Endoscopic Approach to Pancreatic Disease

Tom K. Lin

NASPGHAN Annual Conference
Chicago, IL
October 10-13, 2013

Disclosure

In the past 12 months, I have had no relevant financial relationships with manufacturer(s) of any commercial product(s) and/or provider(s) of commercial services discussed in this CME activity.

Objectives

1. Understand the diagnostic and therapeutic indications for ERCP in pediatric pancreatic disorders.
2. Recognize the applications for endoscopic ultrasound (EUS) in pediatric pancreatic disorders.
3. Appreciate the alternatives to endoscopic management of pancreatic diseases.

The pancreas…the forgotten organ

Changes...

- Greater recognition of pancreatic disorders (including pancreatitis) in children
- Advances in hereditary pancreatitis
- Growing number of pediatric gastroenterologists trained in advanced therapeutic endoscopy

Endoscopic Interventions

- ERCP
- EUS
- Pancreatoscopy

Pancreatic duct obstruction

Roto-Rooter

"A plumbing problem"

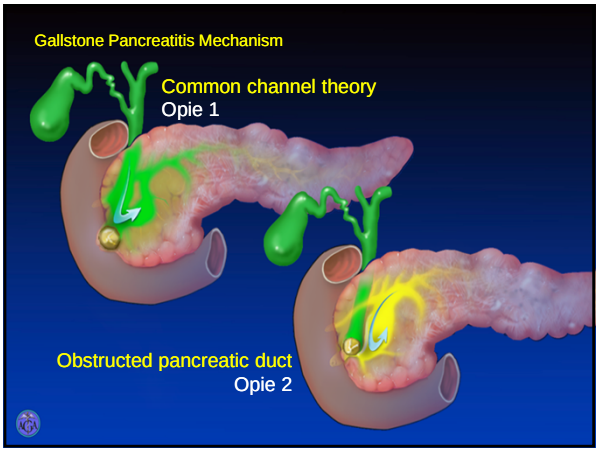
- Gallstone pancreatitis
- Pancreas divisum
- SOD
- Recurrent and chronic pancreatitis (stricture or stone formation)
- Tumor

Pancreatic duct obstruction

Roto-Rooter

"A plumbing problem"

- Gallstone pancreatitis
- Pancreas divisum
- SOD
- Recurrent and chronic pancreatitis (stricture or stone formation)
- Tumor

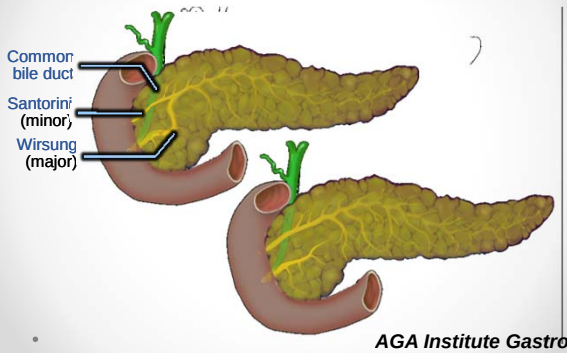


Gallstone Pancreatitis

Pancreas Divisum

- Most common congenital anomaly of the pancreas
- 5-15% of the normal population
- 25.6% incidence in series of patients with idiopathic pancreatitis
- Theory: main pancreatic drainage via the dorsal duct and the accessory papilla

Pancreas Divisum



AGA Institute GastroS

Pancreas Divisum Therapy

- Dorsal duct stent placement
- Minor papillotomy or dilation
- Surgical sphincteroplasty
- Surgical drainage procedure (e.g. Puestow)

Divisum: Minor Papillotomy

Greatest likelihood of response:

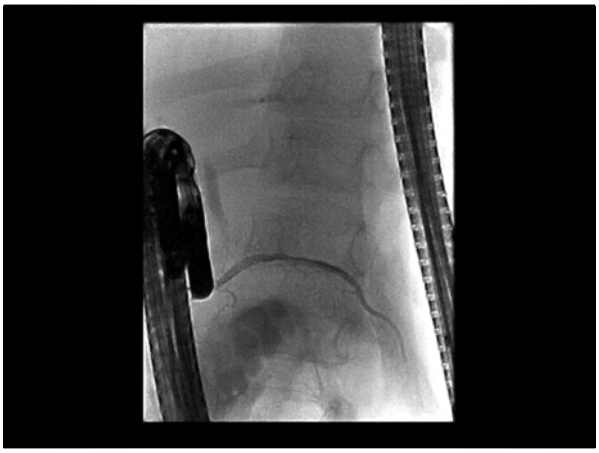
- Those with ARP
- Those who have not progressed to CP
- Long-term improvement in 32%
- Repeat endoscopic therapy may be needed (restenosis)

Gerke, JOP 2004; 5(3):122-131.

Case

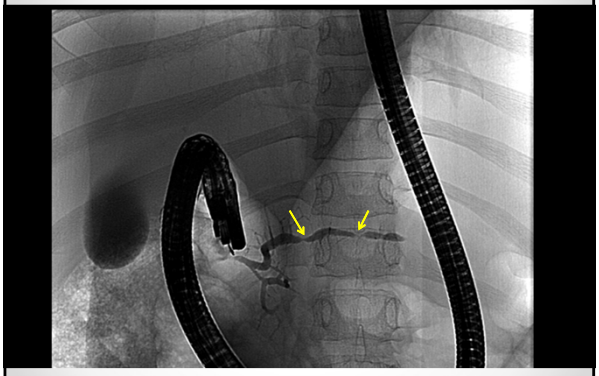
10 y/o female

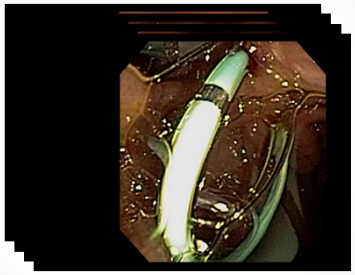
- acute recurrent pancreatitis
- CFTR mutation (p.D1152H)
- SPINK1 mutation
- MRCP: pancreas divisum; mildly dilated, irregular dorsal duct



Case

8 y/o male
- acute recurrent pancreatitis since age 2
- nown CF mutations (Y1032C/R1070W)
- MRCP suggestive of pancreas divisum



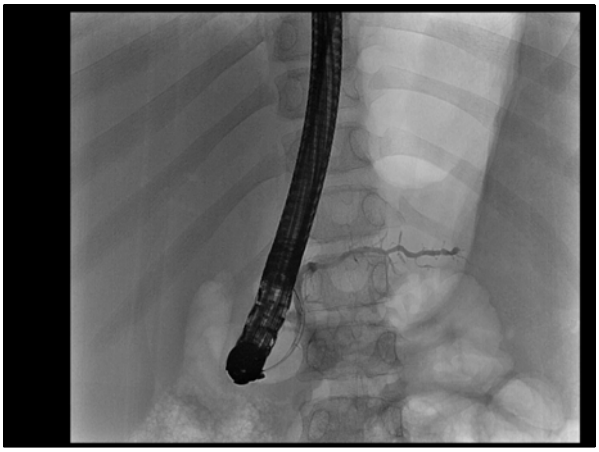


Sphincter of Oddi Dysfunction

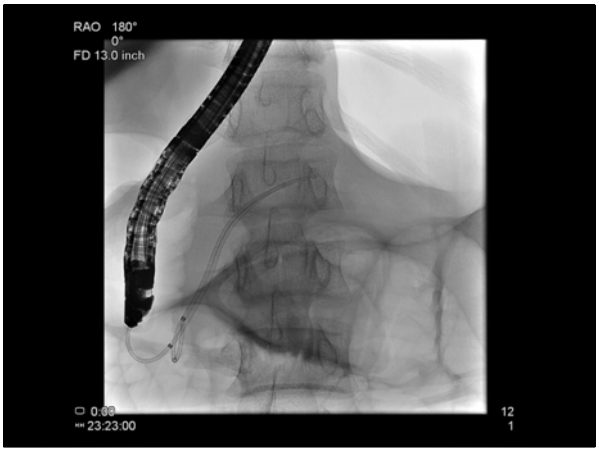
- Diagnosis:
  - gold standard = SOD manometry
- *No pediatric norms for normal sphincter pressure*
- Biliary sphincterotomy alone ***vs*** biliary and pancreatic sphincterotomy

Sphincter of Oddi Dysfunction

ARP/CP

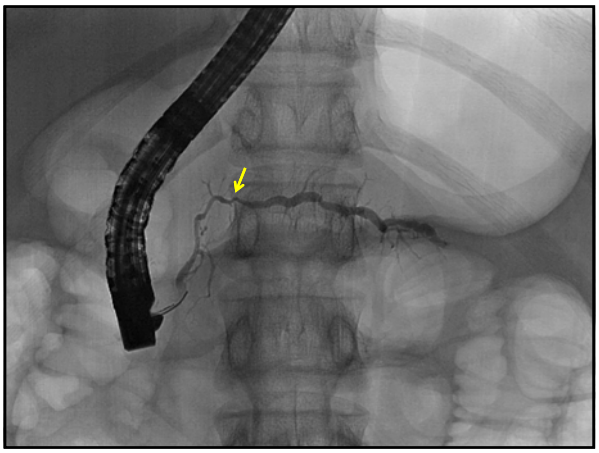



RAO 180°
FD 13.0 inch
22:24:13



Pancreatic duct disruption

- Blunt abdominal trauma
  - Bicycle handlebar
  - MVA (seat belt injury)
  - Non-accidental trauma
- Gun shot wound



Non-accidental Trauma

Anomalous Pancreaticobiliary Junction (APBJ)

- ERCP gold standard for diagnosis
- Majority of choledochal cysts associated with anomalous ductal junctions
- Risk factor for recurrent pancreatitis
- Elevated risk for bile duct and gallbladder cancer

Endoscopic Ultrasound

EUS in children

- smaller incidence of pancreatic disorders relative to adults
- limitations in scope size
- limited knowledge in pediatrics of its potential utility

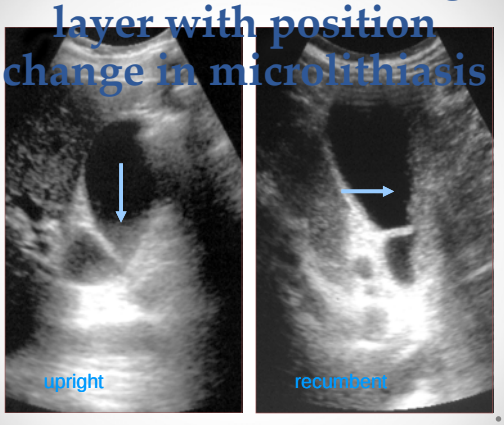
Endoscopic Ultrasound

- Minimally invasive endoscopic procedure
- Effective for identifying changes of chronic pancreatitis
- High diagnostic sensitivity
  - Divisum
  - Choledocholithiasis/gallstone pancreatitis
  - Microlithiasis
- FNA of pancreatic masses
- Cyst drainage
- Necrosectomy

EUS: gallstone pancreatitis

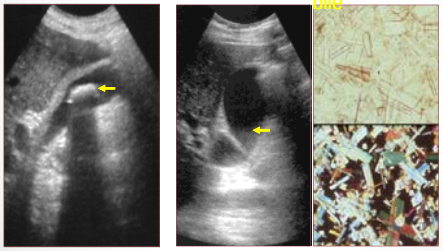
- Intermediate probability cases
- microlithiasis
- Failed ERCP (rendezvous access – EUS guided PTC)

layer with position change in microlithiasis



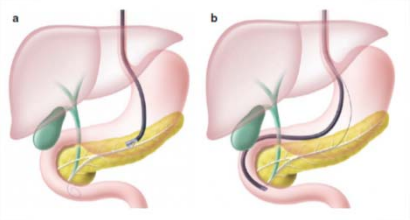
Gallstones vs Microlithiasis

Gallstones | Sludge | Crystals in bile



Polarized light

EUS: Anterograde access



Itoi, Dig Endosc 2013; 25(3):241-52.

EUS: Anterograde access

Itoi, Dig Endosc 2013; 25(3):241-52.

EUS: Anterograde access

Itoi, Dig Endosc 2013; 25(3):241-52.

EUS: Pancreatic Mass

Autoimmune Pancreatitis

Proctor, Clin Radiol 2013; 68(4):422-32.

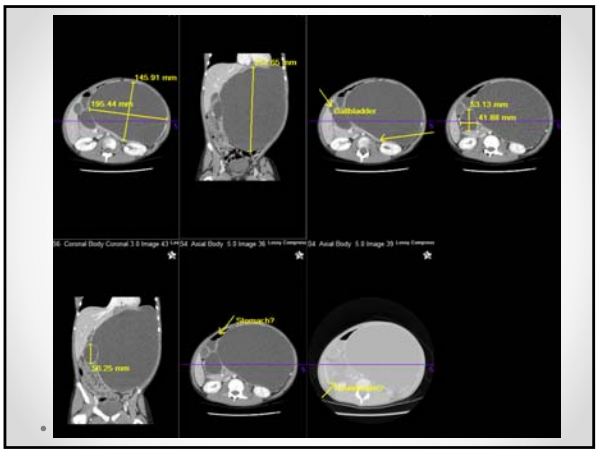
Pediatric pancreatic EUS-Trucut

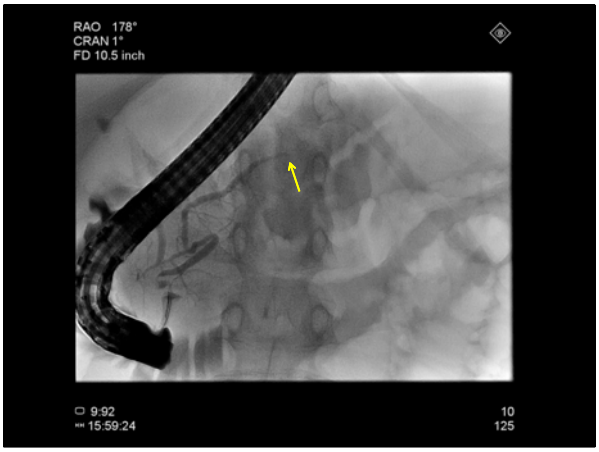
- **Use of TCB in pediatric population has been limited**
  - Difficult to use TCB needle
  - Smaller pancreas size
  - Paucity of indications
  - Uncertain role of TCB
  - Heightened concern regarding safety in pediatrics
- **Mayo clinic results (Fujii, GIE 2013; 77(5):824-28):**
  - Diagnostic yield 86% (comparable to adults)
  - Early diagnosis allows for timely & disease-specific therapy
  - AIP may be more common than previously thought
  - EUS with TCB is **safe and feasible**

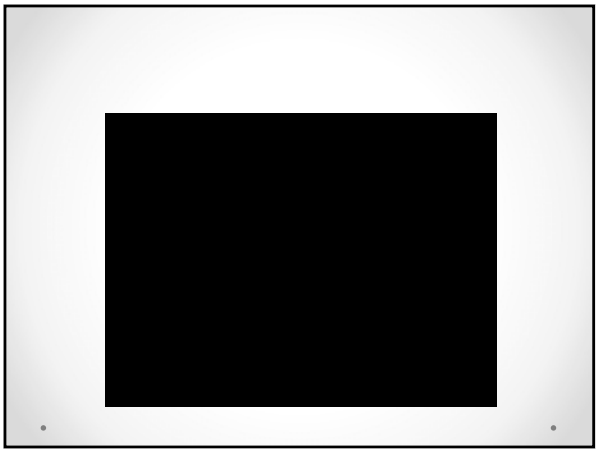
EUS Cyst Drainage

Case

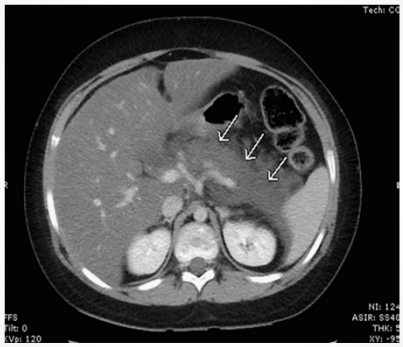
9 y/o female
- bicycle handlebar blunt trauma
- abdominal pain and vomiting
- CT scan: fractured pancreas
- development of large pseudocyst


145.91 mm
195.44 mm
Gallbladder
33.13 mm
41.88 mm
Stomach?
50.25 mm


RAO 178°
CRAN 1°
FD 10.5 inch
9:92
15:59:24
10
125



Pancreatic Necrosis

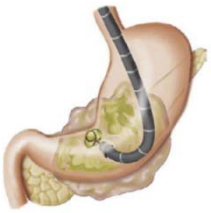


Raizner, J Pediatr 2013; 162(4):788-92.

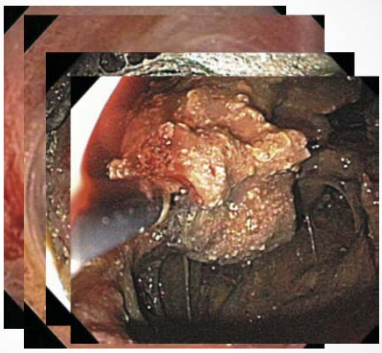
Endoscopic Necrosectomy

- Transmural access (gastric or duodenal) to walled-off pancreatic necrosis
- Effective option to operative necrosectomy
- Necessity for proper expertise
- Reserved for experienced *adult* centers

Endoscopic Necrosectomy



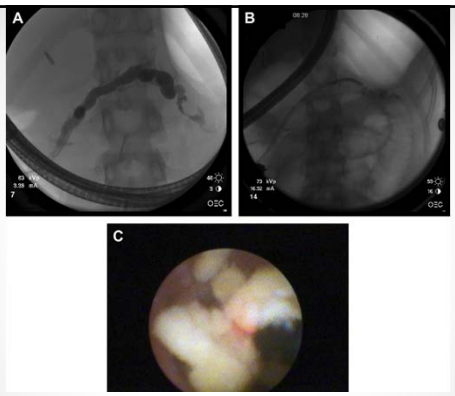
Baron, Gastroenterol Hepatol 2008; 4(9):617-20.



Gardner, GIE 2011; 73(4):718-26.

Pancreatoscopy

- For endoscopic removal of pancreatic intraductal calculi
  - Conventional method:
    - pancreatic sphincterotomy
    - dilation of associated strictures
    - balloon or basket extraction
- Electrohydraulic lithotripsy (EHL)
- Laser lithotripsy (FREDDY, Holmium laser)



Rosenkranz, Gastrointest Endosc Clin N Am 2012; 22(3):435-50.

Endoscopic Alternatives

- Surgical procedures (Puestow, Berne, Beger, Whipple)
- Total pancreatectomy with islet autotrasplantation (TPIAT)
- Operative debridement (open vs laparoscopic) for pancreatic necrosis
- Percutaneous radiologic interventions
- Extracorporeal shockwave lithotripsy (ESWL) for pancreatic stones

Conclusion

- Endoscopic applications (ERCP and EUS) are safe and effective in selective pediatric patients with pancreatic diseases/disorders
- Surgical and radiologic interventions are alternatives when endoscopy is ineffective or no longer feasible.
- Newer endoscopic interventions are available but infrequently indicated in children with pancreatic disorders (necrosectomy, pancreatoscopy)