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Pancreas Divisum: Patient Presentation and Discussion

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Patient JC

- 44 yo male
- Abdominal pain, epigastric, radiating to back x 1d
- Nausea, vomiting, diaphoresis, low-grade fevers, chills

- **PMHx**:

  4 m ago, EU abdominal pain → Normal CT

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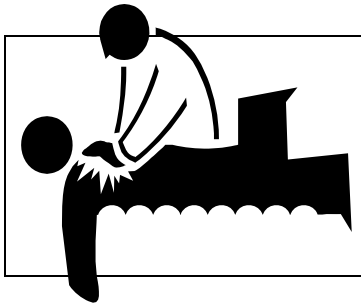

Physical Exam

Vitals: T 100.3 P70 RR20 BP 150/90

- Abd: Distended, tenderness to palpation diffusely, mostly periumbilical
- -Rebound +Voluntary guarding
- BS markedly depressed
- No Cullen/Grey Turner sign

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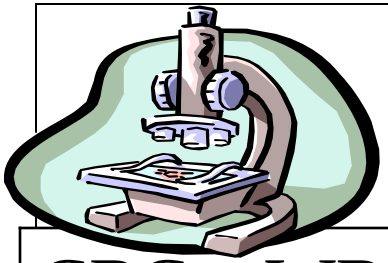
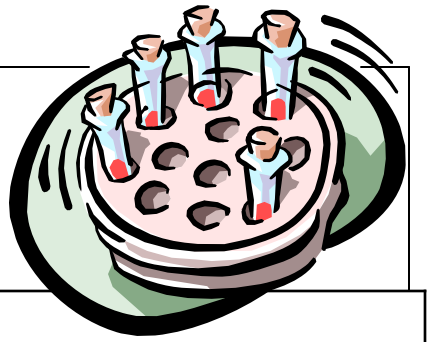


Labs



CBC: WBC 13.4 Hct 42 Plets 257

Amylase 2302 Lipase 1940

LFTs: ALT/AST 47/23 LDH 199
Alk Phos 83 TG 264

E’lytes:

143 | 104 | 23 / 150 Ca 9.3 / Ph 4.1/ Mg 2.0

4.3 | 25 | 0.9 \

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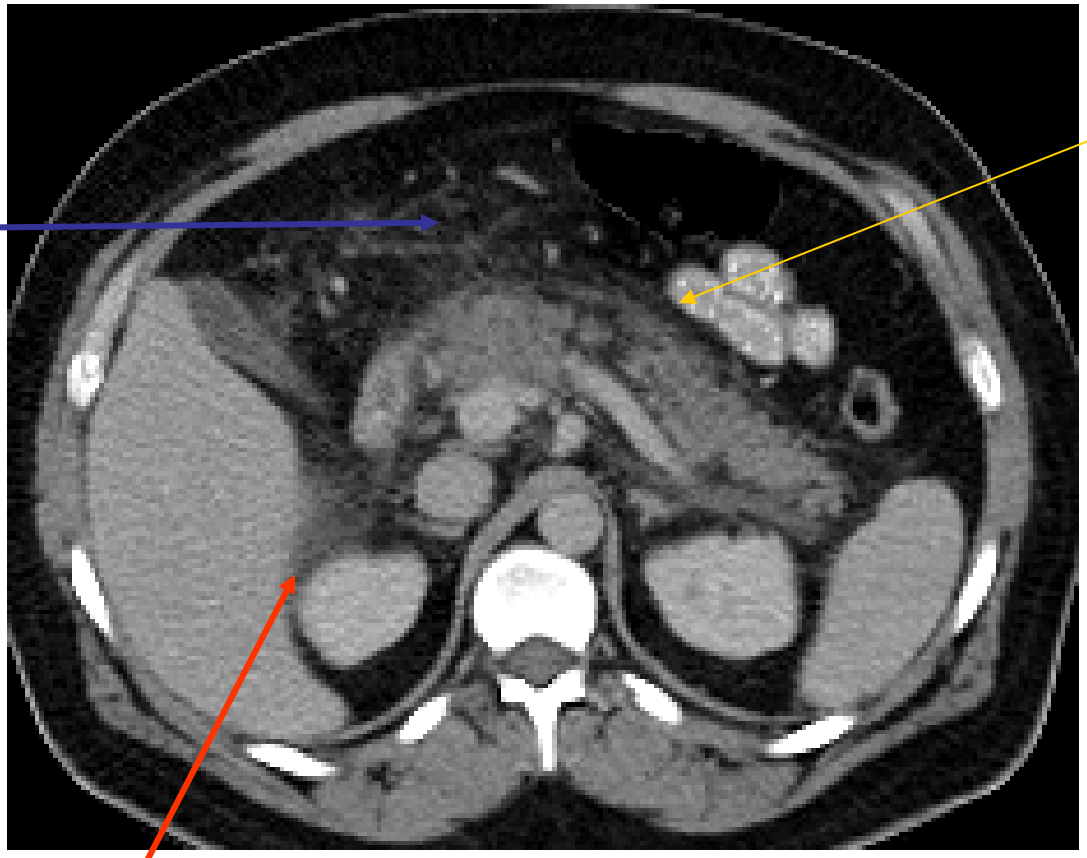
Our Patient JC: Abdomenal CT



Fat stranding (misty appearance) of peripancreatic fat

Indistinctive pancreatic margins

Thickening of pararenal fascia and pararenal fluid accumulation

Findings consistent with pancreatitis

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Anatomy of the Pancreas

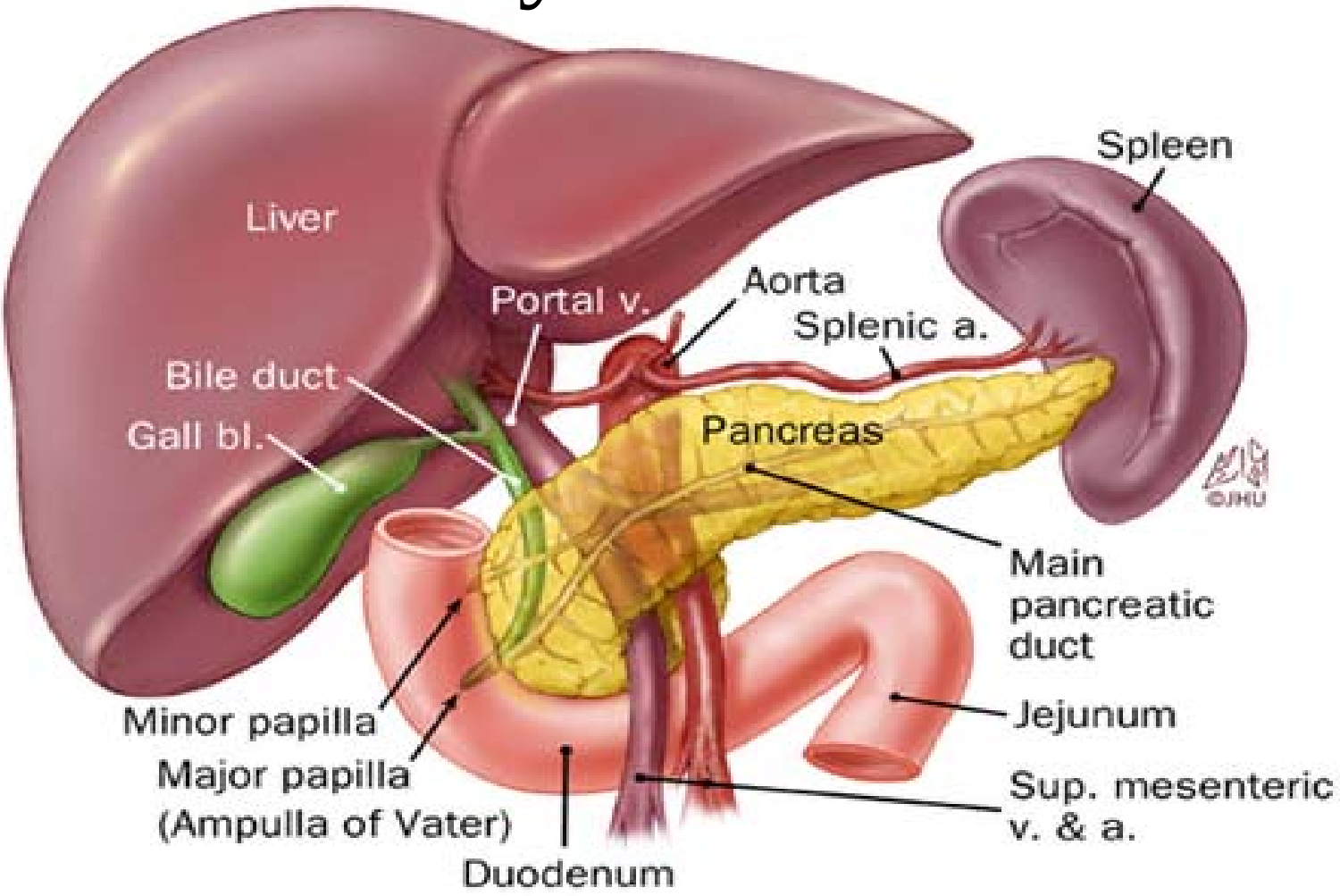

Illustration at http://www.hopkins-gi.org/subspecialties/chronic/introduction/anatomy.htm

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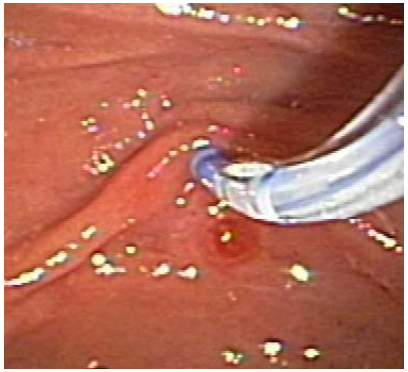
What a mouthful!

JC:Endoscopic Retrograde Cholangiopancreatography (ERCP)



Cannulation of patient JC's major ampulla

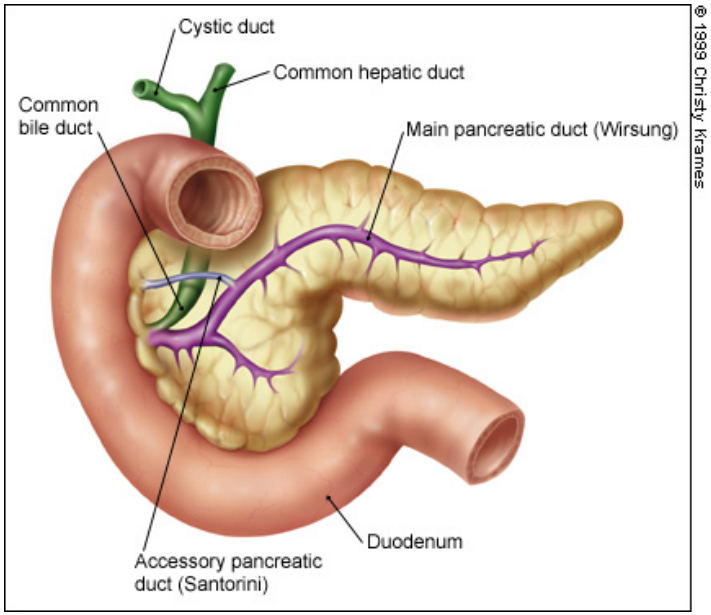
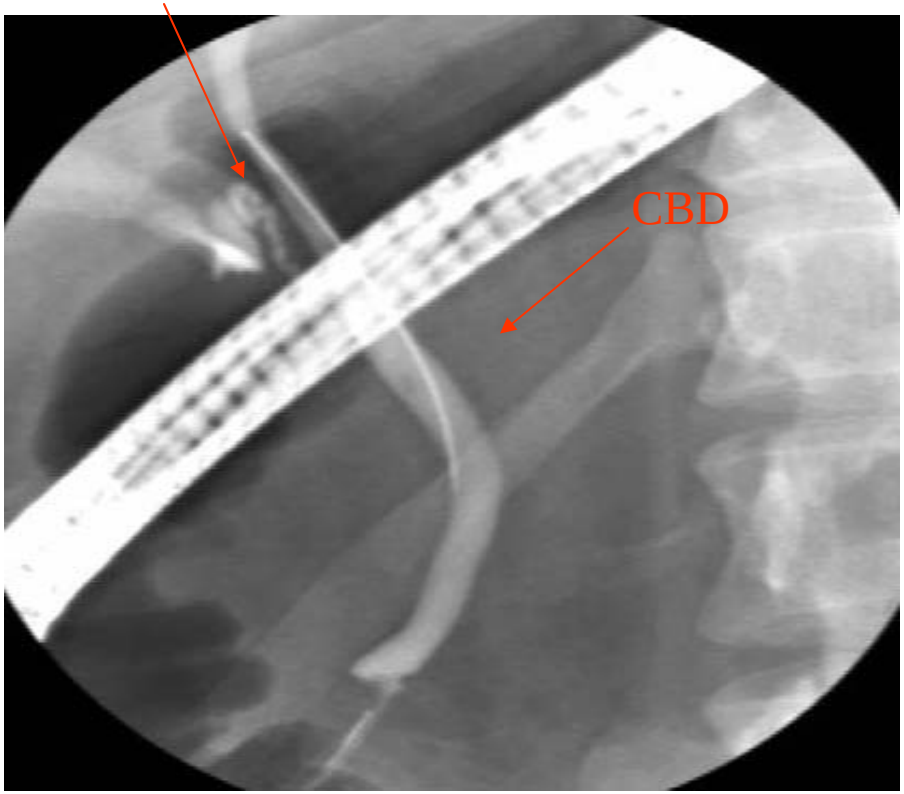


Illustration at http://www.aafp.org/afp/990501ap/2507.html

Cystic duct (corkscrew) and gall bladder



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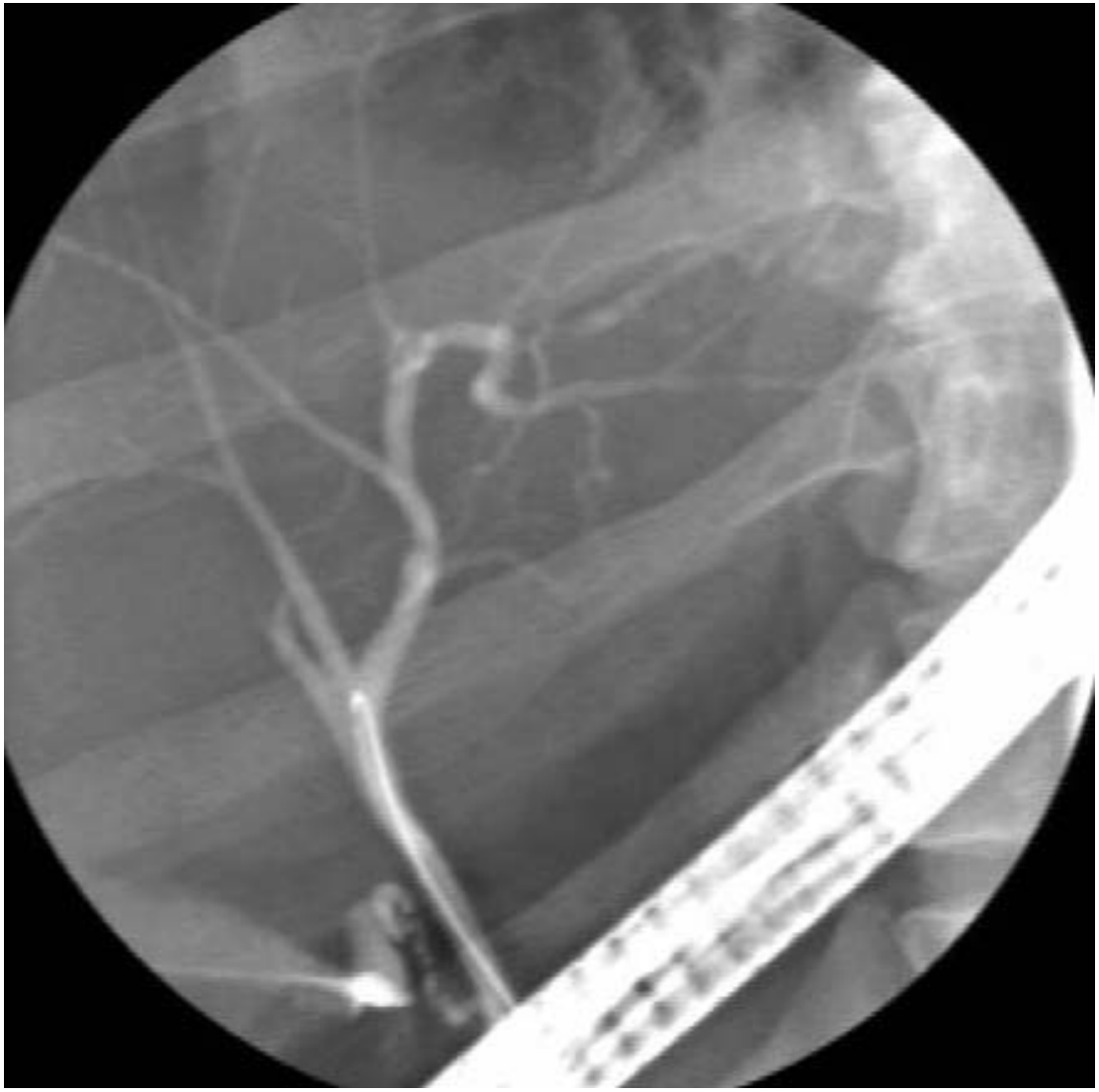
Our Patient JC: ERCP



Normal intrahepatic ductal system

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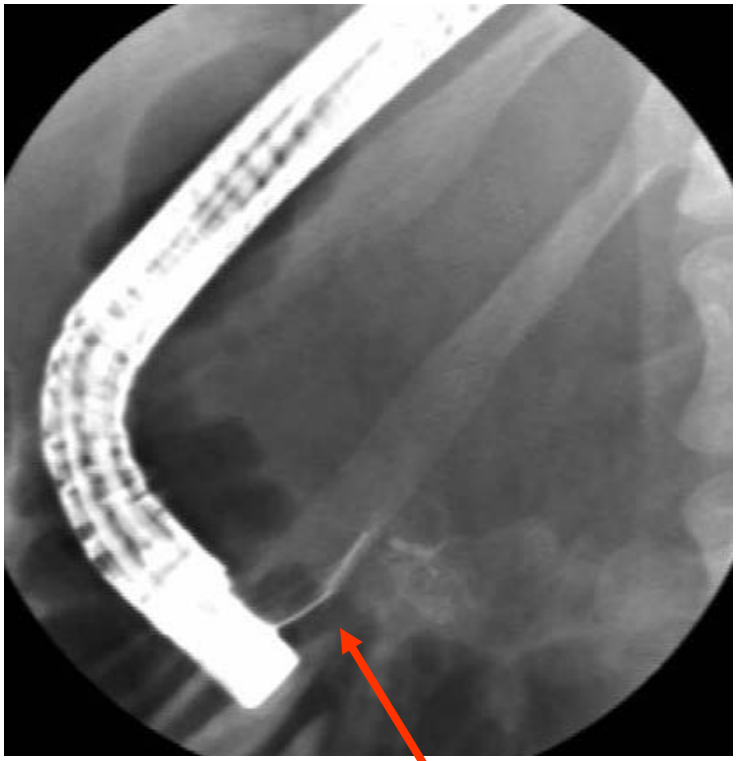
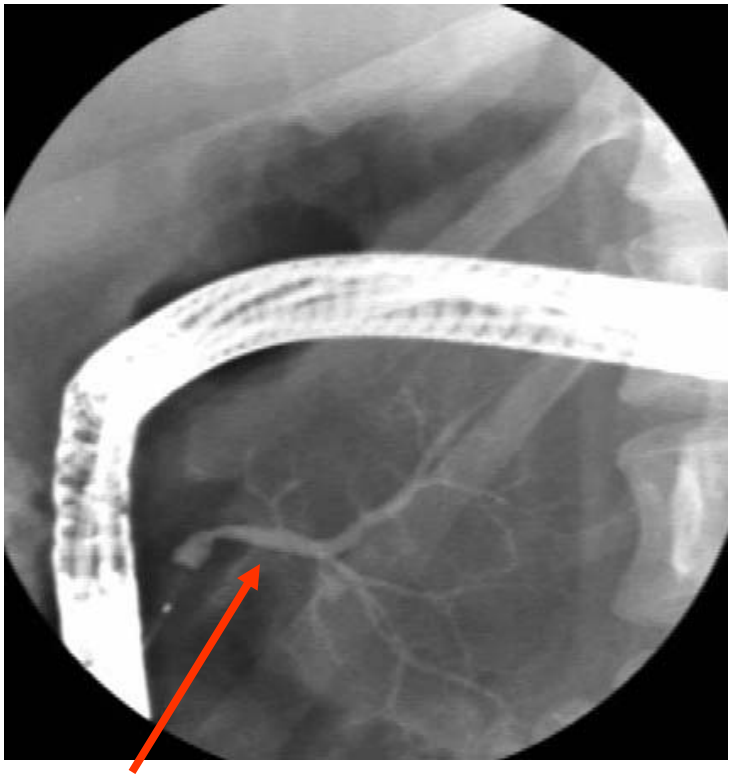
JC: ERCP

Major papilla cannulation



Small ventral duct

Minor papilla cannulation



Dominant dorsal duct connecting to main pancreatic duct

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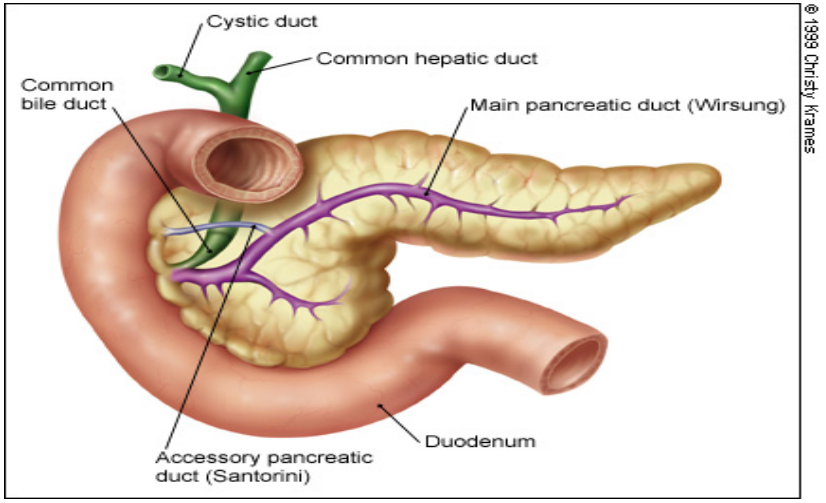
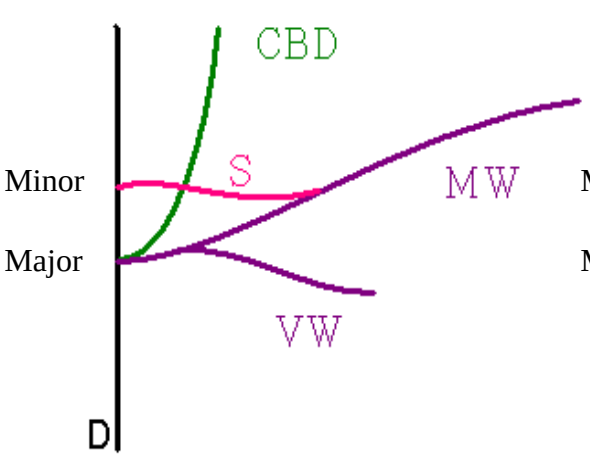
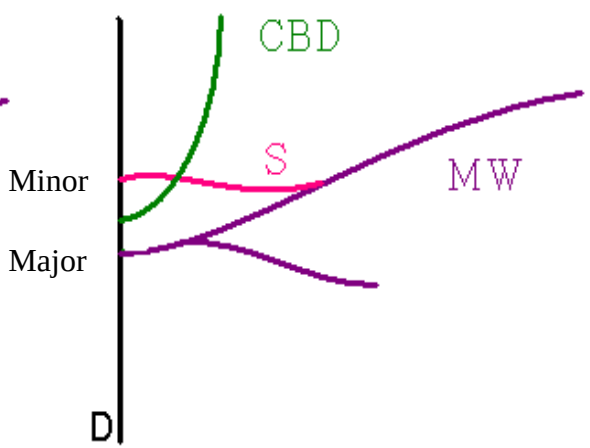


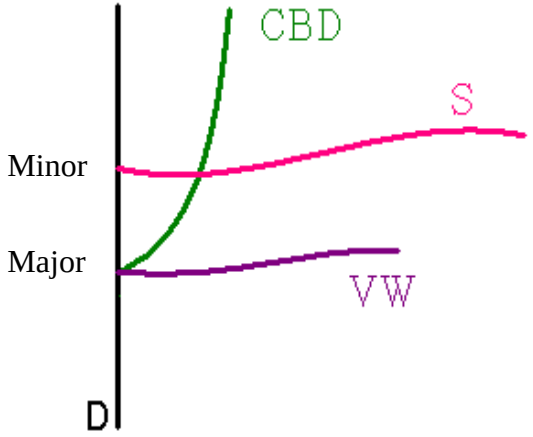
Ductal Variations



Type 1
Normal Anatomy (85%)



Type 2
Separate duodenal openings (5%)



Type 3
Pancreas Divisum (10%)

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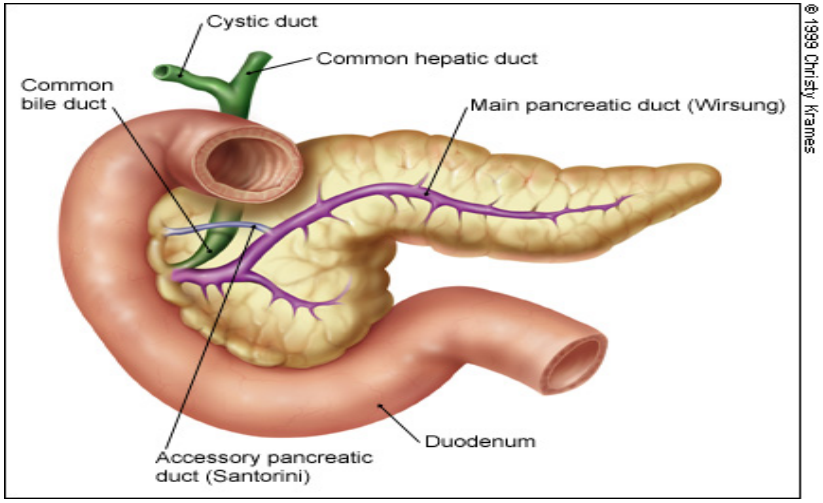
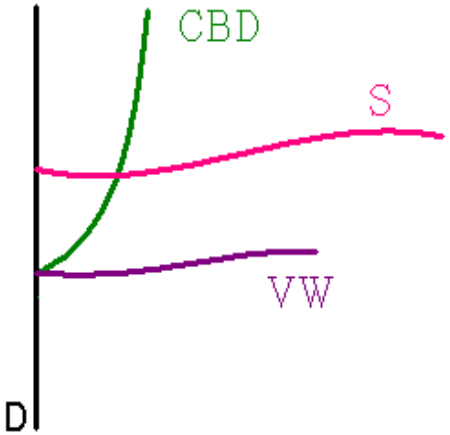


Ductal Variation

Type 3 Pancreas Divisum



The most common congenital variant of pancreatic anatomy.

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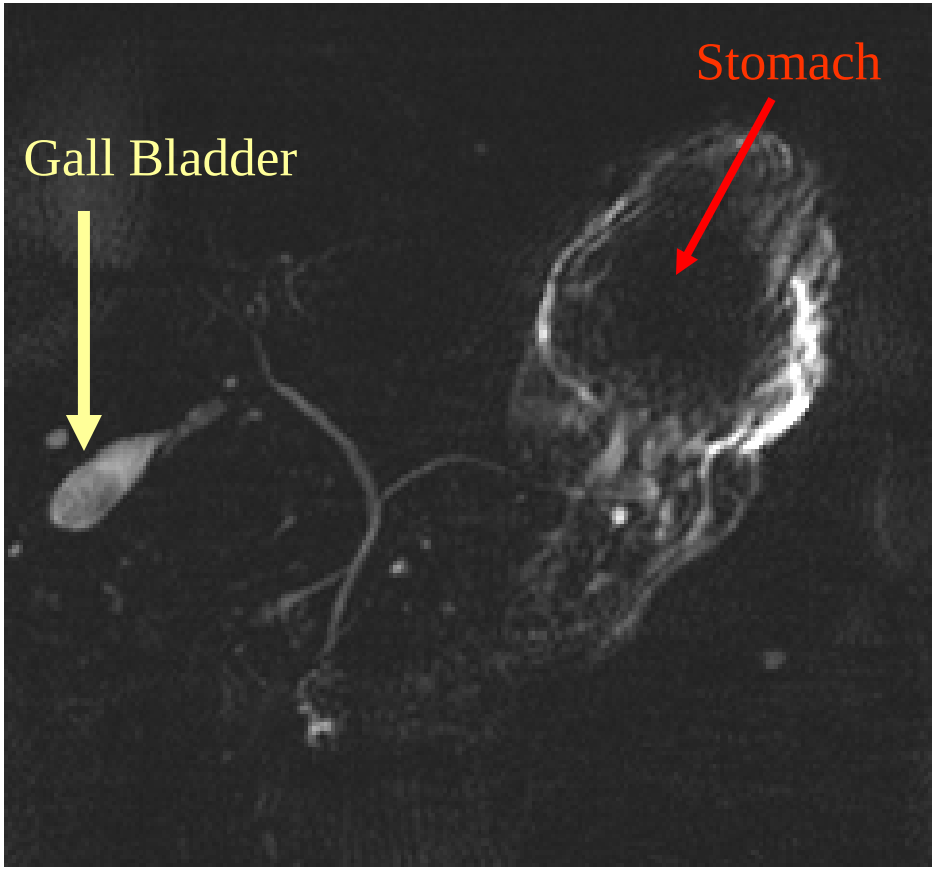
Magnetic Resonance Cholangiopancreatography

- Fluid filled bile and pancreatic ducts are very bright on T2 images

- Accessory duct drains majority of pancreas



→ Pancreas Divisum Anomaly

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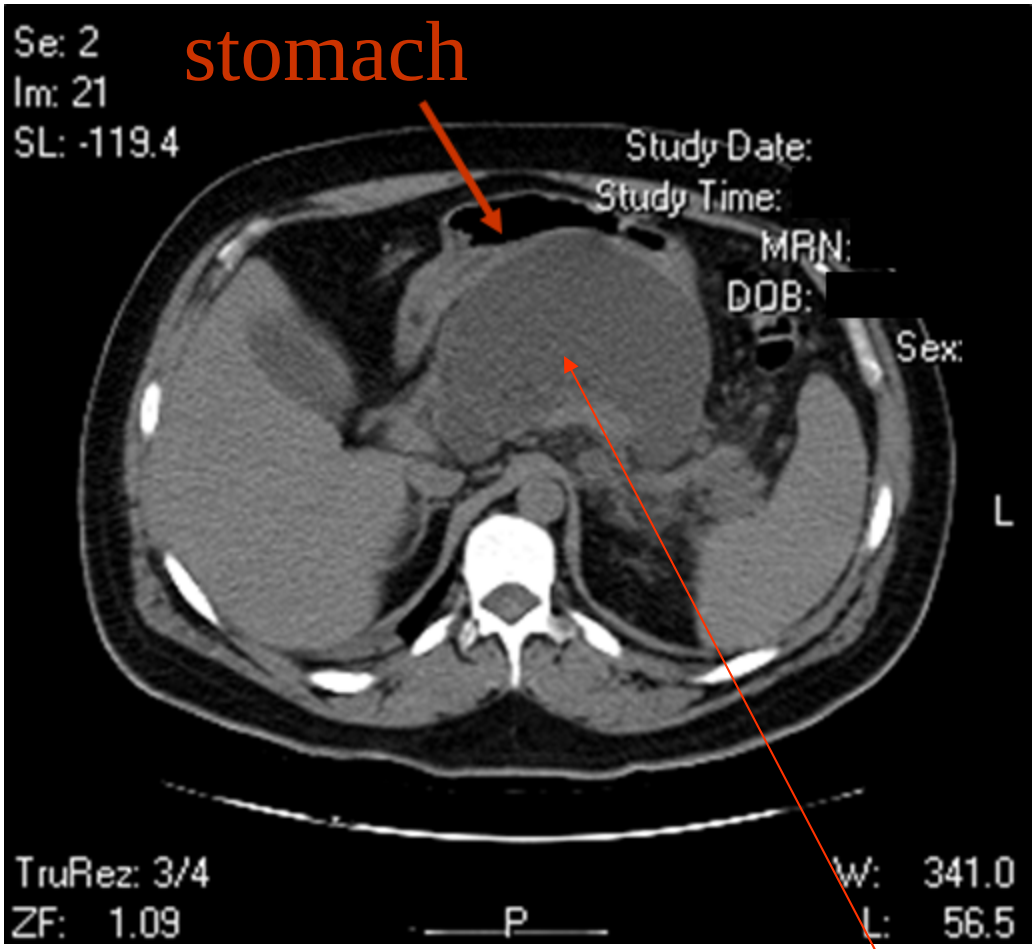
Our Patient JC: 2 Weeks later



J.C. clinically improved, and he was discharged home.

2 weeks later:

He returned to EU with nausea, vomiting, and periumbilical pain, similar to prior admission.

•CT: Pancreatitis and large **pancreatic pseudocyst** extending into lesser sac and compressing stomach

So…

What happened?

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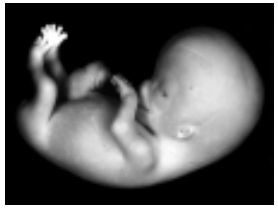
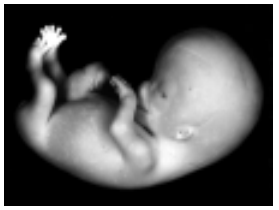
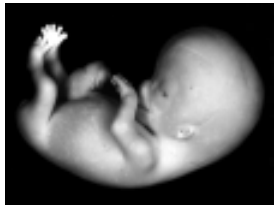
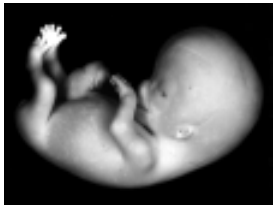




Pancreas Divisum: Embryology





Picture: http://anatomy.med.unsw.edu.au/cbl/embryo/sysnote.htm

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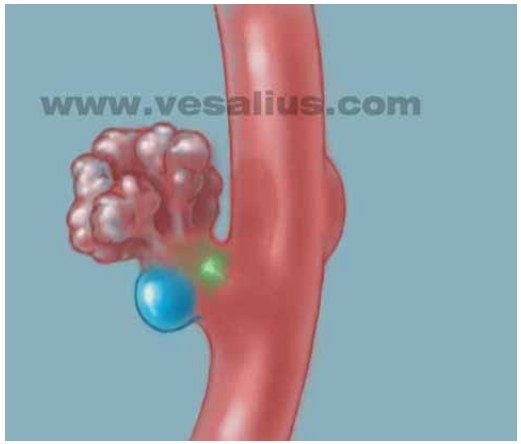
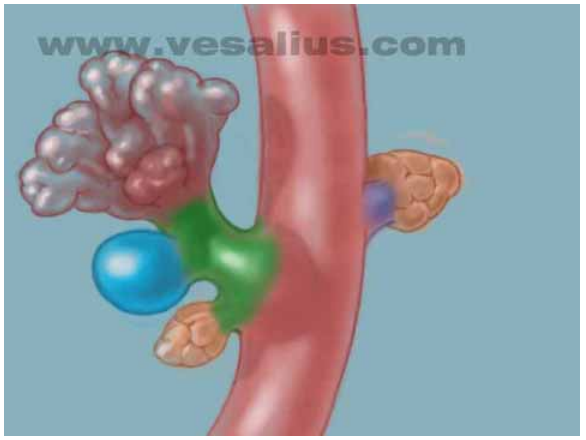
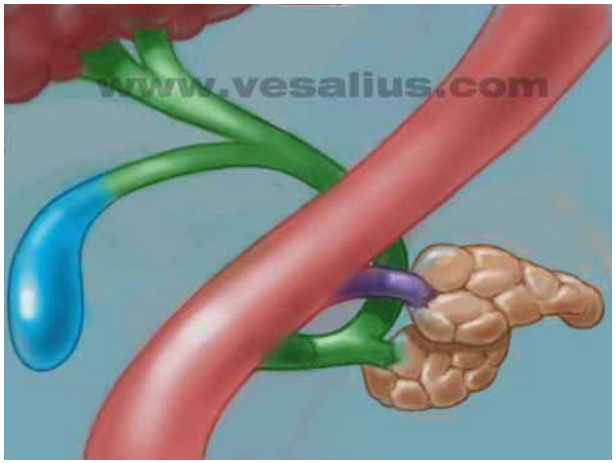
Normal Embryological Development of Pancreas



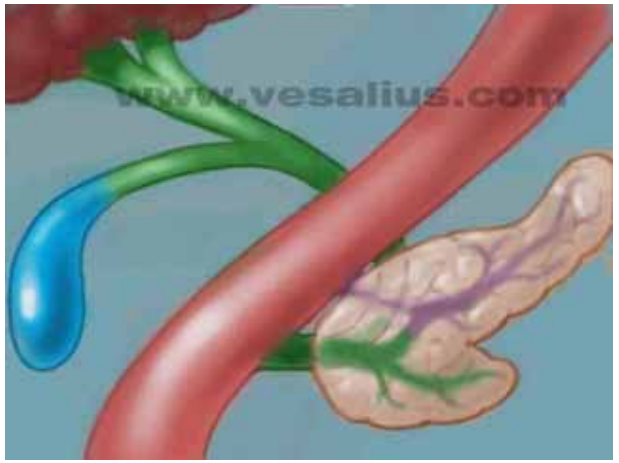
Week 4: Dorsal pancreatic bud



Week 5: Ventral bud appears between GB and duodenum.



Bile duct moves to right, apposing the pancreatic buds as duodenal wall differentially grows.



Dorsal duct (Santorini) and ventral duct (Wirsung) FUSE. The ventral duct is the main duct for pancreatic secretions into the duodenum. If the dorsal duct persists, it is called the minor papilla.

Illustrations: www.vesalius.com

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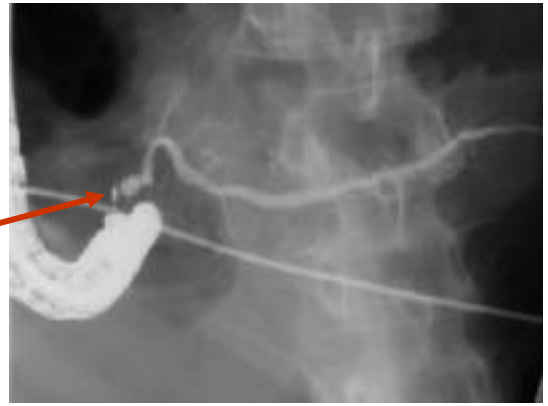
Pancreas Divisum

- NO FUSION of ventral and dorsal pancreatic buds
- Ventral bud only drains ventral pancreas
- Dorsal bud (through minor papilla) must drain majority of pancreas.
- Minor papilla is often stenotic and inhibits flow of pancreatic juice→ Pancreatitis

- Other features:
  - Stenosis of minor papilla
  - Signs of chronic pancreatitis
  - Dilated dorsal duct
  - Santorinicele



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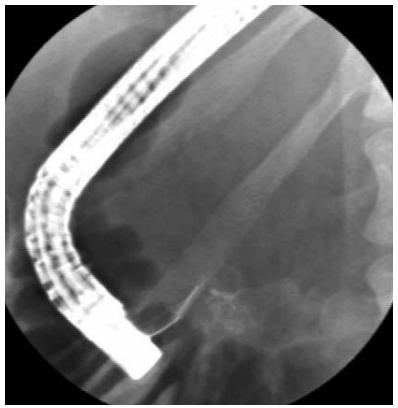
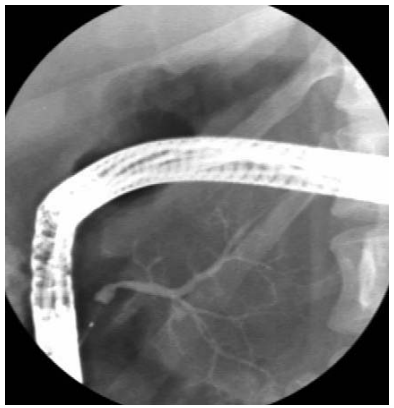
Diagnosis of Pancreas Divisum: ERCP

- Absent or small ventral duct
- Confirm by cannulation of minor duct→ lack of communication between dorsal and ventral and dorsal ducts.





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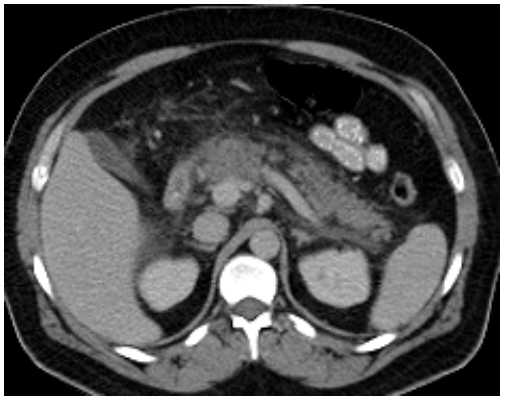
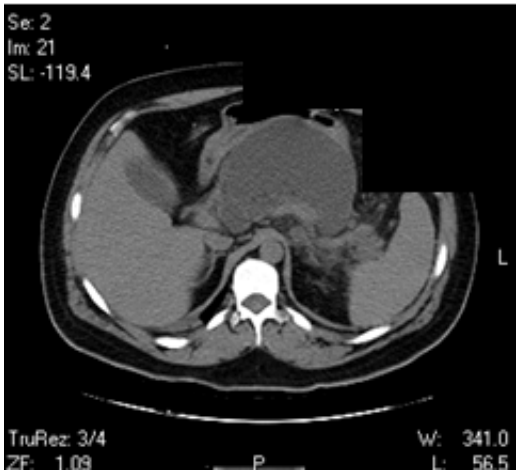
Complications of Pancreatitis





Acute

- Loculated fluid collection
- Pancreatic necrosis
- Pancreatic hemorrhage

Subacute

- Phlegmon
- Pseudocyst
- Pancreatic ascites
- Abscess
- Pseudoaneurysm

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Treatment of Pancreas Divisum

Standard Medical Therapy:

Low fat diet
Analgesics
Pancreatic enzymes
Anticholinergics

Minor Papilla Treatment:

Endoscopic

- Dilatation
- Stenting
- Papillotomy

Open surgical

- Minor sphincteroplasty
- Pancreatico-jejunostomy with Roux-en-Y limb

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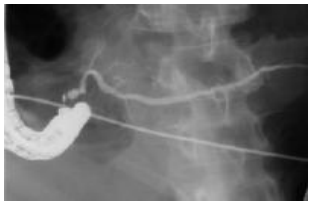
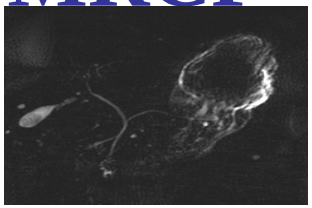
	Pros	Cons
ERCP 	•Best visualization of ductal anatomy •Access for biopsy or therapeutic intervention (sphincterotomy)	•Technically difficult. •Radiation •Expensive •Invasive: Complications (4% ERCP→pancreatitis)
MRCP 	•Noninvasive •Better imaging of parenchyma	•Worse resolution than fluoroscopy so less sensitive than ERCP

MRCP growing in use….

- Screening Examination In Patients With Low or Intermediate Probability Of choledocholithiasis
- Failed or Incomplete ERCP
- Post-operative Anatomy
- Primary Sclerosing Cholangitis (PSC)
- Complications of Chronic Pancreatitis
- Variant Ductal Anatomy!

Articles of interest:

Ertan A. Long-term results after endoscopic pancreatic stent placement without pancreatic papillotomy in acute recurrent pancreatitis due to pancreas divisum. Gastrointestinal Endoscopy 2000; 52(1): 9-12.

Freeman M, et al. Risk factors for post-ERCP pancreatitis: A prospective, multicenter study. Gastrointestinal Endoscopy 2001; 54(4) 425-434.

Varshney S, Johnson CD. Pancreas Divisum. International Journal of Pancreatology 1999; 25 (2): 135-141.

Acknowledgments

Pamela Lepkowski

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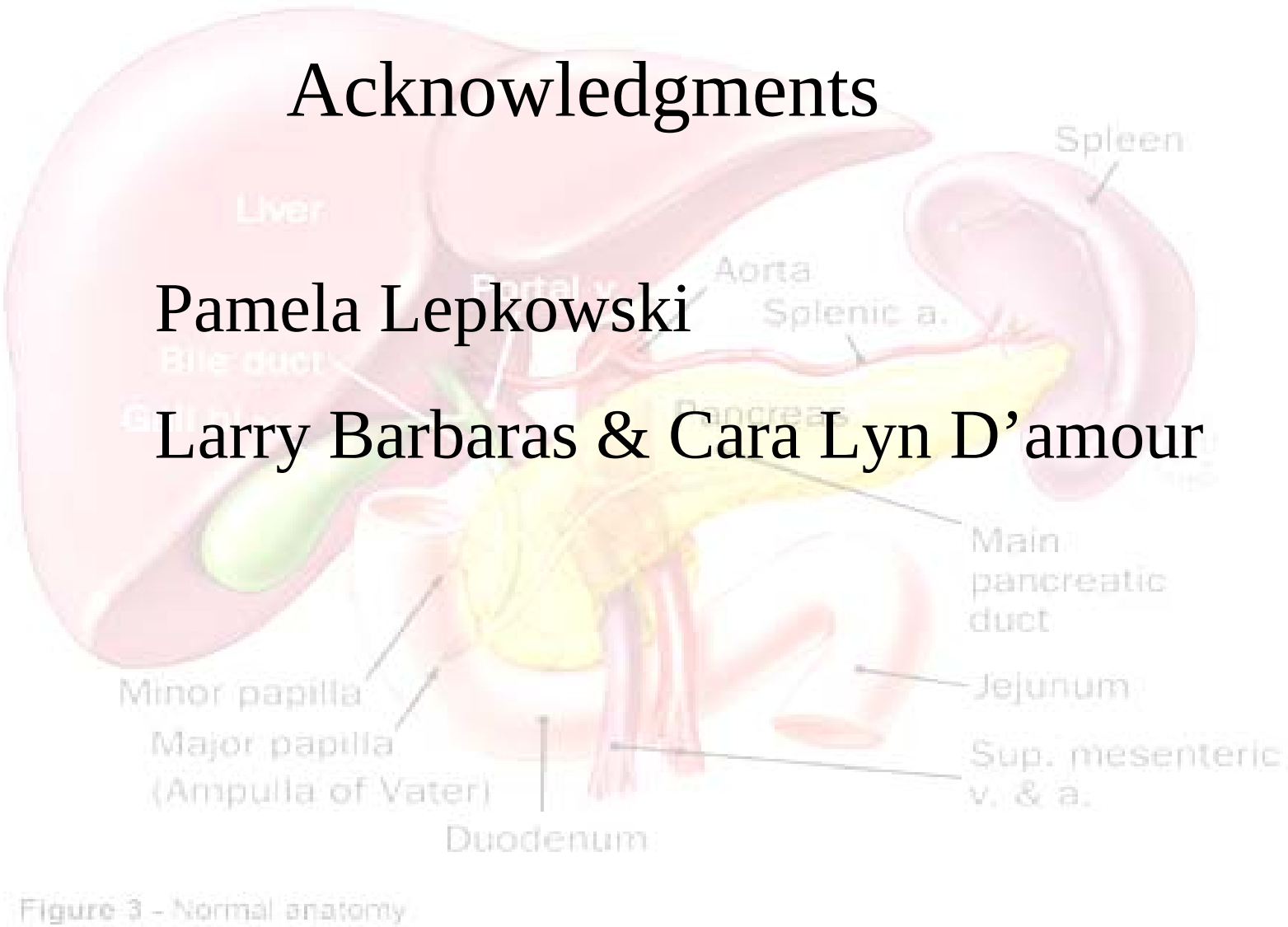

Figure 3 - Normal anatomy