Interventional EUS for Pancreatobiliary Disorders

Cyrus Piraka, MD
Assistant Professor, Gastroenterology
Director of Endoscopy
University of Miami Hospital
Miami, FL
Objectives

• Understand and identify the role of Endoscopic Ultrasound (EUS) in diagnosis of pancreatobiliary disorders.
  – Where is EUS helpful?
  – EUS pancreatobiliary anatomy
  – Types of EUS scopes

• Understand where EUS is used for therapy in pancreatobiliary disorders.
  – EUS-directed therapy
  – EUS complementing ERCP
  – As an alternative to surgery and IR
Intro to EUS – Anatomy

- What can we see and access?
  - Entire pancreas
  - Entire extrahepatic bile duct and bifurcation
  - Left liver and much of the right liver
  - Ampulla
  - Adrenals
    - Left is easier than right to access
Nodes
• Celiac
• Peripancreatic
• Perigastric/gastrohepatic
• Hilum of liver
• Mediastinal

Associated vessels
• Aorta and celiac trunk
• Superior mesenteric artery and vein
• Splenic artery and vein
• Hepatic artery, left gastric artery and gastroduodenal artery
• Portal vein and confluence
• Renal arteries and veins

EUS – Scope types

- Radial – more intuitive, better for lumps/bumps and for esophagus/rectum, but cannot FNA
- Linear – better for pancreatobiliary tree, can perform FNA and injection/wire passage
- Probe – through a therapeutic scope, can access small spaces and evaluate biliary or pancreatic duct, but limited depth of penetration and cannot FNA
Equipment – Radial EUS

**Pros**
- 360 degree image
- Cross-sectional imaging
- Better for mucosal/submucosal imaging

**Cons**
- Cannot as easily do therapy
- Image quality not as good as linear

Source: Olympus
Equipment – Linear EUS

**Pros**

- High quality image
- Can do directed therapy/biopsies
- Has elevator (like ERCP)

**Cons**

- Not cross-sectional
- Not 360 degrees
- Harder to completely visualize mucosa/submucosa

Source: Olympus
Equipment – Accessories/Toys

• Mini-probe
  – Intraductal ultrasound
  – Evaluate stricture

Source: Olympus
EUS – Basic Diagnostics

• Cancer diagnosis and staging
  – Pancreatic
  – Bile duct/ampullary
  – Liver
  – Esophagus
  – Mediastinal/lung
  – Gastric/MALT lymphoma
  – Rectal
  – Neuroendocrine tumors/Insulinoma
EUS – Basic Diagnostics

• Chronic pancreatitis
• Bile duct stones/Gallbladder stones
• Pancreatic cysts
• Autoimmune Pancreatitis
• Intramural/submucosal lesions/masses
• Extrinsic compression
• IBD/fistula assessment
• Mediastinal lesions/adenopathy
• Male/Female GU organs
• Anal canal/fecal incontinence
EUS in pancreatobiliary disorders – diagnostic uses

• Unexplained abdominal pain/suspected sphincter of Oddi dysfunction (SOD)
  – Look for chronic pancreatitis
  – Look for biliary sludge/stone and biliary dilation
  – Identifying dilated bile duct may move someone from a type III to type II SOD or type II to type I SOD
  – Look for ampullary polyp/cancer

• Unexplained weight loss
  – Rule out pancreatic cancer in select circumstances
EUS in pancreatobiliary disorders – diagnostic uses

• Abnormal imaging (CT, MRI, ERCP)
  – Biliary dilation
    • Look for ampullary mass
    • Look for pancreatic mass
    • Look for hilar mass/node
  – Unexplained bile duct stricture
    • Look for pancreatic cancer
    • Look for cholangiocarcinoma
    • Look for hilar node
  – Pancreatic cyst
    • Differentiate type and need for surgery vs. surveillance
  – Mass
    • Pancreatic cancer vs. focal chronic pancreatitis vs. autoimmune pancreatitis
    • Cholangiocarcinoma or metastasis
EUS in pancreatitis - Diagnostic

• Immediate
  – Identification of bile duct stone in GS pancreatitis

• Delayed
  – Identify cause (especially in recurrent AP)
    • Yield 32-88%*
    • Further evaluation of gallbladder/CBD
    • Chronic pancreatitis
    • Pancreas divisum
    • Cancer
    • Autoimmune pancreatitis
    • Ampullary lesion
  – Identify complications (pseudocyst)

Wilcox et al GIE 2006
Necrotic Pseudocyst - EUS
EUS in pancreatitis - Diagnostic

• FNA
  – 19 gauge or 22 gauge needle
  – Tissue diagnosis of cancer
  – Aspirate cyst to differentiate pseudocyst vs. cystic neoplasm

• Trucut biopsy
  – 19 gauge core
  – Increase yield
  – Autoimmune pancreatitis
EUS in pancreatobiliary disorders – diagnostic uses

• Planning ERCP or surgical treatment for chronic pancreatitis
  – Look for stones
  – Look for strictures
  – Look for dilated duct

• Surveillance in family history of pancreatic cancer
Cancer

- Diagnosis – FNA
- Staging
  - **T**
    - 1 – <2 cm and within pancreas
    - 2 – > 2 cm and within pancreas
    - 3 – hits adjacent organs/vessels except superior mesenteric artery or celiac artery
    - 4 – hits superior mesenteric artery or celiac artery
  - **N**
    - 0 – no involvement of lymph nodes
    - 1 – affected lymph nodes
  - **M**
    - 0 – no metastases
    - 1 – distant metastases
    - x – cannot define metastatic involvement with the study
Cysts

• May be pre-malignant
  – Mucinous cysts
    • IPMN
    • Mucinous cystadenoma
    • Cystadenocarcinoma

• No significant malignant potential
  – Serous (“microcystic”) cystadenoma
  – Pseudocyst
Cysts

• Determine need for surgery vs. surveillance vs. neither
  – Likely cyst type
  – Size greater than 3 cm
  – Family history
  – Growth over time
  – Main duct involvement in IPMN
  – Mural nodularity
  – Associated mass
  – Symptoms
    • Weight loss
    • Abdominal pain
    • Recurrent pancreatitis
EUS – Interventional

• Celiac plexus block and neurolysis
  – Pancreatic cancer
  – Other intra-abdominal cancer
  – Chronic pancreatitis
  – Chronic abdominal pain
Figure 25C - Transgastric celiac plexus nerve block

EUS Transgastric approach - needle advanced to region of celiac plexus; alcohol injected

Source: top5plus.com
EUS - Therapeutic

• Pseudocyst drainage
  – Cyst gastrostomy, duodenostomy, esophagostomy

• Abscess drainage

• Pancreatic Necrosectomy
  – Progressive dilation of enterostomy
  – Irrigation with nasocystic drain or via scope
  – Debridement with Dormia basket/other tools
EUS single step pseudocyst drainage

A

≤ 1cm

Stomach/gut wall

19G EUS needle

Pseudocyst wall

Pseudocyst cavity

B

19G EUS needle

0.035 inch guidewire
Other - Therapeutic

• EUS Rendezvous for ERCP
  – Transmural ante- or retrograde ductal access
  – Biliary access
  – Pancreatic duct access
  – Altered anatomy cases (i.e. post-Whipple access of pancreatic duct)
• Choledochoduodenostomy
• Gastropancreatic stenting
  – Creation of pancreaticogastric fistula
• Injection of anti-tumor agents
• Fiducial placement for targeted radiation therapy
Case

• 54 yo man, h/o alcohol abuse
• Admitted with one week of epigastric pain radiating to the back
• EUS reveals 2 pseudocysts (larger 16 x 9cm), ascites and no region of apposition of pseudocyst to stomach, so drainage deferred
• Jejunal feeds continues, sx improved
ERCP – biliary stricture, chronic pancreatitis, no leak
• CT repeated showing 20x17 cm pseudocyst (grew) and 2nd pseudocyst shrank to 5x2cm
• CT angio excluded pseudoaneurysm
• EUS pseudocyst gastrostomy performed
Pseudocyst
Pseudocyst - EUS
Needle and wire - fluoro
Balloon dilation of tract
Pseudocyst gastrostomy
4 weeks post-procedure
• 5 weeks later readmitted for abdominal pain and n/v
• ERCP – PD leak, stented
PD leak
Follow-up – leak resolved, ongoing CBD stricture tx
Case

• 60 yo man non-alcoholic with single episode of pancreatitis
• Weight loss
Cancer - EUS
Pancreatic cancer, nodes
Conclusions

• EUS plays a critical role in the evaluation of causes of pancreatitis and pancreatobiliary disorders

• In select circumstances EUS is a helpful tool in treatment of the causes and complications of pancreatitis and other pancreatobiliary disorders
Bibliography


