

Pancreatic Cancer

Clinical Background

Pancreatic cancer, a common cancer in the U.S., has historically been associated with a high mortality rate.

Epidemiology

- Incidence – 9-10/100,000
- Age – peak incidence in 60s
- Sex – M>F (minimal)
- Ethnicity – 30-40% higher incidence in African Americans

Risk Factors

- Low socioeconomic status
- Male gender
- Tobacco use
- Presence of chronic disease states
 - Chronic pancreatitis
 - Diabetes mellitus
 - Prior cholecystectomy
- Occupational exposures
 - DDT, benzidine, dry cleaning agents, polychlorinated biphenyls (PCBs)
- Genetics
 - Family history of pancreatic cancer
 - Familial syndromes
 - *BRCA1* and *BRCA2* mutations
 - Familial atypical multiple mole melanoma syndrome (FAMMM)
 - Peutz-Jeghers syndrome (PJS)
 - Hereditary nonpolyposis colorectal cancer (HNPCC)
 - Ataxia-telangiectasia syndrome (A-T)
 - Hereditary pancreatitis syndrome
 - Von Hippel-Lindau syndrome (VHL)
 - Li-Fraumeni syndrome (LFS)
 - Familial pancreatic cancer

Pathophysiology

- Tumor is usually ductal adenocarcinoma
 - May also have mucinous cystadenocarcinomic variants
- Uncommon neuroendocrine tumors may also affect the pancreas
 - Insulinoma
 - Glucagonoma
- 70-80% of tumors are located in head of the pancreas
- Tumors may manifest solely as cysts

Clinical Presentation

- No specific early warning symptoms
- Usually abdominal pain and weight loss
- Obstructive jaundice if tumor is at the head of the pancreas

- Late features – ascites, abdominal mass
- If tumors are neuroendocrine in nature, patient may have endocrine syndromes as initial presentation (eg, hypoglycemia)

Diagnosis

- Indications for testing
 - Patient presents with jaundice and pancreatic mass
 - Monitoring for tumor recurrence after surgery
- Laboratory testing
 - CA 19-9 serum antigen testing – sensitivity depends on stage of cancer (70-90% sensitivity and 90% specificity)
 - May be elevated in benign obstructive jaundice, chronic pancreatitis
 - Should be used in conjunction with imaging studies to diagnose pancreatic cancer
 - Limited use as early screening
 - Serial monitoring recommended to assess follow up after potentially curative surgery or response to palliative chemotherapy
 - Other potential markers include MUC-1 antigen (also known as CA15-3 antigen) and carcinoembryonic antigen-related cell adhesion molecule 1 (CEACAM1) – although neither has been sufficiently validated for pancreatic cancer
 - Cystic lesions – fluid concentrations of amylase, carcinoembryonic antigen (CEA), and CA 19-9
 - Levels suggesting a diagnosis of cancer
 - Amylase <250 U/mL
 - CEA >800 ng/mL
 - CA 19-9 >37 U/mL
- Histology
 - Biopsy of tumor with histologic evaluation
 - Fine needle aspiration (FNA) via EUS is initial procedure of choice for diagnosis
- Molecular
 - KRAS2 gene mutation in ductal adenocarcinoma is common
 - FISH detection of aneuploidy for chromosomes 3, 7 and 17 and loss of the 9p21 locus is helpful in establishing the diagnosis of pancreatic ductal carcinoma in cytologic specimens
- Imaging studies
 - Transabdominal ultrasound/CT/MRI
 - Endoscopic retrograde cholangiopancreatography (ERCP) to outline extent of ductal involvement

Screening

- No studies demonstrating efficacy
- Only viable in high-risk patients
- Best screening tool appears to be endoscopic ultrasound

Monitoring

- CA 19-9 – serial monitoring recommended to assess follow-up after potentially curative surgery or response to palliative chemotherapy
 - CEA – less useful in monitoring than CA 19-9

Lab Tests

Indications for Laboratory Testing

Tests generally appear in the order most useful for common clinical situations. For test-specific information, refer to the test number in the ARUP Laboratory Test Directory on the ARUP Web site at www.aruplab.com.

Test Name and Number	Recommended Use	Limitations	Follow Up
Cancer Antigen-GI (CA 19-9) 0080461 Method: Electrochemiluminescent Immunoassay	Diagnose and monitor pancreatic cancer	Cannot be interpreted as absolute evidence of the presence or absence of malignant disease. Results obtained with different methods cannot be used interchangeably	
Cancer Antigen-GI (CA 19-9), Body Fluid 0020746 Method: Electrochemiluminescent Immunoassay	Diagnose and monitor pancreatic cancer	Cannot be interpreted as absolute evidence of the presence or absence of malignant disease. Results obtained with different assay methods or kits cannot be used interchangeably	
Pancreatobiliary FISH 2002461 Method: Fluorescence in situ Hybridization/Automated Image Analysis or Manual Screening	Detect aneuploidy for chromosomes 3, 7, and 17 and loss of the 9p21 locus Use in conjunction with current standard diagnostic procedures as an aid for initial diagnosis of pancreatic cancer	Negative result indicates that none of the numeric chromosomal abnormalities commonly associated with pancreatic carcinoma were identified with specimen; it does not exclude the possibility of pancreatic carcinoma	In the presence of other evidence suggesting pancreatic carcinoma, additional clinical studies should be considered
Amylase, Body Fluid 0020506 Method: Enzymatic	Assist with evaluating pancreatic cysts as benign or malignant		

Immunohistochemistry Stain Offering arup005 Method: Immunohistochemistry	For fixed tissue samples, consultative services as well as immunohistochemical staining for CAM5.2 (LMW), PGP9.5, synaptophysin, EMA, p21 and p27 are available		
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Additional Tests Available

Test Name and Number	Comments
Carcinoembryonic Antigen, Fluid 0020742 Method: Electrochemiluminescent Immunoassay	Assist with evaluating pancreatic cysts as benign or malignant

Guidelines

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