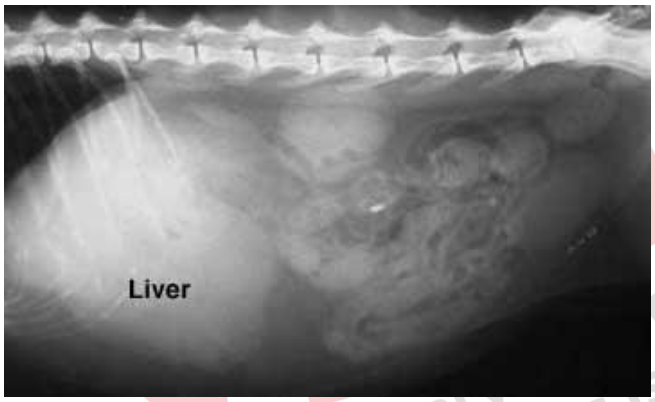
Liver Tumors, Liver Lobectomy	Liver tumors may be primary, meaning that the tumor originated in the liver or it may be metastatic, meaning the tumor(s) has originated from another organ or site in the body and ha spread to the liver. Primary liver tumors can originate from liver cells (hepatocytes), bile ducts, connective tissue, blood vessels, and neuroendocrine (hormone-secreting) cells. The most common type of primary malignant liver tumor in dogs is hepatocellular carcinoma. The most common benign liver tumor in dogs are benign adenomas. The most common primary benign liver tumor in the cat is a bile duct adenoma (biliary cystadenoma). 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, and myelolipomas. Signs and Symptoms: Signs of a liver tumor are typically nonspecific and usually do not point to the liver as the primary source of the problem. Clinic signs may include: • decreased appetite • weight loss • lethargy • vomiting • increased thirst • increased urination • distention of the abdomen with fluid • seizures • icterus (jaundice- noticeable yellow discoloration of the whites of the eyes, gums, inner ear flaps and poorly haired areas of skin).   Icteric dog (left) and icteric cat (right).

Diagnosis: The veterinarian may detect a liver mass upon palpation of the abdomen. Diagnostic testing may include:

- bloodwork (complete blood count, chemistry profile, coagulation profile)
- urinalysis
- abdominal radiographs (X-rays)
- abdominal ultrasound
- thoracic radiographs (chest X-rays)
- computed tomography (CT) scan or magnetic resonance imaging (MRI)



Radiograph of a dog with a large liver tumor.

Treatment: The treatment of choice for a solitary liver tumor is surgical removal, provided that it has not spread to another internal organ. A celiotomy (incision into the abdomen) is performed to expose the liver and associated tumor. Commonly, the tumor can be removed using a surgical stapler(s) and will be submitted for biopsy. As the liver is a highly vascular organ, perioperative blood transfusion therapy is often necessary with surgical conditions of the liver.

Postoperative care: After surgery, the 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.

Discharge instructions will commonly include pain medications and antibiotics. An Elizabethan collar or recovery suit is instructed to wear to prevent licking of

	the incision. Pets will usually schedule for a recheck evaluation within 7-14 days after surgery. At this time, if indicated by the biopsy report, an Oncologist consultation may be made to discuss initiating additional treatment. Prognosis: 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 have a significantly greater chance of tumor related complications than dogs that have had their tumors removed. Liver tumors are fragile and may rupture causing life-threatening internal bleeding. A tumor may compress the main bile duct that drains bile from the liver into the intestine, thereby causing icterus (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. Potential complications after surgery may include ongoing bleeding, infection, twisting of a liver lobe adjacent to the portion of liver that has been removed, re-growth of the tumor in the liver, and spread of the tumor to other internal organs.