by symptoms of abdominal discomfort, pruritus, lethargy, and weight loss. Less common presenting features include epigastric pain, backache, new-onset diabetes mellitus, and acute pancreatitis caused by pressure effects on the pancreatic duct. Nausea and vomiting, resulting from gastroduodenal obstruction, may also be a symptom of this disease.

Physical Signs Patients can present with jaundice and cachexia, and scratch marks may be present. Of patients with operable tumors, 25% have a palpable gallbladder (Courvoisier's sign). Physical signs related to the development of distant metastases include hepatomegaly, ascites, left supraclavicular lymphadenopathy (Virchow's node), and periumbilical nodules (Sister Mary Joseph's nodes).

DIAGNOSIS

Diagnostic Imaging Patients who present with clinical features suggestive of pancreatic cancer undergo imaging to confirm the presence of a tumor and to establish whether the mass is likely to be inflammatory or malignant in nature. Other imaging objectives include the local and distant staging of the tumor, which will determine resectability and provide prognostic information. Dual-phase, contrast-enhanced spiral CT is the imaging modality of choice (Fig. 112-1). It provides accurate visualization of surrounding viscera, vessels, and lymph nodes, thus determining tumor resectability. Intestinal infiltration and liver and lung metastases are also reliably depicted on CT. There is no advantage of magnetic resonance imaging (MRI) over CT in predicting tumor resectability, but selected cases may benefit from MRI to characterize the nature of small indeterminate liver lesions and to evaluate the cause of biliary dilatation when no obvious mass is seen on CT. Endoscopic retrograde cholangiopancreatography (ERCP) is useful for revealing small pancreatic lesions, identifying stricture or obstruction in pancreatic or common bile ducts, and facilitating stent placement; however, it is associated with a risk of pancreatitis (Fig. 112-2). Magnetic resonance cholangiopancreatography (MRCP) is a noninvasive method for accurately depicting the level and degree of bile and pancreatic duct dilatation. EUS is highly sensitive in detecting lesions less than 3 cm in size (more sensitive than CT for lesions <2 cm) and is useful as a local staging tool for assessing vascular invasion and lymph node involvement. Fluorodeoxyglucose positron emission tomography (FDG-PET) should be considered before surgery or radical chemoradiotherapy (CRT), because it is superior to conventional imaging in detecting distant metastases.

Tissue Diagnosis and Cytology Preoperative confirmation of malignancy is not always necessary in patients with radiologic appearances consistent with operable pancreatic cancer. However, EUS-guided fine-needle aspiration is the technique of choice when there is any doubt, and also for use in patients who require neoadjuvant treatment. It has an accuracy of approximately 90% and has a smaller risk of intraperitoneal dissemination compared with the percutaneous route.

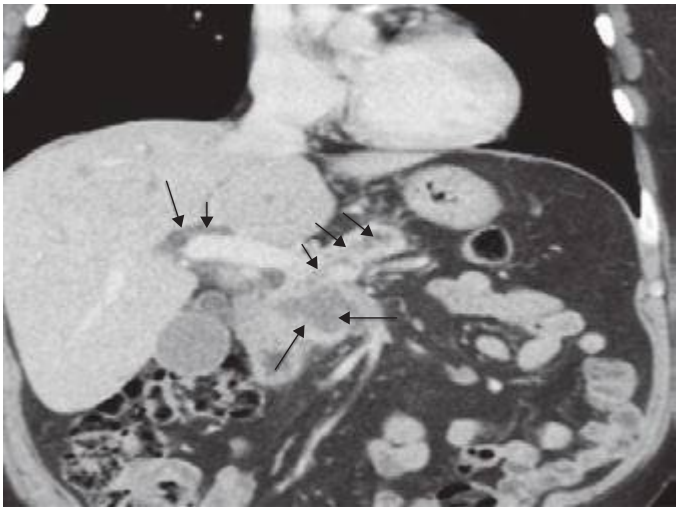

FIGURE 112-1 Coronal computed tomography showing pancreatic cancer and dilated intrahepatic and pancreatic ducts (*arrows*).

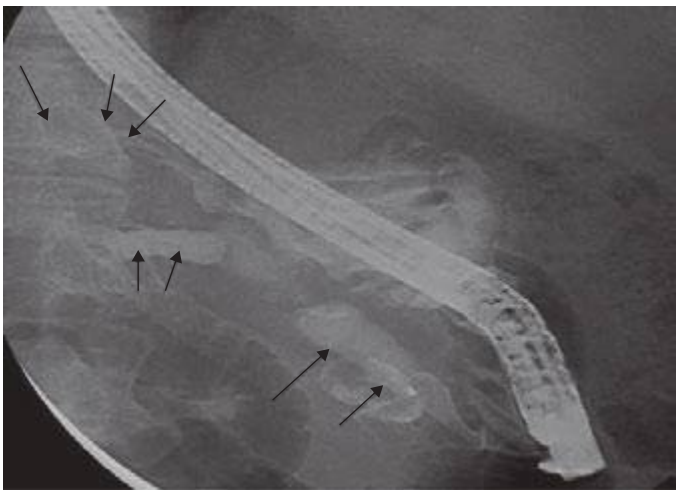

FIGURE 112-2 Endoscopic retrograde cholangiopancreatography showing contrast in dilated pancreatic duct (*arrows*).

Percutaneous biopsy of the pancreatic primary or liver metastases is only acceptable in patients with inoperable or metastatic disease. ERCP is a useful method for obtaining ductal brushings, but the sensitivity of ERCP for diagnosis ranges from 35 to 70%.

Serum Markers Tumor-associated CA19-9 is elevated in approximately 70–80% of patients with pancreatic carcinoma but is not recommended as a routine diagnostic or screening test because its sensitivity and specificity are inadequate for accurate diagnosis. Preoperative CA19-9 levels correlate with tumor stage, and postresection CA19-9 level has prognostic value. It is an indicator of asymptomatic recurrence in patients with completely resected tumors and is used as a biomarker of response in patients with advanced disease undergoing chemotherapy. A number of studies have established a high pretreatment CA19-9 level as an independent prognostic factor.

STAGING

The American Joint Committee on Cancer (AJCC) tumor-node-metastasis (TNM) staging of pancreatic cancer takes into account the location and size of the tumor, the involvement of lymph nodes, and distant metastasis. This information is then combined to assign a stage (Fig. 112-3). From a practical standpoint, patients are grouped according to whether the cancer is resectable, locally advanced (unresectable, but without distant spread), or metastatic.

TREATMENT PANCREATIC CANCER

RESECTABLE DISEASE

Approximately 10% of patients present with localized nonmetastatic disease that is potentially suitable for surgical resection. Approximately 30% of patients have R1 resection (microscopic residual disease) following surgery. Those who undergo R0 resection (no microscopic or macroscopic residual tumor) and who receive adjuvant treatment have the best chance of cure, with an estimated median survival of 20–23 months and a 5-year survival of approximately 20%. Outcomes are more favorable in patients with small (<3 cm), well-differentiated tumors and lymph node–negative disease.

Patients should have surgery in dedicated pancreatic centers that have lower postoperative morbidity and mortality rates. The standard surgical procedure for patients with tumors of the pancreatic head or uncinate process is a pylorus-preserving pancreaticoduodenectomy (modified Whipple's procedure). The procedure of choice for tumors of the pancreatic body and tail is a distal pancreatectomy, which routinely includes splenectomy.

Postoperative treatment improves long-term outcomes in this group of patients. Adjuvant chemotherapy comprising six cycles of gemcitabine is common practice worldwide based on data from three randomized controlled trials (Table 112-1). The Charité