Adenocarcinoma of the Hepatopancreatic Ampulla in a Domestic Cat

V. L. HAINES, P. R. BROWN, R. H. HRUBAN, AND D. L. HUSO

Abstract. A 13-year-old spayed female Siamese cat was submitted for necropsy following unsuccessful treatment for obstructive jaundice. Histopathologic examination revealed an adenocarcinoma of the hepatopancreatic ampulla. The carcinoma obstructed the pancreatic and common bile ducts entering the ampulla, resulting in severe diffuse acinar degeneration, atrophy and fibrosis of the pancreas, and dilatation of the bile ducts, biliary fibrosis, and ductule proliferation in the liver. In humans, carcinoma of the ampulla of Vater, the hepatopancreatic ampulla, is considered an uncommon malignancy.

Key words: Adenocarcinoma; ampulla of Vater; cats; hepatopancreatic ampulla.

A hepatopancreatic ampullary carcinoma was diagnosed in a cat. This is believed to be the first report of a hepatopancreatic ampullary carcinoma in a nonhuman species.

The ampulla of Vater was first described by the German anatomist Abraham Vater in 1720. It is a flask-shaped dilatation formed by the junction of the intramural portion of the common bile duct and the main pancreatic duct of Wirsung proximal to their opening into the lumen of the duodenum at the apex of the major duodenal papilla. In the cat, the common bile duct runs a short distance within the intestinal wall before entering the ampulla. The cat's major duodenal papilla is located on the dorsal internal wall of the duodenum about 3 cm from the pylorus. About 2 cm caudolateral to the major papilla is the smaller, minor duodenal papilla, which receives the accessory pancreatic duct.

Bile duct carcinomas have been reported in the dog, cat, pig, horse, sheep, cow, parrot (Amazona spp.), sloth bear (Melursus ursinus), and pallid bat (Antrozous pallidus). The majority of these biliary carcinomas were intrahepatic tumors; however, extrahepatic tumors have been reported in the sloth bear, Asiatic bear (Selenarctos thibetanus), and domestic cat. These extrahepatic tumors have generally involved the gallbladder, cystic duct, and/or common bile duct.
Fig. 1. Visceral lesions; cat. Note the markedly distended gallbladder, nodular pancreas (arrows), and site of the tumor serosal border (arrowhead).

In humans, carcinoma of the ampulla of Vater (the hepatopancreatic ampulla) is considered an uncommon malignancy but is the most common of the extrahepatic bile duct tumors. Chronic inflammation and bile acids have been suggested as predisposing influences. Diagnosis of the tumor is usually made late in the course of the disease, and the general presentation is one of progressive obstruction of the biliary duct. Symptoms may include jaundice, pain, pruritus, weight loss, hepatomegaly, and elevated serum bilirubin and alkaline phosphatase. Definitive diagnosis is made by surgical biopsy, but percutaneous transhepatic cholangiogram and endoscopic retrograde cholangiopancreatography aid in the presumptive diagnosis and localization of the lesion. Surgery is the treatment of choice. Standard surgical therapies include local excision of the ampulla with reanastomosis of the pancreatic and biliary ducts to the duodenal mucosa or a pancreatoduodenectomy (Whipple’s procedure).

A 13-year-old spayed female Siamese cat was submitted for necropsy following unsuccessful symptomatic treatment for hepatobiliary disease. The cat had been depressed, anorectic, and jaundiced and had suffered weight loss and bouts of vomiting over a 2-week period. Symptomatic therapy included intravenous and subcutaneous fluids, broad spectrum antibiotics, corticosteroids, and B-complex vitamins. Clinical laboratory data indicated obstructive biliary disease without evidence of infection, multisystem disorder, or underlying immunosuppressive disease. Serum values at presentation were aspartate aminotransferase (AST) = 89 IU/liter, alanine aminotransferase (ALT) = 230 IU/liter, alkaline phosphatase (ALP) = 527 IU/liter, total bilirubin = 7.3 mg/dl, direct bilirubin = 3.6 mg/dl, and cholesterol = 209 mg/dl. Serum values 11 days later were AST = 141 IU/liter, ALT = 460 IU/liter, ALP = 813 IU/liter, total bilirubin = 8.1 mg/dl, direct bilirubin = 4.2 mg/dl, and cholesterol = 288 mg/dl. Complete blood count results were within normal limits. The cat tested negative for feline leukemia virus antigen and feline infectious peritonitis antibodies. Radiographic evaluation did not reveal any additional findings. Exploratory laparotomy was declined by the owner. The subject was euthanatized and submitted for necropsy.

Significant gross lesions included a thin body, generalized jaundice, and a markedly distended gallbladder and cystic duct (Fig. 1). The gallbladder and cystic duct contained 35 ml of green, viscous bile. No stones or inspissated bile were noted. The walls of the gallbladder, cystic duct, and common bile duct appeared normal. The major duodenal papilla was easily observed because of an everted swollen appearance. A
well-delineated mass was palpable within the wall of the duodenum at the level of the hepatopancreatic papilla. Attempts to pass a probe retrograde from the papilla through the ampulla and from the serosal aspect of the extramural common bile duct through the ampulla were unsuccessful. Attempts at expressing bile through the opening were also unsuccessful, indicating complete obstruction within the intramural portion of the duct. A transverse cut through the duodenal wall at the level of the major papilla revealed a firm tan mass approximately 1 cm in diameter extending from the luminal surface to the serosal surface. The pancreas appeared nodular and fibrotic. The liver was discolored tan with red reticulated foci of centrilobular congestion. The liver borders were slightly rounded.

Histopathologic examination revealed that the mass was centered around the hepatopancreatic periampulla (Fig. 2) and extended from the duodenal mucosal surface at the level of the ampullary opening, through the submucosa, and deep into the muscularis externa. This mass was an adenocarcinoma composed of neoplastic tubuloacinar glands infiltrating a dense nonneoplastic stroma (Fig. 3). Multifocal areas of lymphocytic infiltrate were noted throughout the lesion. The neoplastic epithelial cells were cuboidal to columnar and had round to oval hyperchromatic nuclei and lightly eosinophilic cytoplasm with ill-defined borders. Rare mitotic figures were noted. There was mild Brunner’s gland hyperplasia within the submucosa. In the liver, there were dilated bile ducts, biliary fibrosis, and ductule proliferation with multifocal areas of mild portal lymphocytic infiltrates. No evidence of metastasis to the liver was noted. The pancreas had severe diffuse acinar degeneration and atrophy and diffuse intra- and interlobular fibrosis. The pancreatic tissue immediately adjoining the tumor appeared to be compressed. In the gallbladder wall, there were multifocal areas of subserosal lymphocytic infiltrates. The spleen had mild extra-medullary hematopoiesis.

The ampulla is said to be lined by bile duct epithelium, but actually it represents a confluence of three types of epithelium: biliary, duodenal, and pancreatic. Therefore, carcinomas occurring within the region could theoretically arise from any of the three tissue types. Histologic interpretation of the point of origin of carcinomas in this region is based on where the mass is centered and the extent of involvement of the surrounding structures.

Both gross and histopathologic findings indicated that this adenocarcinoma was clearly centered on and exclusively involved the ampulla. No neoplastic cells were noted within the pancreas proper, the ducts of the pancreas, or the duodenal mucosa. Clinical and postmortem findings were consistent with obstruction of both the biliary and pancreatic duct. A previous report of a scirrhous adenocarcinoma of the distal portion of the extrahepatic bile duct in a cat did not involve the ampulla. Liver lesions in that cat resembled those reported here, but lesions consistent with obstruction of the pancreatic duct were not present.

Adenocarcinoma of the hepatopancreatic ampulla is apparently a very rare tumor in domestic cats and other animals. However, this tumor should be considered whenever there is evidence of concurrent obstruction of the pancreatic and biliary ducts. This tumor may cause severe symptoms of biliary duct obstruction while still quite small in size and may be entirely within the duodenal wall. Careful dissection and sectioning of the duodenal papilla, intraduodenal bile duct, and ampulla are required to arrive at the proper diagnosis.

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References


Request reprints from Dr. P. R. Brown, Division of Comparative Medicine, Johns Hopkins School of Medicine, 720 Rutland Avenue, Baltimore, MD 21205-2196 (USA)