# 16 April 2010
# Resident Teaching Conference

# Pancreatitis

**W. H. Nealon, M.D., F.A.C.S.**
**J.J. Smith, M.D., D.W.D.**

## Resources:

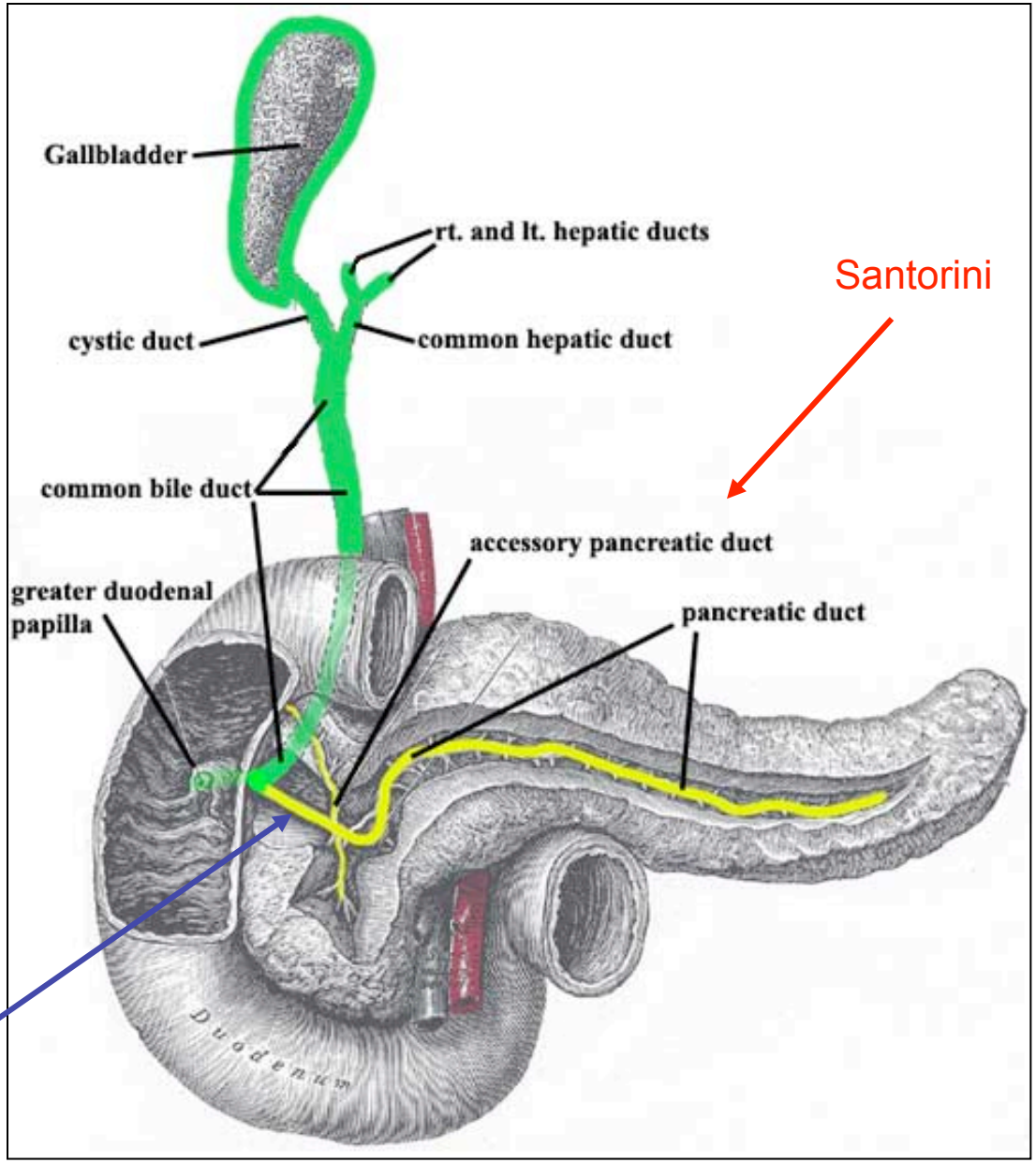
Dr. Nealon

pp. 200-204 Absite Rvw book

pp. 450-494 Cameron (8th)

SESAP 13, categories 3 and 4

ACS Reading




anatomy.med.umich.edu/.../ duodenum_ans.html

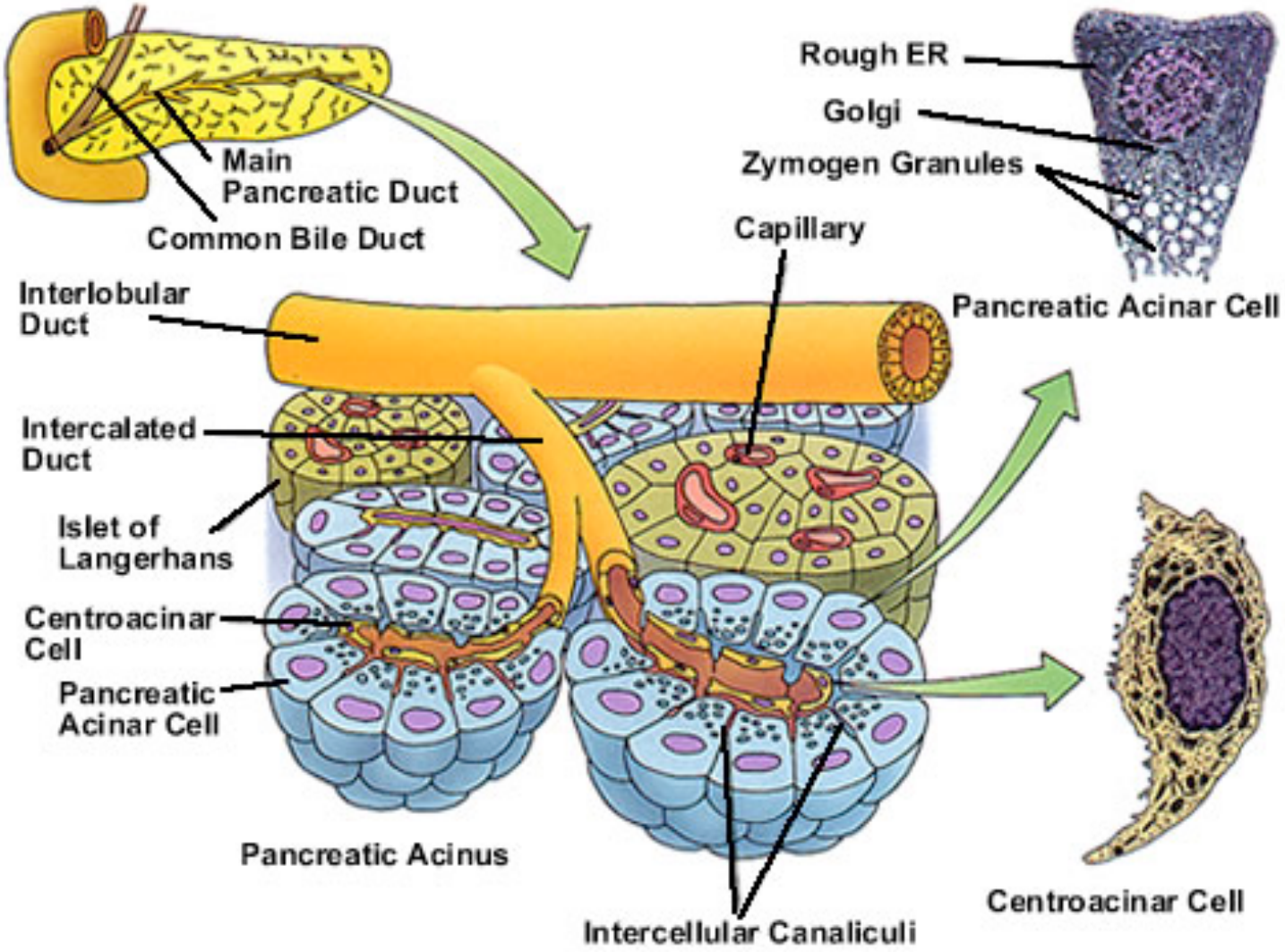
# Bud and ductology

- Ventral pancreatic bud
  - Connects to Duct of Wirsung
  - Migrates posteriorly to the right and then clockwise to fuse with dorsal bud
  - Forms uncinate and inferior portion of the head

- Dorsal pancreatic bud: body, tail and superior aspect of pancreatic head (has Duct of Santorini)

- Duct of Santorini: small accessory duct draining directly into duodenum

- Duct of Wirsung: major pancreatic duct merging with CBD before entering duodenum




http://www.med-ed.virginia.edu/courses/cell/handouts/images/Liver5.jpg

# Exocrine pancreas

- Amylase, lipase, trypsinogen, chymotrypsinogen, carboxypeptidase, HC03-

- Amylase
  - Only pancreatic enzyme secreted in active form
  - Hydrolyzes alpha 1-4 linkages of glucose chains

# Endocrine function of the pancreas

- Alpha cells: glucagon
- Beta cells: insulin (center of islets)
- Delta cells: somatostatin
- PP or F cells: pancreatic polypeptides
- Islet cells: also produce VIP, 5-HT, neuropeptide Y and gastrin-releasing peptide

# Blood flow

- Majority of blood flow goes to:
  - Islet cells

- After islets ➔ blood goes to the acinar cells

# Hormonal control of pancreatic excretion

- Secretin: Increases HC03-
- CCK: increases enzymes
- Acetylcholine: increases HC03- and enzymes
- Somatostatin and glucagon: decr exocrine function
- CCK and secretin: most released from cells in the duodenum

# Annular Pancreas

- 2nd portion of duodenum trapped in pancreatic band
  - "Double-bubble" on KUB
  - Associated duodenal atresia
- Associated with Down's Syndrome
  - From ventral pancreatic bud via failure of clockwise rotation
- Rx: duodenojejunostomy or duodenoduodenostomy and sphincteroplasty
  - Pancreas not resected

# Pancreas divisum

- Failed fusion of pancreatic ducts
- Most are asymptomatic but some get pancreatitis
- Dx:  ERCP
  - Minor papilla will show long and large duct of Santorini
  - Major papilla shows short duct of Wirsung
- Rx:  sphincteroplasty and stent placement if sxs
  - May need open sphincteroplasty if stenting fails
  - If long-standing a sphincteroplasty may not work
    - Proceed with longitudinal pancreaticoJ

# SESAP 13

Category 3 Item 28

A 40-year-old man with no co-morbidities presents with diffuse abdominal pain and distention and a 2-day history of nausea and vomiting. He is afebrile and hemodynamically normal, but is anuric and serum creatinine is 3.0 mg/dL.

A computed tomographic (CT) scan confirms necrotizing pancreatitis with a large peripancreatic phlegmon. There is no evidence of cholelithiasis or cholecystitis. He has had no prior episodes of pancreatitis.

The next step in management should be

(A) total parenteral nutrition (TPN)

(B) bowel rest, fluid resuscitation

(C) surgical pancreatic debridement

(D) fine-needle aspiration of peripancreatic fluid

(E) prophylactic antifungal agents

B

# Pancreatic pseudocysts

- More common in pts with chx pancreatitis
- Symptoms:
  - Post-prandial Pain, fever, wt loss
  - Complications
    - Obstruction--bowel or bile duct
    - Rupture, hemorrhage and infection
- Often occurs in head of pancreas
  - Small cysts may resolve spontaneously (<5cm)
- Non-epithelialized sac
- Manage expectedly for about 6 weeks--allow the pseudocyst to mature

# Pancreatic pseudocysts

- Treat pts with continued symptoms or pseudocysts that are growing
- Old adage was to use TPN
  - new data suggests that enteral nutrition is best
  - distal to ligament of Treitz--still debatable
- Usually in the head of pancreas
- Can present with:
  - Pain, fever
  - Leukocytosis, palpable mass
  - Jaundice

# More Pancreatic pseudocysts

- Pts with symptoms or growing pseudocycst need evaluation of the duct (e.g., ERCP or MRCP)
  - If duct involved:  need cystogastrostomy
  - If duct NOT involved:  may succeed with perc drain
  - Nealon classification can help you here

- Complications of pancreatic pseudocyst
  - SBO, infection
  - Portal or splenic vein thrombosis

- Incidental cysts
  - Should be resected unless associated with pancreatitis or unless the cyst is purely serous

# SESAP 13

Category 4 Item 11

A 35-year-old man has epigastric pain and emesis. Four weeks previously, he was discharged after an admission for uncomplicated acute pancreatitis. He has been receiving corticosteroids since a cadaveric renal transplant 4 years ago. Pertinent data include: WBC count, 11,000/$mm^3$ ; amylase, 1000 IU (normal 80 to190 IU); and normal serum creatinine and BUN. The abdominal computed tomographic (CT) scan shown is obtained.

Of the following, the most appropriate management would be

(A) open debridement

(B) cystgastrostomy

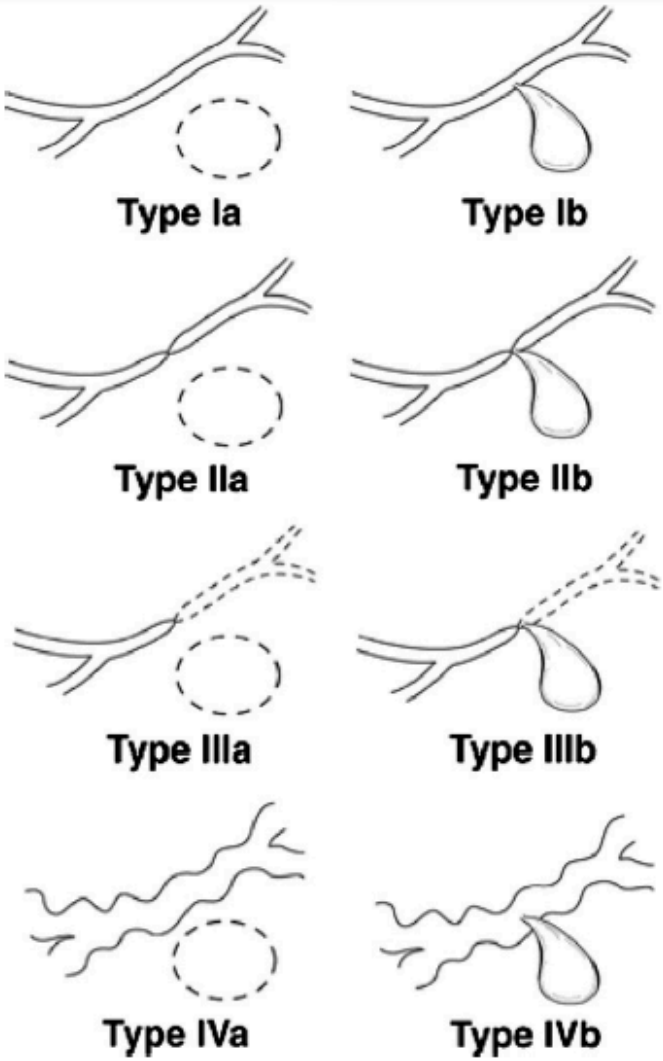
(C) Roux-en-Y cystjejunostomy

(D) enteral feeding distal to the ligament of Trietz

(E) CT-guided percutaneous drainage

Media for Category 4 Item 11

# Nealon Classification




WH Nealon, et. al *A Unifying Concept: Pancreatic Ductal Anatomy Both Predicts and Determines the Major Complications Resulting from Pancreatitis*. *JACS*, Vol. 208, No. 5, May 2009

D

# Chx pancreatitis

- Corresponds to irreversible panrenchymal fibrosis
- EtOH most common cause
  - Idiopathic 2nd most common
- Pain most common problem
  - Anorexia, wt loss, malabsorption, steatorrhea
- Exocrine tissue gets calcified and fibrotic
  - Islet cells usually preserved

# Chx pancreatitis

- Advanced disease:  chain of lakes
  - Alternating segments of dilation and stenosis in panc duct
- Can cause malabsorption of fat-soluble vitamins
  - Stents can temporize
- Dx:  abdominal CT
  - U/S = shows panc ducts >4mm, cysts and atrophy
  - ERCP = v. sensitive at diagnosing chx pancreatitis
- Rx:  supportive care
  - Pain control
  - Nutritional support (TFs or TPN)

# Chx pancreatitis

Surgical indications:

- Pain interferes with QOL
- Nutritional compromise
- Addiction to narcotics
- Can't r/o cancer
- Biliary obstruction or abscess
- Can use splanchnicectomy or celiac gangliionectomy for p/o pain control

Surgical options:

- Puestow = longit. pancreaticoJ (for ducts >8mm, most pts improve)
- Open along main panc duct and drain into jejunum

- Distal pancreatic resection:
  - for obstructive chx pancreatitis

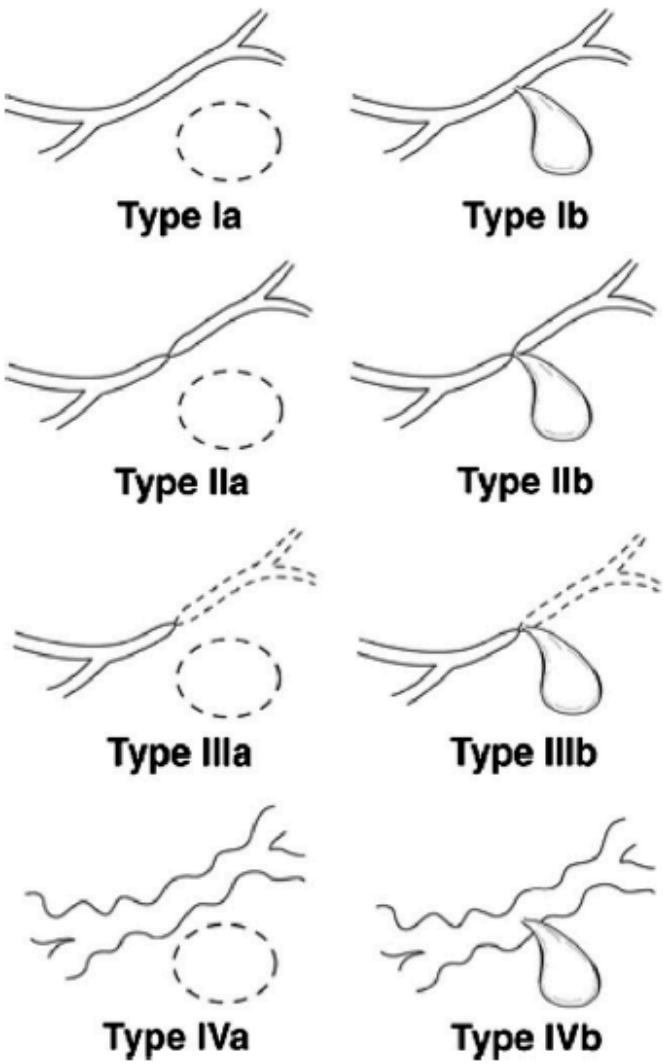
- Whipple:
  - Possible if head disease (large or small) and small duct variants

# Chx pancreatitis

- Common bile duct stricture:
  - Proximal dillation that can occur with chx pancreatitis
  - Rx = hepaticoJ or cheldochoJ for pain, jaundice cholangitis

- Splenic vein thrombosis:
  - Chx pancreatitis most common cause of splenic vein thrombosis
  - Can get bleeding from gastric varices that form as collaterals
  - Rx = splenectomy for bleeding gastric varices

# Nealon Classification




WH Nealon, et. al *A Unifying Concept: Pancreatic Ductal Anatomy Both Predicts and Determines the Major Complications Resulting from Pancreatitis*. *JACS*, Vol. 208, No. 5, May 2009

# SESAP 13

Category 4 Item 30

Which of the following statements about the surgical management of chronic pancreatitis is TRUE?

(A) Puestow pancreaticojejunostomy results in lasting pain relief in 85% of patients

(B) Pancreaticoduodenectomy rarely results in long-term pain relief in patients with chronic pancreatitis

(C) Local resection of the head of the pancreas combined with longitudinal pancreaticojejunostomy (Frey procedure) is associated with a high risk of pancreatic endocrine insufficiency

(D) Thoracoscopic splanchnicectomy is ineffective as a means of pain relief for chronic pancreatitis

(E) Patients who continue to drink alcohol after a Frey procedure have a much higher risk for continued pain than those who discontinue alcohol consumption

C

# Pancreatic insufficiency

- Usually result of long-standing -itis or can occur after total panc
  - Over 90% of function has to be lost
- Refers to exocrine function
- Symptoms:  malabsorption and steatorrhea
- Dx:  fecal fat test
- Rx:  high CHO, high-protein, low-fat diet with enzyme repletion
- Steatorrhea:  give Pancrease

# Pancreatic etiologies of biliary stenosis

- Secondary to pseudocysts, fibrosis
- Complications:  biliary cirrhosis, cholangitis
- Operative management appropriate for:
  - Persistent jaundice, cirrhosis
  - Progressive dilation of hepatic ducts or cholangitis
  - If you cannot r/o cancer
- Rx:  hepaticoJ

# SESAP 13

Category 4 Item 10

A 35-year-old man is admitted with acute pancreatitis secondary to hypertriglyceridemia. Oral intake is discontinued, and he is hydrated with intravenous fluids. He has minimal upper abdominal tenderness without peritoneal signs.

Seventy-two hours after admission, he has a worsening leukocytosis with left shift, elevated amylase, and right upper quadrant rebound tenderness. The computed tomographic (CT) scan shown is obtained.

The most appropriate management would be

(A) laparotomy

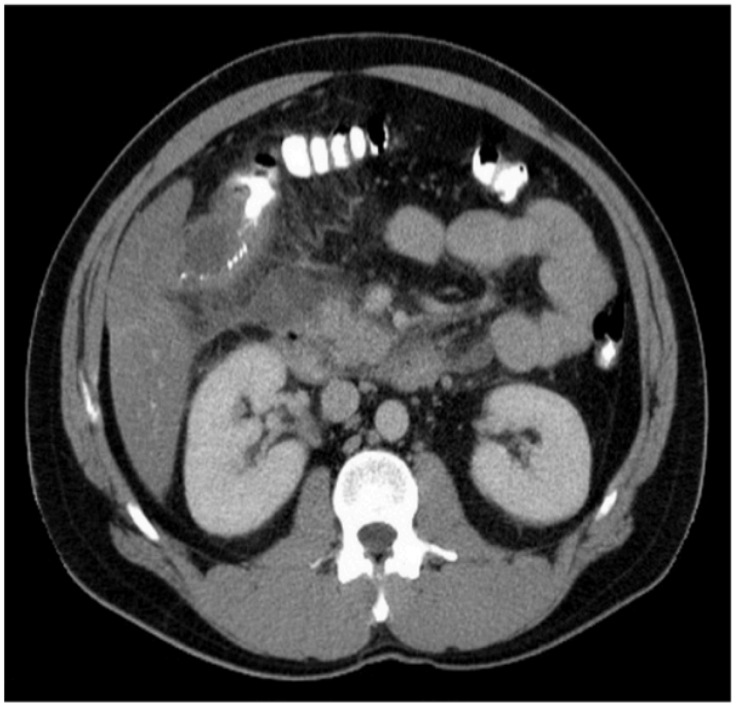
(B) nasogastric tube decompression and broad-spectrum antibiotics

(C) somatostatin therapy

(D) repeat CT scan in 48 to 72 hours

(E) percutaneous drainage

Media for Category 4 Item 10



A

# SESAP 13

Category 4 Item 44

A 39-year-old woman is admitted with gallstone pancreatitis and epigastric pain. Pertinent data include amylase, 2000 U/L; bilirubin, 1.2 mg/dL; and WBC count, 15,000/$mm^3$. After 2 days of medical management, her epigastric pain resolves. Her amylase is 340 U/L and her bilirubin and WBC count have returned to normal.

Laparoscopic cholecystectomy should be attempted

(A) after endoscopic retrograde cholangiopancreatography (ERCP) and sphincterotomy

(B) prior to discharge

(C) once her amylase is normal

(D) 4 to 6 weeks later

(E) only if the patient develops recurrent pancreatitis

B

# SESAP 13

Category 4 Item 48

A 42-year-old previously healthy man arrives in the emergency department with a 12- hour history of excruciating epigastric pain. He is afebrile and not jaundiced. Pulse is 115/min, blood pressure is 90/60, and WBC count is 16,400/$mm^3$. The abdominal computed tomographic (CT) scan shown is obtained.

Immediate management should include

(A) peritoneal dialysis

(B) exploratory laparotomy

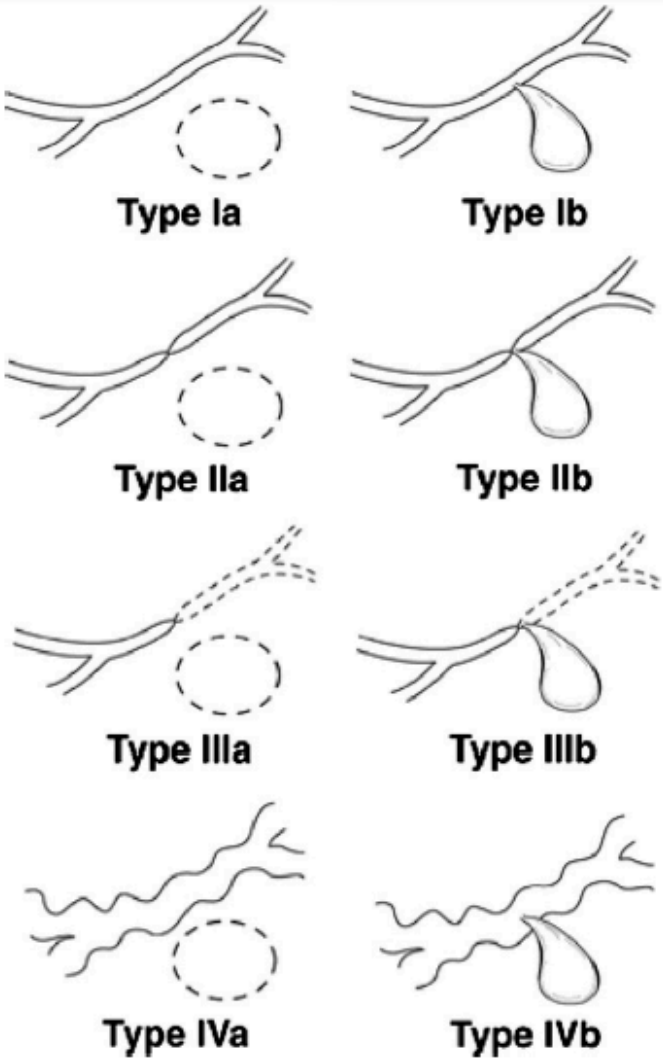
(C) needle aspiration

(D) fluid resuscitation

(E) endoscopic retrograde cholangiopancreatography (ERCP)

Media for Category 4 Item 48

# Nealon Classification




WH Nealon, et. al *A Unifying Concept: Pancreatic Ductal Anatomy Both Predicts and Determines the Major Complications Resulting from Pancreatitis*. *JACS*, Vol. 208, No. 5, May 2009

D

# SESAP 13

Category 4 Item 49

*A 42-year-old previously healthy man arrives in the emergency department with a 12- hour history of excruciating epigastric pain. He is afebrile and not jaundiced. Pulse is 115/min, blood pressure is 90/60, and WBC count is 16,400/mm$^3$. The abdominal computed tomographic (CT) scan shown in the previous item is obtained.*

Four weeks later, the patient returns to the emergency department with abdominal fullness. Vital signs are normal. The computed tomographic (CT) scan shown is obtained.

Treatment now should be

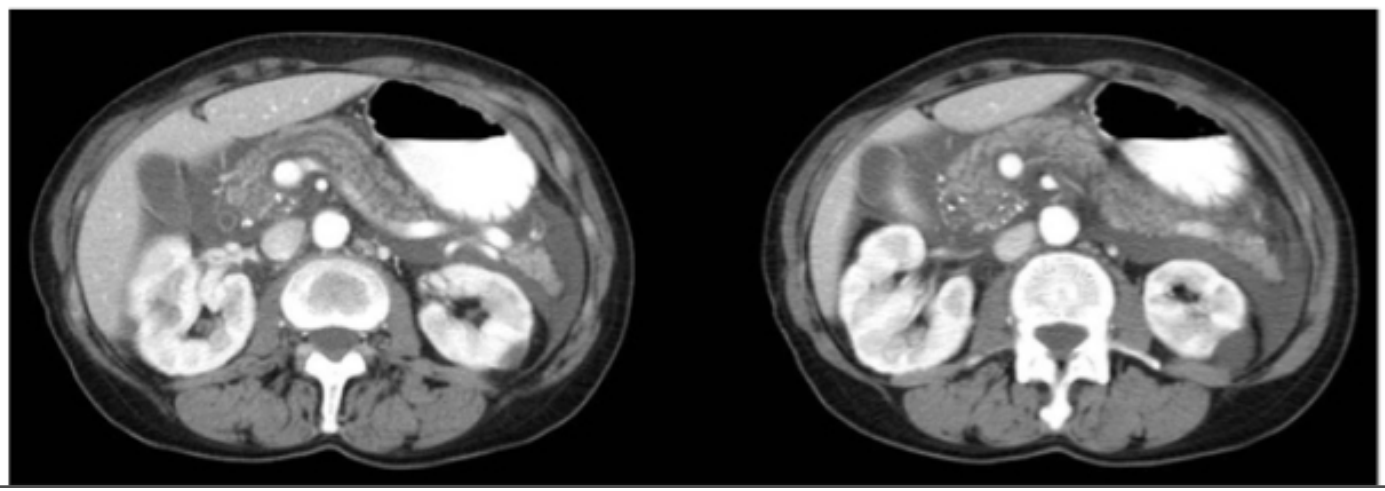
(A) endoscopic retrograde cholangiopancreatography (ERCP)

(B) surgical decompression

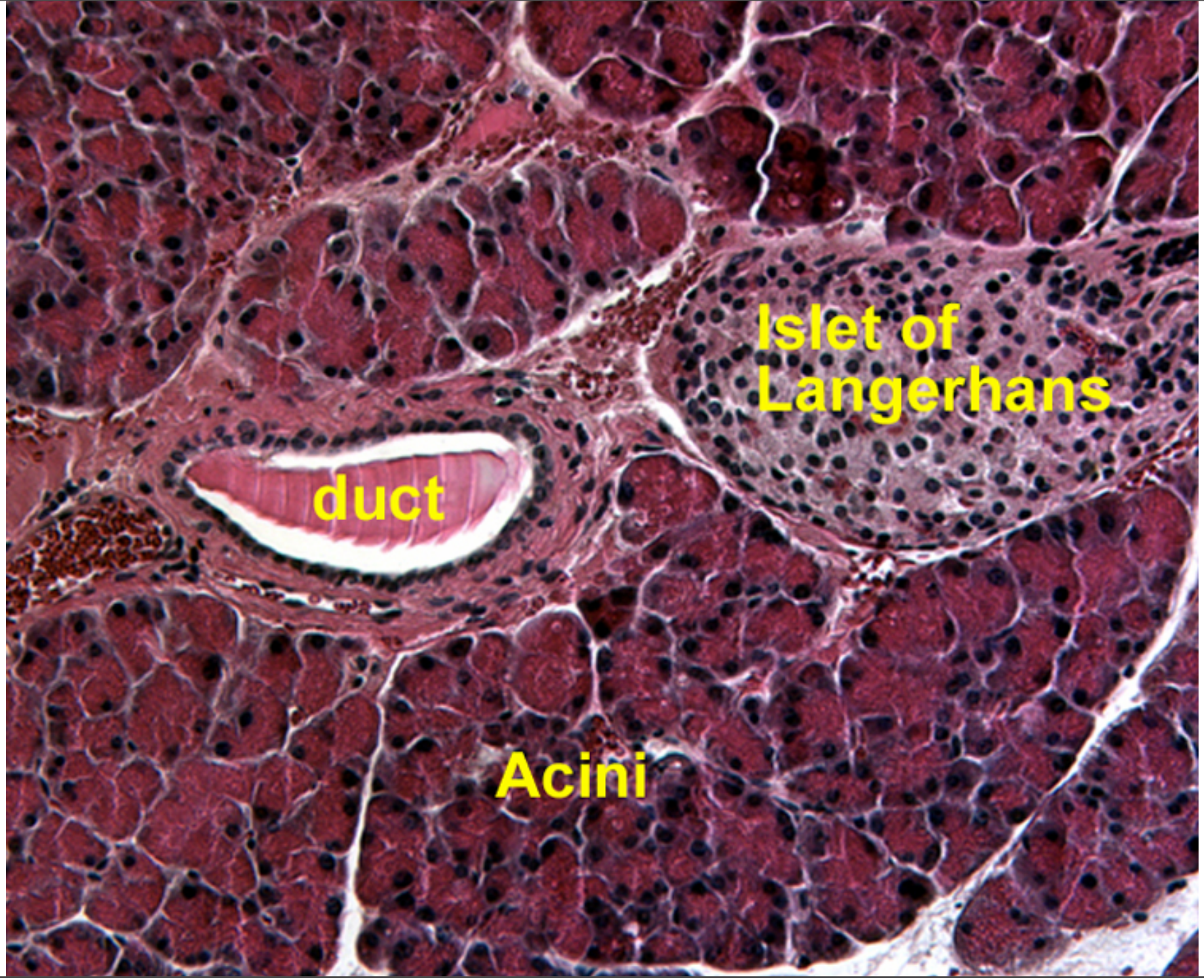
(C) percutaneous aspiration

(D) 14-day course of antibiotics

(E) repeat CT scan in 30 days



E


Islet of
Langerhans
duct
Acini