pancreatitis. The diagnosis is supported by the results of liver function tests and abdominal imaging. Transabdominal ultrasound is the initial imaging modality of choice; it has a sensitivity of 20% to 90% for detection of a stone and 55% to 90% for detection of dilation of the common bile duct. EUS and MRCP have replaced ERCP for diagnosis of bile duct stones; the sensitivity and specificity are 94% and 95%, respectively, for EUS and 93% and 94% for MRCP. ERCP is reserved for therapeutic interventions.

Acute Cholangitis

Acute (suppurative) cholangitis is a life-threatening infection of the biliary tract that occurs as a result of choledocholithiasis. The classic clinical manifestations are abdominal pain, jaundice, and fever (Charcot's triad). Clinical findings may be absent or atypical in elderly or immunosuppressed patients. Cholangitis is a medical-surgical emergency that can lead rapidly to sepsis, shock, and death. Diagnosis is based on a compatible clinical and laboratory picture (abnormal liver function test results and leukocytosis) together with radiologic or endoscopic evidence of common bile duct stones.

Treatment of acute cholangitis includes administration of broad-spectrum antibiotics and prompt removal of stones, typically with ERCP and sphincterotomy (Video 44-2). Cholecystectomy is subsequently performed after the patient has been stabilized.

Gallstone Pancreatitis

Biochemical evidence of pancreatic inflammation complicates choledocholithiasis and acute cholecystitis in up to 30% and 15% of patients, respectively. There are two proposed mechanisms by which gallstones may induce pancreatitis: reflux of bile into the pancreatic duct due to transient obstruction of the ampulla and obstruction at the ampulla secondary to stones or edema. Considering that gallstone pancreatitis recurs in 25% of patients, a cholecystectomy should be performed once the patient has recovered clinically from an attack of pancreatitis. If the patient remains jaundiced during an attack, suggesting the presence of a stone in the bile duct, an ERCP with sphincterotomy is performed to extract the stone.

Biliary Neoplasms

Cholangiocarcinoma and cancer of the ampulla of Vater are uncommon in the United States. Cholangiocarcinoma can arise at any level of the biliary system. It is more common in older men, occurring predominantly in men 50 to 70 years of age. Risk factors include primary sclerosing cholangitis (PSC), choledochal cysts, chronic ulcerative colitis, liver flukes, and recurrent pyogenic cholangitis (Oriental cholangiohepatitis). Patients with these cancers usually have unremitting painless jaundice, although necrosis and sloughing of the tumor can cause intermittent biliary obstruction and the appearance of occult fecal blood. Cholangiocarcinoma located at the bifurcation of the extrahepatic bile duct (50% of cases) is known as a *Klatskin tumor* (Fig. 44-5). Surgical cure is possible in only a small proportion of patients with cholangiocarcinoma. If the tumor is unresectable, palliative biliary drainage is undertaken.

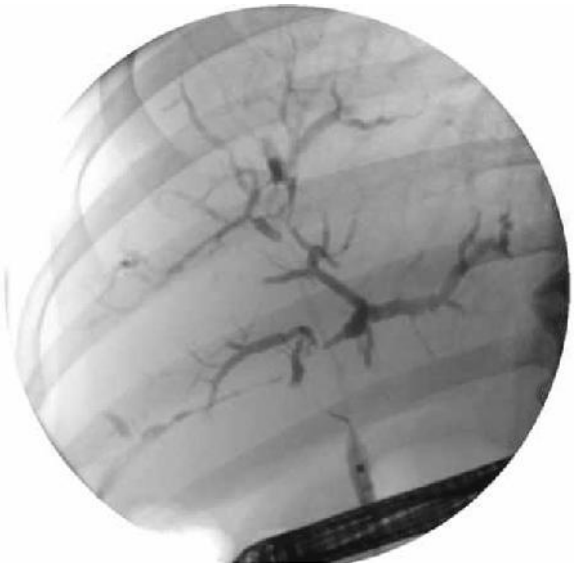

FIGURE 44-5 Cholangiogram obtained on endoscopic retrograde cholangiopancreatography demonstrates a Klatskin tumor at the bile duct bifurcation.

Nonmalignant Causes of Biliary Obstruction

Biliary Strictures

Benign biliary strictures usually result from surgical injury or chronic pancreatitis. Biliary strictures resulting from surgical injury may cause symptoms even years after the initial injury. Early diagnosis is important because strictures that partially obstruct are clinically asymptomatic and can cause secondary biliary cirrhosis. Biliary stricture should be suspected in any patient with a history of surgery of the right upper quadrant or chronic pancreatitis who has persistently elevated levels of serum alkaline phosphatase and γ-glutamyl transpeptidase. Endoscopic balloon catheter dilatation with or without stenting or surgical repair is useful in selected patients.

Other Causes of Biliary Obstruction

Structural abnormalities such as choledochal cysts, Caroli's disease (congenital segmental intrahepatic bile duct dilation), and duodenal diverticula may cause bile duct obstruction, often with secondary choledocholithiasis resulting from bile stasis. Hemobilia, with intermittent bile duct obstruction by blood clots, may be caused by hepatic injury, neoplasms, or hepatic artery aneurysms. Biliary parasites should always be considered as a cause of biliary obstruction in the appropriate epidemiologic setting. *Ascaris lumbricoides* is a common cause of cholangitis and jaundice in South America, Africa, and the Indian subcontinent. *Clonorchis sinensis* is the etiologic agent of Oriental cholangiohepatitis in Korea and Southeast Asia and in immigrants to the United States. The liver fluke *Fasciola hepatica* is a leading cause of biliary strictures and cholangitis worldwide, most commonly in the Bolivian Andes.

Primary Sclerosing Cholangitis

PSC is an idiopathic condition of nonmalignant, nonbacterial, chronic inflammatory fibrosis and obliteration of the intrahepatic and extrahepatic bile ducts. It most commonly occurs in young