile to become trapped in the liver can cause icterus.

Obstruction of the bile duct. The bile duct carries bile, an important fluid for digestion, from the gall bladder to the small intestine. Obstruction can occur within the gall bladder or anywhere along the bile duct.

How is the cause of icterus determined?

The diagnosis of icterus itself is usually straightforward. However, determining the cause of icterus can be a challenge and usually requires a series of tests. Within each category listed above are several possible causes of icterus. Once the probable cause can be placed into one of these three categories, additional tests are performed to look for the specific disease that is causing the icteric state.

Occasionally, a blood sample is drawn and the serum component is found to be yellow before the pet is visibly jaundiced. This information is helpful and can give a clue to impending problems.

What tests determine hemolysis?

Since hemolysis results in red blood cell destruction, determination of red blood cell numbers is one of the first tests performed on the icteric patient. There are three tests that may be used for this. The **red blood cell count** is an actual machine count of red blood cells. The **packed cell volume (PCV)** is a centrifuge-performed test that separates the red blood cells from the serum or plasma (the liquid parts of the blood). The **hematocrit** is another way to determine if there is a reduced number of red blood cells. All three of these tests are part of a complete blood count (CBC).

What causes hemolysis?

Hemolysis can be caused by toxic plants, drugs, parasites on the red blood cells, heartworm disease, autoimmune diseases, cancer, and other things. Several tests are needed to determine the cause of hemolysis in your pet, so that it can be treated successfully.

What tests are used to diagnose liver disease?

A biochemistry profile is performed on pets with icterus. This is a group of 20-30 tests that are performed on a blood sample. The biochemistry profile contains several tests that are specific for liver disease. The main ones are the alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP or ALKP), and total bilirubin. If these tests are normal and there is reason to suspect liver disease, a bile acid analysis is performed.

Although each of these tests evaluates the liver, they only determine if liver disease is occurring. None of them are able to determine the exact cause of the disease. To make that determination, an ultrasound of the abdomen or even a biopsy of the liver may be necessary. A biopsy of the liver can be done in three ways.



Fine-needle aspirate. To perform this procedure, a small gauge needle is inserted through the skin into the liver. A syringe is used to aspirate some cells from the liver. The cells are placed on a glass slide, stained, and studied under a microscope. This is the least invasive and quickest test, but it has certain limitations. Because only a few cells are obtained, it is possible that a representative sample from the liver will not be obtained. It is also not possible to view the cells in their normal relationship to each other (i.e., tissue architecture). Some diseases can be diagnosed with this technique and others cannot.

Needle biopsy. This procedure is similar to the fine-needle aspirate except a much larger needle is used. This needle is able to obtain a core of tissue, not just a few cells. The sample is fixed in formaldehyde and submitted to a pathologist for analysis. General anesthesia is required, but the pet is anesthetized for only a very short period of time. Done properly, this test can provide valuable insight into the cause of liver disease and icterus at least 50% of the time.

Surgical wedge biopsy. The pet is placed under general anesthesia, and the abdomen is opened surgically. This permits direct observation of the liver so the exact site for biopsy can be chosen. A piece of the liver is surgically removed using a scalpel. This approach gives the most

reliable biopsy sample, but the stress of surgery and the expense are the greatest of all of the biopsy methods.

What causes liver disease?

The most common causes of liver disease in dogs include bacterial infections, viral infections, toxic plants, chemicals, drugs, cancer, autoimmune diseases, and certain breed-specific liver diseases. Some of the causes of liver-related icterus in cats include infectious diseases (feline leukemia (FeLV), feline infectious peritonitis (FIP), fungal diseases, cancer, hepatic lipidosis (fatty liver syndrome), and cholangiohepatitis complex.

What tests determine bile duct obstruction?

Dogs and cats with obstructed bile ducts are usually extremely icteric. An evaluation of the gall bladder and bile duct is necessary to be sure that obstruction is present.

An ultrasound examination is the most accurate non-invasive way to evaluate the gall bladder and bile duct. This technology uses sound waves to “look” at the liver, gall bladder, and bile duct. If this is not available, radiographs (x-rays) should be taken of the liver. However, sometimes exploratory surgery is necessary to properly evaluate the dog for biliary obstruction. The most common causes of bile duct obstruction include pancreatitis, trauma, cancer, gall bladder stones, liver flukes, and severely thickened bile.

How is icterus treated?

Icterus is not a disease; it is a sign that disease is present. Therefore, there is not a specific treatment for icterus. Icterus will resolve when the disease that causes it is cured.

The basis for resolving icterus is to diagnose the underlying disease. When the proper testing is done, this is usually possible. Treatment can begin as soon as a diagnosis is obtained.

If icterus is not diagnosed and treated promptly, damage to the kidneys can occur.

Will my dog or cat recover?

The prognosis is dependent upon the underlying cause. Some diseases causing icterus are fatal, but others have a good prognosis for full recovery.

References:

Ernest Ward, DVM, Lifelearn Inc.

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