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
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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<th>Labs</th>
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<tr>
<td>CBC: WBC 13.4</td>
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<tr>
<td>Amylase 2302</td>
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<tr>
<td>LFTs: ALT/AST 47/23</td>
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<tr>
<td>Alk Phos 83</td>
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<td>E’lytes:</td>
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<td>143</td>
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Our Patient JC: Abdominal CT

Fat stranding (misty appearance) of peripancreatic fat

Indistinctive pancreatic margins

Thickening of pararenal fascia and pararenal fluid accumulation

Findings consistent with pancreatitis
Anatomy of the Pancreas

JC: Endoscopic Retrograde Cholangiopancreatography (ERCP)

Cannulation of patient JC’s major ampulla

Illustration at http://www.aafp.org/afp/990501ap/2507.html
Our Patient JC: ERCP

Normal intrahepatic ductal system
JC: ERCP

Major papilla cannulation

Small ventral duct

Minor papilla cannulation

Dominant dorsal duct connecting to main pancreatic duct
Ductal Variations

Type 1
Normal Anatomy (85%)

Type 2
Separate duodenal openings (5%)

Type 3
Pancreas Divisum (10%)
Ductal Variation

Type 3
Pancreas Divisum

The most common congenital variant of pancreatic anatomy.
Magnetic Resonance Cholangiopancreatography

- Fluid filled bile and pancreatic ducts are very bright on T2 images
- Accessory duct drains majority of pancreas

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

2 weeks later:

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

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

What happened?
Pancreas Divisum: Embryology

Normal Embryological Development of Pancreas

Week 4: Dorsal pancreatic bud

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

Week 5: Ventral bud appears between GB and duodenum.

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
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
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.
Complications of Pancreatitis

Acute

Loculated fluid collection
Pancreatic necrosis
Pancreatic hemorrhage

Subacute

Phlegmon
Pseudocyst
Pancreatic ascites
Abscess
Pseudoaneurysm
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
- Pancreatice-jejunostomy with Roux-en-Y limb
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<th>Pros</th>
<th>Cons</th>
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| **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:


Acknowledgments

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