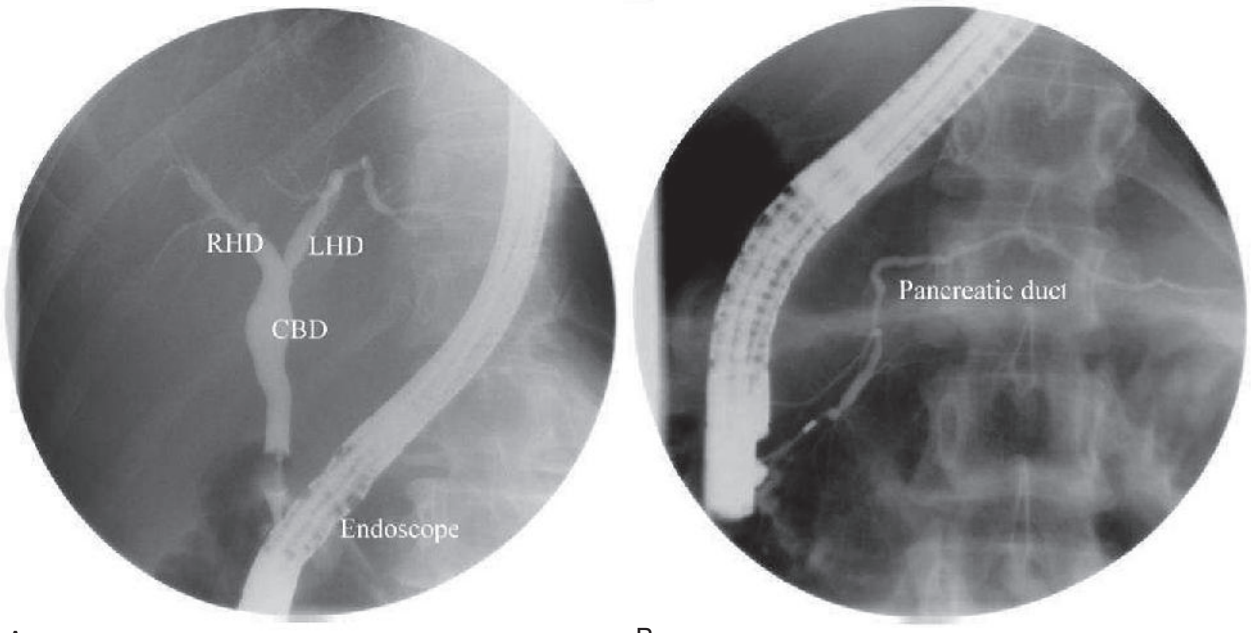

FIGURE 34-3 Endoscopic retrograde cholangiopancreatography (ERCP). **A,** Normal cholangiogram. Contrast material injected into the biliary tree during ERCP demonstrates the intraductal anatomy of the common bile duct *(CBD)*, right hepatic duct *(RHD)*, left hepatic duct *(LHD)*, and smaller intrahepatic biliary radicals. **B,** Normal pancreatogram. Contrast material injected into the pancreatic duct during ERCP defines the intraductal anatomy throughout the length of the pancreas. (Courtesy Brian C. Jacobson, Boston, Mass.)

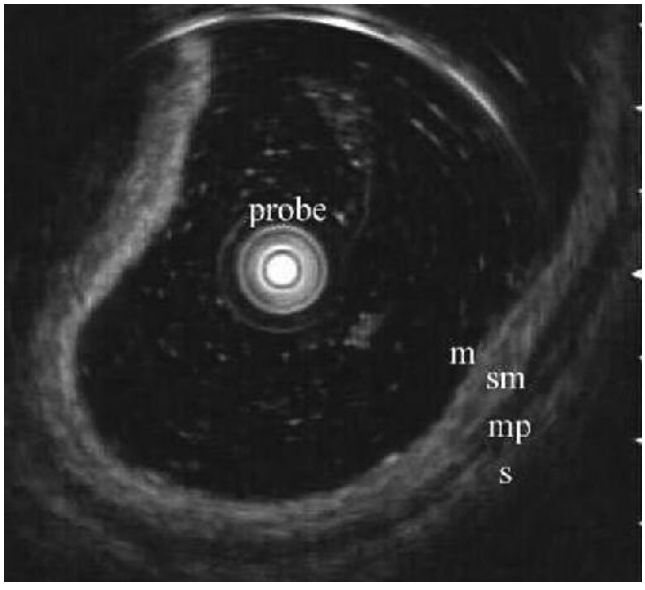

FIGURE 34-4 Endoscopic ultrasound of the gastrointestinal wall. A 12-MHz ultrasound probe, passed through the accessory channel of an endoscope, demonstrates the normal layers of the rectal wall. The mucosa *(m)* appears as a superficial, hyperechoic *(white)* band and a deeper hypoechoic *(black)* band. The submucosa *(sm)* appears as the next hyperechoic layer. The muscularis propria *(mp)* appears hypoechoic, and the serosa *(s)* appears as the outermost, hyperechoic layer. (Courtesy Brian C. Jacobson, Boston, Mass.)

Fine-needle aspiration (FNA) as well as core biopsy can be performed under EUS guidance, and FNA is the preferred approach to obtaining a tissue diagnosis in many circumstances (e.g., pancreatic masses or cysts, subepithelial lesions of the GI tract, intra-abdominal or paraesophageal lymphadenopathy). Recent advances such as elastography and contrast-enhanced harmonic EUS have further enhanced the diagnostic capability of EUS, particularly in terms of distinguishing malignant from benign processes. However, EUS is more than just a diagnostic modality, and the spectrum of EUS-guided therapies is rapidly expanding. Therapeutic maneuvers that can be performed via EUS guidance include pseudocyst drainage, celiac axis neurolysis, fiducial placement into solid tumors to guide stereotactic radiotherapy, drainage of pelvic abscesses, and achievement of bile duct access (when initial attempts at ERCP have failed).

NONENDOSCOPIC IMAGING PROCEDURES

Plain Abdominal Radiographs

Plain abdominal radiographs include upright, supine, and lateral decubitus films obtained with standard radiographic equipment and without the use of contrast agents. Plain films are most useful in the initial evaluation of abdominal pain or nausea and vomiting, particularly when perforation or obstruction is suspected, and they may reveal evidence of a pneumoperitoneum, dilated bowel loops and air-fluid levels, excessive amounts of stool, or displacement of bowel loops. These findings are indicative of a perforation, obstruction or ileus, constipation or fecal impaction, and volvulus or organ enlargement, respectively (Fig. 34-5). Calcifications, such as those seen in chronic pancreatitis and gallstone disease, may also be visible on these radiographs.

Contrast Studies

Contrast agents such as barium or the water-soluble diatrizoate (e.g., Gastrografin) can be administered by mouth or rectum to detect mucosal abnormalities (ulcerations and masses),