

## Endoscopic Ultrasound-guided Fine Needle Aspiration (EUS/FNA) for Pancreatic Cancer

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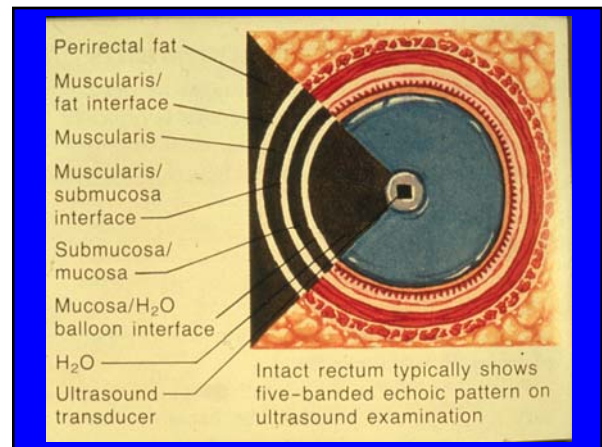
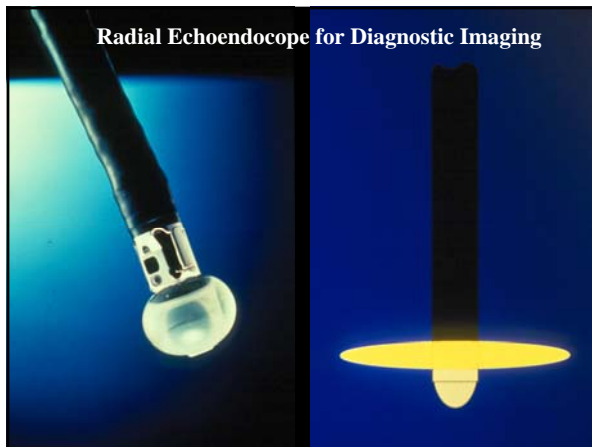
## Pancreatic Cancer

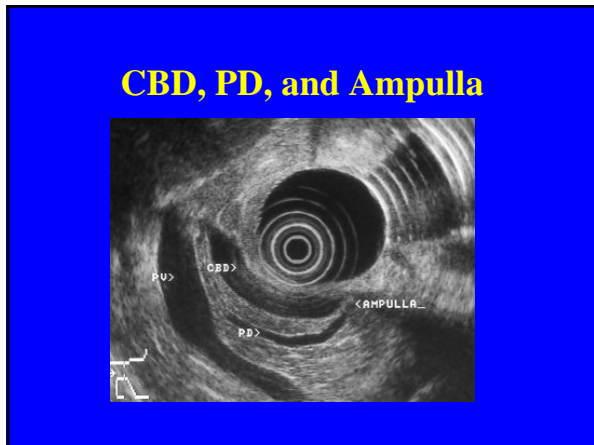
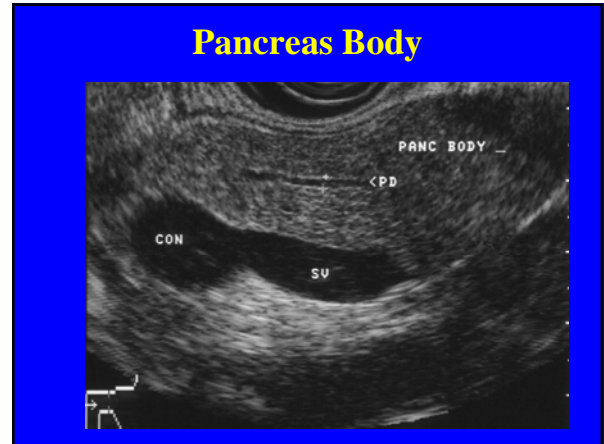
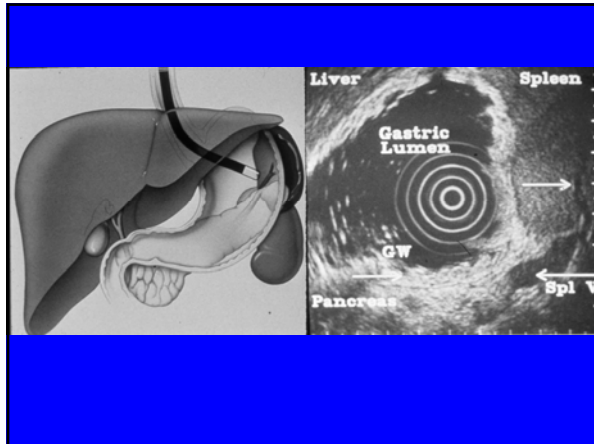
- **Presenting symptoms**
  - “painless jaundice” – pancreatic head or ampulla
  - Pain
  - Weight loss
  - New onset diabetes – especially in elderly
  - Steatorrhea
  - Acute pancreatitis – especially in elderly

## Pancreatic Cancer

- **Diagnosis**
  - ERCP brush cytology – 50% sensitive
  - CT/FNA – 50% sensitive
  - CA19-9 – not very sens or spec unless >1000
  - EUS/FNA – 90% sensitive
- **Staging determines if resectable**
  - Unresectable if mets or encasement of SMV/SMA/PV/Celiac
- **Survival is poor, but surgery is only chance for cure**

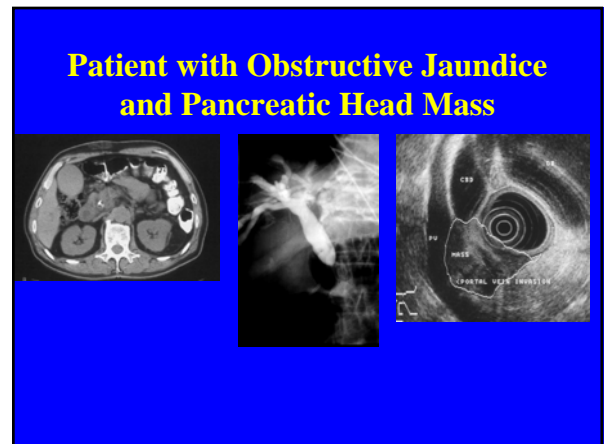
## EUS Overview



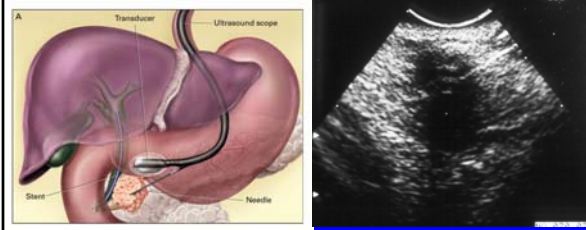


- ### EUS for pancreatico-biliary diseases
- Detection of CBD stones
  - Evaluation of obstructive jaundice
  - Diagnosis and staging of pancreatic cancer
  - Evaluation of cystic lesions of the pancreas
  - Detection of chronic pancreatitis

### EUS Diagnosis and Staging of Pancreatic Cancer



## EUS/FNA Cytology to Diagnose Pancreatic Cancer



## Trans-duodenal EUS/FNA of Pancreatic Head Mass



## EUS/FNA Diagnosis of Pancreatic Cancer

- Sensitivity 90%, Specificity 100%
- Risks 1%
  - Pancreatitis, bleeding, infection

## EUS/FNA Dx of Pancreatic Cancer When Prior CT/FNA or ERCP Cytology is Negative

IUMC 57/61 93%  
Gress, Ann Int Med 2001;134:459-64

Mayo Clinic  
Prior negative CT/FNA (61) 90%  
Prior negative ERCP cyto (41) 94%  
Harewood, Am J Gastro 2002;97:1386-91

## EUS Staging of Pancreatic Cancer

- Initial EUS studies in 1990s suggested EUS more accurate in staging than CT
  - T-stage 85%
  - N-stage 75%
- However improved CT staging with new technology
  - Spiral CT
  - Multidetector CT (MDCT)

## EUS vs MDCT for Staging Pancreatic Cancer

- Prospective, observational, cohort study
  - 120 patients with suspected panc cancer
  - MDCT using 4 images per rotation
- EUS → MDCT
- T staging accuracy
  - EUS 67% vs CT 41% p=0.012
- N staging accuracy
  - EUS 44% vs 42% ns
- For identifying resectable tumors
  - EUS 88%; CT 92%
- For identifying unresectable tumors
  - EUS 68%; CT 64%
- **Conclusion:**
  - EUS may not add to MDCT for determining resectability

Dewitt, Ann Int Med 2004

## EUS vs ERCP for Evaluating Obstructive Jaundice

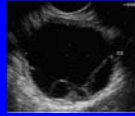
- **Advantages**
  - Safer – no risk of pancreatitis or cholangitis
  - Don't need to place biliary stent for drainage
  - Assess ducts, parenchyma, nodes, vessels
  - Obtain tissue dx of mass and LNs
- **Disadvantages**
  - Can't remove CBD stones
  - Can't place stent

## Endoscopic Approach to Diagnosing Possible Pancreatic Cancer

- Multi-detector CT with pancreatic protocol to assess for mass
- If no mass identified, then EUS to determine if mass present or if CBD stone
- If mass present, decide ahead of time if EUS/FNA needed/desired, or if patient will be going to surgery regardless
- If patient not going to surgery (i.e. unresectable, distant mets, medical problems) or if any question of lymphoma or auto-immune pancreatitis, then EUS/FNA for diagnosis
- Reserve ERCP for placing biliary stent in patients who are not going to surgery
- Need good communication between Interventional Endoscopist and Surgeon

## Pancreatic Cystic Lesions

- Increasingly detected as incidental finding on imaging studies
- **Differential Diagnosis**
  - **Benign**
    - Pseudocysts
    - Simple
    - Serous cystadenoma
  - **Premalignant/Malignant**
    - Mucinous cystadenoma
    - Intra-ductal papillary mucinous neoplasm (IPMN)
    - Carcinoma
    - Neuroendocrine tumor



Courtesy of WR Brugge

## Diagnosis of Pancreatic Cystic Neoplasms by EUS/FNA

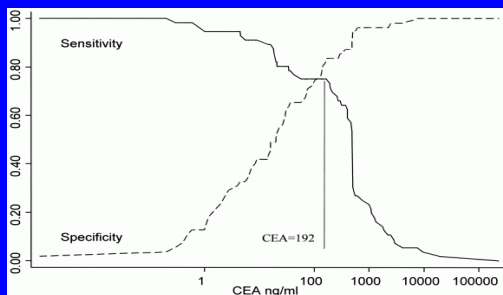
Brugge, Gastro 2004;126:1330-1336

- Multi-center study prospective study
- 341 pts underwent EUS/FNA: 112 surgical resection
- Evaluated EUS image, cytology, cyst fluid tumor markers (CEA, CA 72-4, CA 125, Ca 19-9, CA 15-3)
- 112 underwent surgical resection
 

– Mucinous cyst	68
– Inflammatory	27
– Serous	7
– Endocrine	5
– Other	5

## Sensitivity and Specificity Curves for Pancreatic Cyst Fluid CEA for Diagnosing Mucinous Cystic Lesions

Brugge, Gastro 2004;126:1330-1336



## Accuracy of Distinguishing Mucinous versus non-Mucinous Pancreatic Cysts

Brugge, Gastro 2004;126:1330-1336

	<u>EUS</u>	<u>Cytology</u>	<u>CEA</u>
<b>Sensitivity</b>	56%	35%	76%
<b>Specificity</b>	45%	83%	84%
<b>Accuracy</b>	51%	59%	79%*

\*p<0.05 compared to EUS morphology or cytology

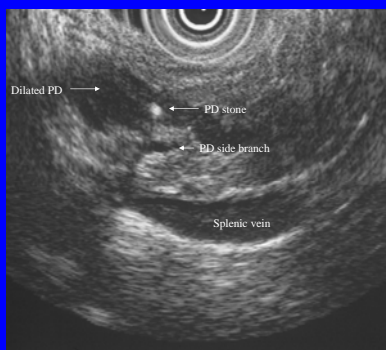
## Dilemma of Pancreatic Cysts

- Neither cytology nor fluid CEA is perfect in distinguishing mucinous versus non-mucinous
- Natural history of mucinous cysts is unknown
  - Who benefits from surgery?

## Practical Approach to Pancreatic Cysts

- Consider patient
  - If young patient with large cyst → surgery
  - If symptomatic → surgery
  - If asymptomatic → EUS to determine if mass
  - EUS/FNA if patient will go to surgery if mucinous cyst
- Not all cysts need evaluation – especially as many patients are elderly with incidentally found small cysts
- Follow cystic lesions with serial CT scans

## Chronic Pancreatitis



## EUS/FNA Cytology for Diagnosing Early Chronic Pancreatitis

- 37 pts with suspected CP
- 27 with suspect CP and abnl EUS had FNA
- 25 had cytologic evidence of CP
- More sensitive in mild grade CP than ERCP
- Poor correlation with indirect panc function testing
- Safe: Mild pancreatitis in 7%

Hollerbach, Endoscopy 2001

## EUS/FNA for Diagnosis of Chronic Pancreatitis - Dilemmas

- No “gold standard”
- No cytologic criteria for chronic pancreatitis
- Conflicting agreement with functional testing
- Future Questions:
  - Can it detect “early” chronic pancreatitis?
  - Can EUS/FNA be performed safely for pancreatic “gold standard” biopsy?