Pancreatic Ductal Carcinoma

- Malignancy arising from ductal epithelium of exocrine pancreas.
- Pancreatic adenocarcinoma, pancreatic cancer.
- Head (60%), body (20%), diffuse (15%), tail (5%)
- Etiology
  - Risk factors: Cigarette smoking, alcohol, obesity, diabetes mellitus, chronic pancreatitis, high-fat diet.
- Age
  - Median age at onset: 71 years
  - Almost always after age 45
  - Peak: 7th-8th decade

Clinical Issues

- Most common malignant tumor of exocrine pancreas and accounts for > 95% of pancreatic malignancies
- Most common symptoms are jaundice, weight loss, abdominal pain, and back pain
  - Often asymptomatic until late in course, particularly body/tail tumors that do not cause jaundice
- Only potentially curative treatment is complete surgical resection with negative surgical margins
- Only 15-20% of patients candidates for surgery at presentation, with 5-year survival of ~ 20% after surgery
- 5-year survival rate is < 5% without surgery with median survival of 3.5 months

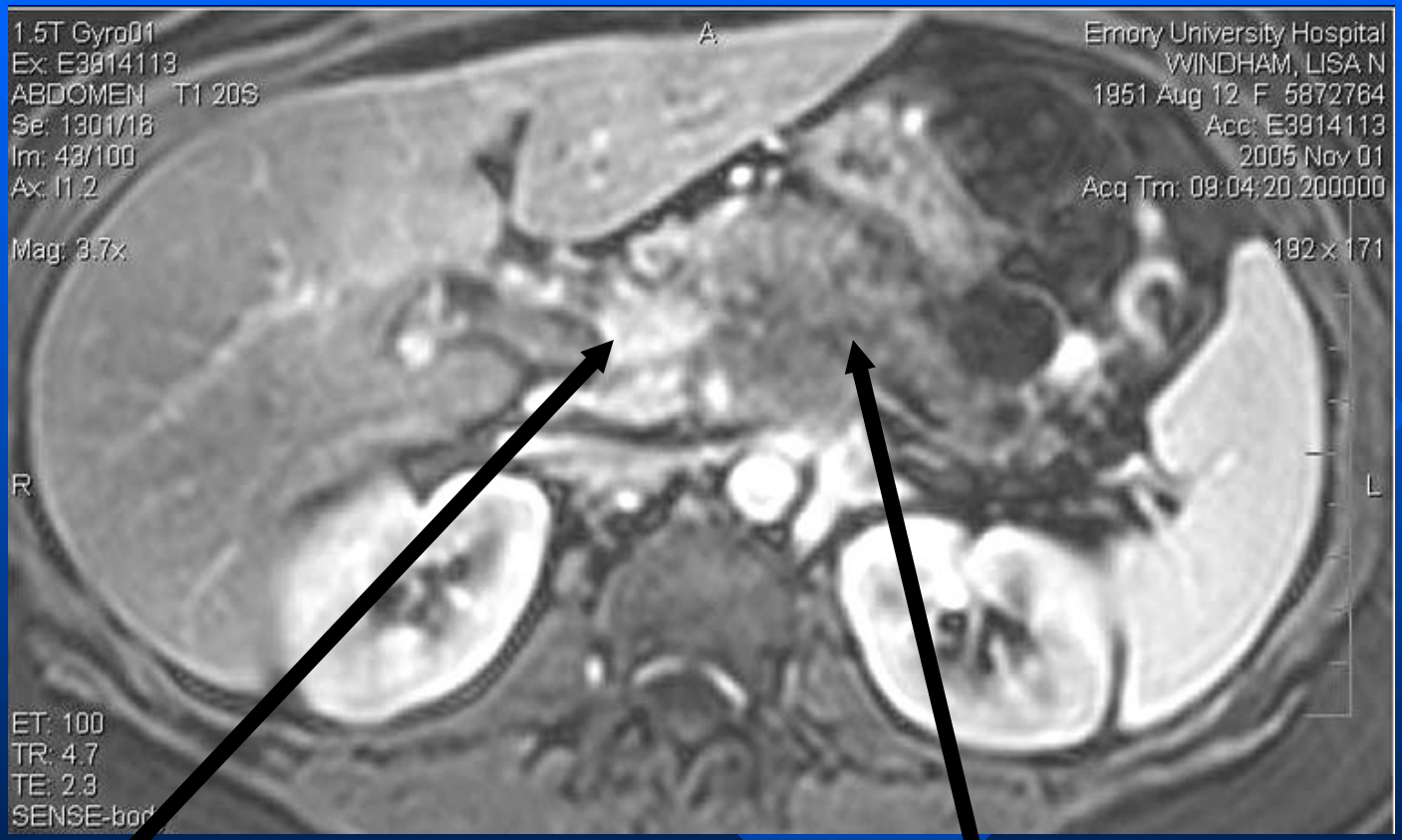
Imaging

- **CT**: Poorly marginated, hypodense mass with tendency to infiltrate posteriorly into retroperitoneum
  - Strong tendency to obstruct pancreatic and common bile ducts with abrupt ductal cutoff at site of obstruction
  - Pancreatic parenchymal atrophy upstream from mass
  - Soft tissue infiltration to involve adjacent vessels and organs (e.g., duodenum, bowel, stomach, and adrenals)
  - Most common sites of distant metastatic disease are liver, peritoneum, and lungs
  - Arterial involvement quantified as $< 180°$ or $\geq 180°$ tumoral involvement of vessel circumference
  - Venous involvement may involve abutment, encasement, narrowing, or occlusion
- **MR**: Tumor conspicuous on T1WI, appearing low signal and juxtaposed against high signal pancreatic parenchyma
  - T2WI less useful, as tumors isointense to pancreas
  - Conspicuity on T1WI C+ similar to CT, with tumors demonstrating progressive delayed enhancement

Staging

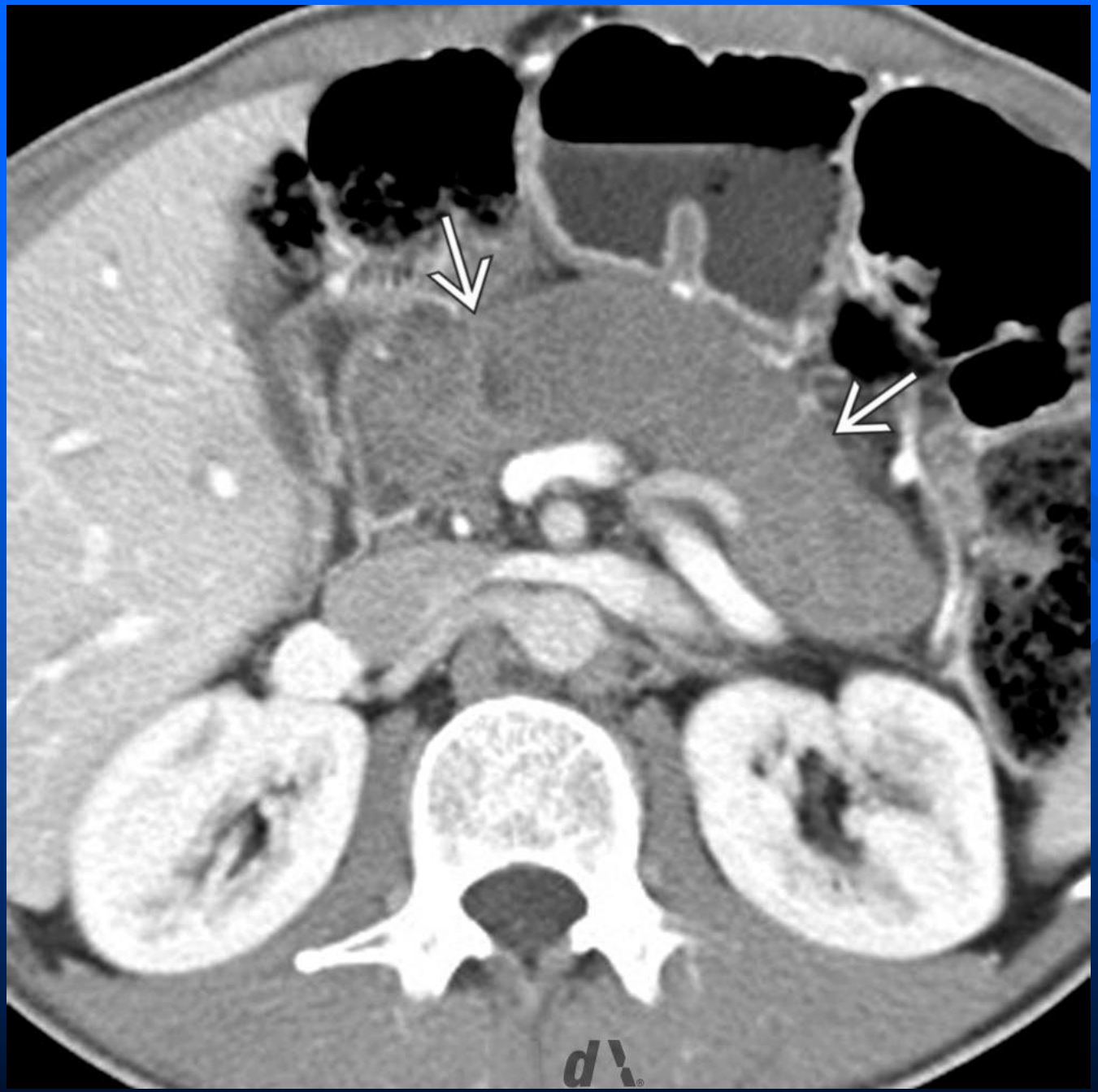
- Local staging
  - T1 tumor limited to pancreas ≤ 2 cm
  - T2 tumor limited to pancreas ≥ 2 cm
  - T3 tumor beyond pancreas but no celiac or SMA involvement
  - T4 tumor involves celiac or SMA
- Determination of locoregional resectability (MD Anderson criteria)
  - Unequivocally resectable
    - » No metastatic disease, suspicious lymphadenopathy distant from tumor, or vascular involvement of SMV, portal vein, celiac, hepatic artery, or SMA
    - » Local lymph nodes immediately around tumor do not generally preclude surgical resection
  - Unresectable
    - » Distant metastatic disease or bulky lymphadenopathy distant from mass
    - » > 180° involvement of SMA or > 180° involvement of celiac/hepatic artery without options for reconstruction
    - » Occlusion of SMV or portal vein without options for reconstruction
  - Borderline resectable (definition may vary depending on author and institution)
    - » ≤ 180° involvement of SMA
    - » Short segment encasement or abutment of common hepatic artery near its origin with possibility of reconstruction at surgery
    - » Short segment occlusion of SMV/portal vein with possibility of venous reconstruction

Pancreatic Adenocarcinoma (infiltrates tail)

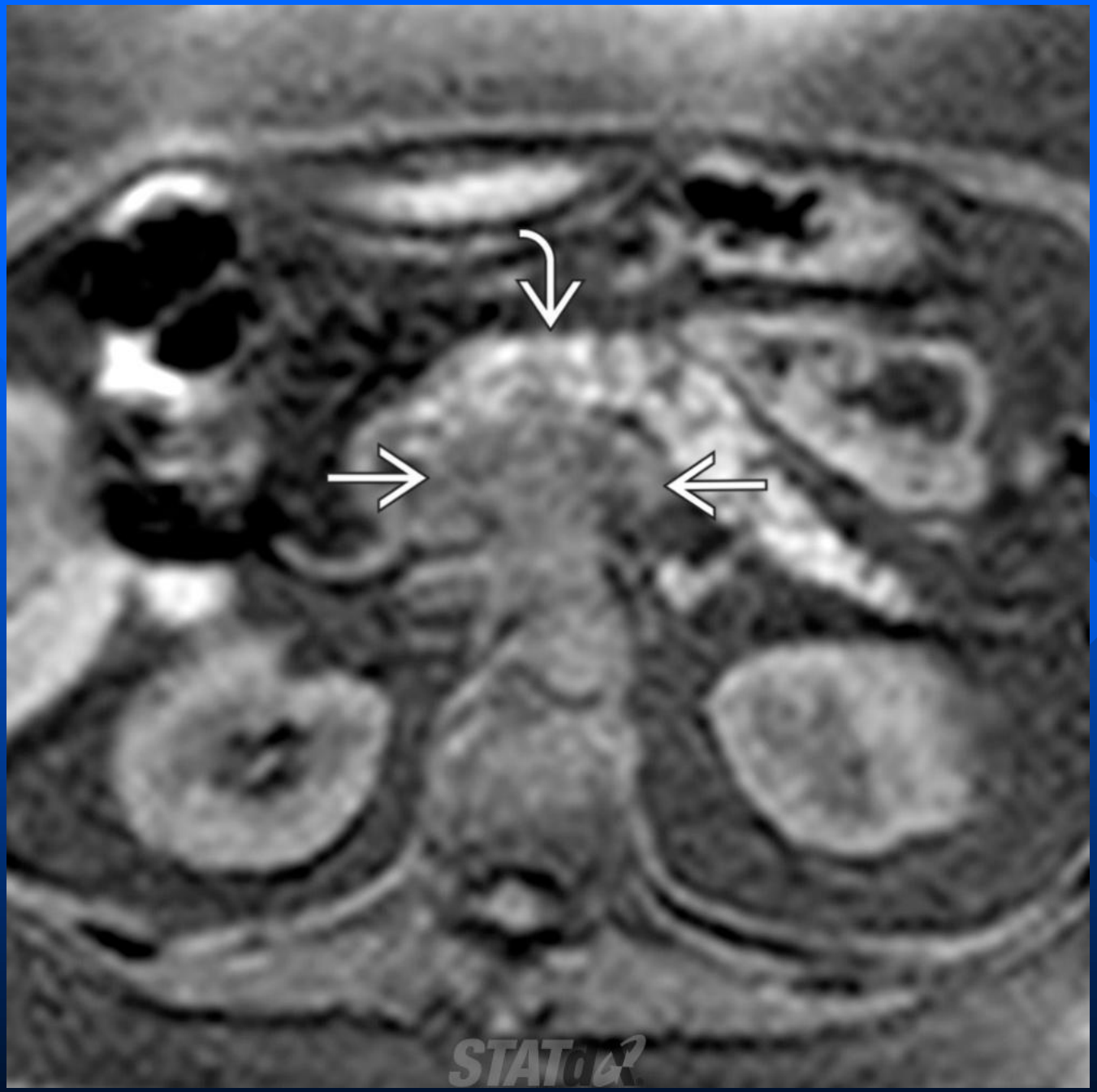


Normal enhacing Pancreas

Abnormal



Axial CECT demonstrates hypodense enlargement of the entire pancreas (white solid arrow), representing infiltration by pancreatic adenocarcinoma. Although uncommon, pancreatic cancer can rarely diffusely involve the entire gland, and may be confused for autoimmune pancreatitis.



Axial T1 noncontrast MR demonstrates a hypointense uncinate process mass (white solid arrow) nicely juxtaposed against the T1 hyperintense normal pancreatic parenchyma (white curved arrow). Noncontrast T1 images tend to be more helpful than T2WI for pancreatic adenocarcinoma identification.