Current Concepts in Hepatobiliary Surgery

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KEYWORDS

• Hepatobiliary surgery • Hepatic mass lesions • Liver biopsy • Partial hepatectomy • Cholecystectomy • Cholecystoenterostomy • Choledochotomy

KEY POINTS

- Knowledge of the anatomy of the liver and biliary tract helps minimize complications associated with hepatobiliary surgery.
- Information important for planning partial hepatectomies to treat hepatic masses includes distribution of mass lesions; histologic diagnosis; and patient oncotic, blood typing/cross-matching, and coagulation status.
- Goals of extrahepatic biliary surgery include confirmation of the underlying disease process (eg, biliary mucocele, cholecystitis, and bile duct obstruction; trauma; or leakage) establishment of a patent biliary system, and minimization of perioperative complications.
- Veterinary patients undergoing either extensive liver resection or correction of biliary tract obstruction or leakage tend to have an extensive list of risk factors associated with the primary condition and the surgical procedure.

INTRODUCTION AND ANATOMIC CONSIDERATIONS

Hepatobiliary surgery in dogs and cats may be used to investigate or treat various conditions of the liver and biliary tract including persistent hepatic disease, hepatic abscessation, hepatic mass lesions, gallbladder mucocele, cholecystitis, biliary leakage, and extrahepatic biliary obstruction. Surgical procedures performed include hepatic biopsy, partial hepatectomy, cholecystotomy, cholecystectomy, cholecystoenterostomy, and choledochotomy. Although liver transplantation is not currently performed clinically in dogs and cats, information gleaned from its use in research dogs has provided valuable information to the clinical veterinary surgeon.[1] Knowledge of the anatomy of the liver and biliary tract helps minimize complications associated with hepatobiliary surgery.

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The liver is the largest gland in the body and has exocrine (bile) and endocrine function. It is divided into four lobes (left, right, quadrate, and caudate), four sublobes, and two processes by deep fissures. The left hepatic lobe, comprised of the left lateral and medial sublobes, which may be joined by a bridge of liver tissue dorsally, forms nearly one-half of the total liver mass. The right hepatic lobe is smaller than the left and has the right lateral and medial sublobes. The right lateral lobe is often fused to the right medial lobe and the caudate process of the caudate lobe. The right medial lobe is variably fused to the quadrate lobe. The quadrate lobe lies almost on the midline, and its lateral aspect forms one side of the gallbladder fossa. The caudate lobe is composed of the caudate and papillary processes and the connecting isthmus. The isthmus is located between the dorsally located caudal vena cava and the more ventral portal vein. The caudate process forms the most caudal portion of the liver, whereas the papillary process lies in the lesser curvature of the stomach.[2] From a surgical perspective, the liver may be grouped into three subdivisions: left (left lateral and medial lobes) comprising approximately 44% of liver volume, central (quadrate and right medial lobes), and right (right lateral and caudate lobes), each comprising about 28% of liver volume.

The portal vein provides the functional blood supply to the liver. It divides into left and right branches in the dog, with the left branch supplying the central and left divisions. The feline portal vein divides into right, left, and central branches. The hepatic artery provides nutritional supply to hepatic parenchyma and bile ducts.[1] Each canine sublobe is supplied by a single hepatic artery and at least one lobar portal vein.[3]

The biliary system begins at the hepatic canaliculi, with up to eight hepatic ducts, although three or four hepatic ducts was more commonly observed, joining to form the bile duct.[4] The initial hepatic duct to enter the bile duct usually is the right medial hepatic duct.[4] The gallbladder is connected to the bile duct via the cystic duct, which tends to be greater than 5 mm long in most dogs.[4] After passing intramurally within the duodenum for approximately 2 cm, the bile duct opens approximately 3 to 6 cm aborad to the pylorus.

LIVER BIOPSY CONSIDERATIONS

Indications and Contraindications

Diagnosis of most liver diseases requires histopathologic examination of liver tissue.[5] Diffuse liver diseases may be sampled randomly, but focal lesions require careful selective sampling.[5] Ideally, the patient's coagulation status should be assessed before a liver biopsy is performed.[5] Significant bleeding complications have been observed in dogs and cats with thrombocytopenia (platelets $<80 \times 10^3/\mu L$) undergoing ultrasound-guided liver biopsies.[6] The liver may be evaluated via fine-needle aspiration (cytology) or biopsy (histopathology). Ultrasound-guided fine-needle aspirations for cytologic examination of the liver have been shown to have serious limitations when used to identify the primary disease process in dogs and cats with clinical evidence of liver disease.[7] Hepatic cytologic samples are more reliable for diffuse hepatic disease, especially neoplasia, and less reliable for inflammation, necrosis, and hyperplasia.[8]

Technique

Liver biopsies are performed frequently and use various techniques in dogs and cats, including needle core, laparoscopic, and surgical biopsy. An ideal liver biopsy should be of proper size and taken from a location that represents the primary liver pathology.[5] Samples from multiple lobes are often preferred. In addition to tissues for histopathology, samples may also be obtained for microbiologic testing or quantification of