



## Liver Tumors

### Associated Terms:

Hepatocellular Carcinoma, Hepatectomy, Liver Lobectomy, Biliary Cystadenoma, Cholangiocellular Carcinoma, Bile Duct Carcinoma, Liver Cancer, Hepatoma



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### Overview:

When the news reaches a pet owner that a single, large tumor has been discovered in a pet's liver, pet owners should not despair, as most of these tumors can be surgically removed. The most common type of primary liver tumor, **hepatocellular carcinoma**, originates from liver cells (hepatocytes) and has a **low rate of spread to other organs**. Other types of primary liver tumors originate from:

- bile ducts
- connective tissue
- blood vessels
- hormone-secreting cells (neuroendocrine)

Metastatic liver tumors are those that have spread from another organ of the body to the liver. Tumors that spread to the liver from another organ or region of the body are more common than those that originate within the liver itself.

When a large, single mass is located in the liver, called a massive tumor, a hepatocellular carcinoma is the diagnosis in at least half of dogs. **Cats tend to develop more benign tumors than dogs**. Bile duct adenomas (biliary cystadenomas) account for more than half of all liver tumors in cats, yet are uncommon in dogs. Bile duct carcinomas are the most common malignant liver tumor in cats and the second most common liver tumor in dogs. Uncommon liver tumors include:

- carcinoids
- sarcomas of various types
- myelolipomas

### Signs and Symptoms:

**Warning signs of a liver tumor are typically nonspecific** and usually do not point to the liver as the primary source of the problem. Approximately 75% of dogs and half of cats show signs of illness, including:

- decreased appetite
- weight loss
- lethargy
- vomiting
- increased thirst
- increased urination
- distention of the abdomen with fluid
- seizures

Some dogs and cats become jaundiced, which is a visible yellow discoloration of the whites of the eyes, gums, inner ear flaps and poorly haired areas of skin.

### Diagnostics:

Your primary care veterinarian may detect a liver mass upon palpation of the abdomen. Further testing may include:

- a blood analysis (complete blood count, chemistry profile, coagulation profile and urinalysis)
- abdominal x-rays
- abdominal ultrasound
- chest x-rays
- advanced imaging such as computed tomography (CT) scan or magnetic resonance imaging (MRI)

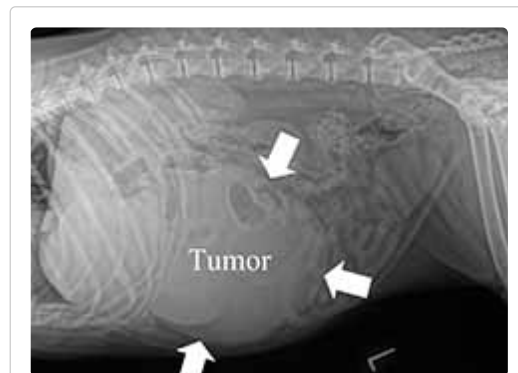


Figure 1. X-ray of the abdomen of a dog that has a large liver tumor (arrows outline the tumor)

Based on abdominal x-rays or abdominal ultrasound, your pet's veterinarian may make a presumptive diagnosis of a liver tumor. (Figure 1) Although these initial tests may suggest that the tumor is very large and inoperable, usually these can be successfully removed. Due to the complexity of liver surgery and the risk of bleeding complications during surgery, many primary care veterinarians will refer your pet to an ACVS board-certified veterinary surgeon.

### Treatment:

**The treatment of choice for a solitary liver tumor is surgery**, provided that it has not spread to another internal organ. An abdominal incision is made to expose the liver and associated

tumor. Commonly, the tumor can be successfully removed using a surgical stapler, yet a deep-seated tumor may require meticulous dissection of the liver to remove the mass (Figure 2).

Chemotherapy may be recommended if the tumor type is sensitive to this medication. A biopsy report is needed to determine the potential response of this type of treatment.

Injecting a type of glue and chemotherapy into the blood vessels that feed an inoperable liver tumor can block the blood supply to the tumor and help shrink the tumor. This treatment, although not curative, may increase the survival time of your pet.



Figure 2. A liver mass that has been removed from a dog

### Aftercare and Outcome:

After surgery, your pet is monitored in an intensive care unit and medication is administered to control pain. Fluids and antibiotics may be administered via an intravenous catheter for a few days after the procedure to maintain hydration and prevent infection. Daily blood tests may be performed to check for signs of internal organ dysfunction and internal bleeding. If needed, a blood or plasma transfusion may be given.

At home, pain medications and antibiotics may be required. If your pet does not eat a regular diet, a low fat home-cooked diet may be offered. An Elizabethan collar (i.e., a protective device worn around an animal's neck) is kept on your pet when not under your direct supervision to prevent licking of the incision. Alternatively, a tee shirt can be put on your pet to protect the incision. Pet owners should schedule for an evaluation with their pet's veterinary surgeon about 10-14 days after surgery. At this time, if indicated by the biopsy report, an oncologist may initiate the first round of chemotherapy.

**The outcome of surgical treatment of hepatocellular carcinomas is generally very favorable** with survival times commonly exceeding 3.8 years and metastasis seen in less than 5% of pets. **Removal of resectable biliary cystadenomas in cats has a good prognosis with long survival times.** Surgical removal of bile duct carcinomas yields short survival times in both dogs and cats due to metastasis and regrowth of the tumor in the liver. Sarcomas and carcinoids have a poor prognosis, as the majority of these have metastasized at the time of diagnosis.

**Dogs that have untreated primary liver tumors (specifically hepatocellular carcinoma) are 15 times more likely to die of tumor-related complications than dogs that have had their tumors removed.** Liver tumors are fragile and may rupture at any time, thus may cause life-threatening internal bleeding. A tumor may compress the main bile duct that drains bile from the liver into the intestine, thereby causing jaundice. It may compress internal organs or the great vessels in the abdomen and cause a variety of signs such as vomiting and distention of the abdomen with fluid. Rarely, liver tumors produce insulin-like substances that cause the pet to have low blood sugar.

Ongoing bleeding after surgery, although seen in less than 2% of operated patients, can result in death

of the pet in the postoperative period. Other complications may include:

- infection
- twisting of a liver lobe adjacent to the portion of liver that has been removed
- re-growth of the tumor in the liver
- spread of the tumor to other internal organs

This Animal Health Topic was written by and reviewed by Diplomates of the American College of Veterinary Surgeons. Any opinions stated in this article are not necessarily the official position of the American College of Veterinary Surgeons.

The American College of Veterinary Surgeons recommends contacting an ACVS board-certified veterinary surgeon or your general veterinarian for more information about this topic.

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