ANATOMY OF PANCREAS

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Ragama

Clinical case

- 31 year old gemttlemen from Ragama area was admitted to the NCTH Ragama

  C/O severe epigastric pain ,radiating to back associated with vomiting

- He had taken 1 bottle of arrack in the previous night

Investigations

- High WBC/DC
- Elevated serum amylase and lipase levels
- USS abdomen and CT showed
  - Oedematus pancreas
  - Peripancreatic fluid
  - Left side pleural effusion

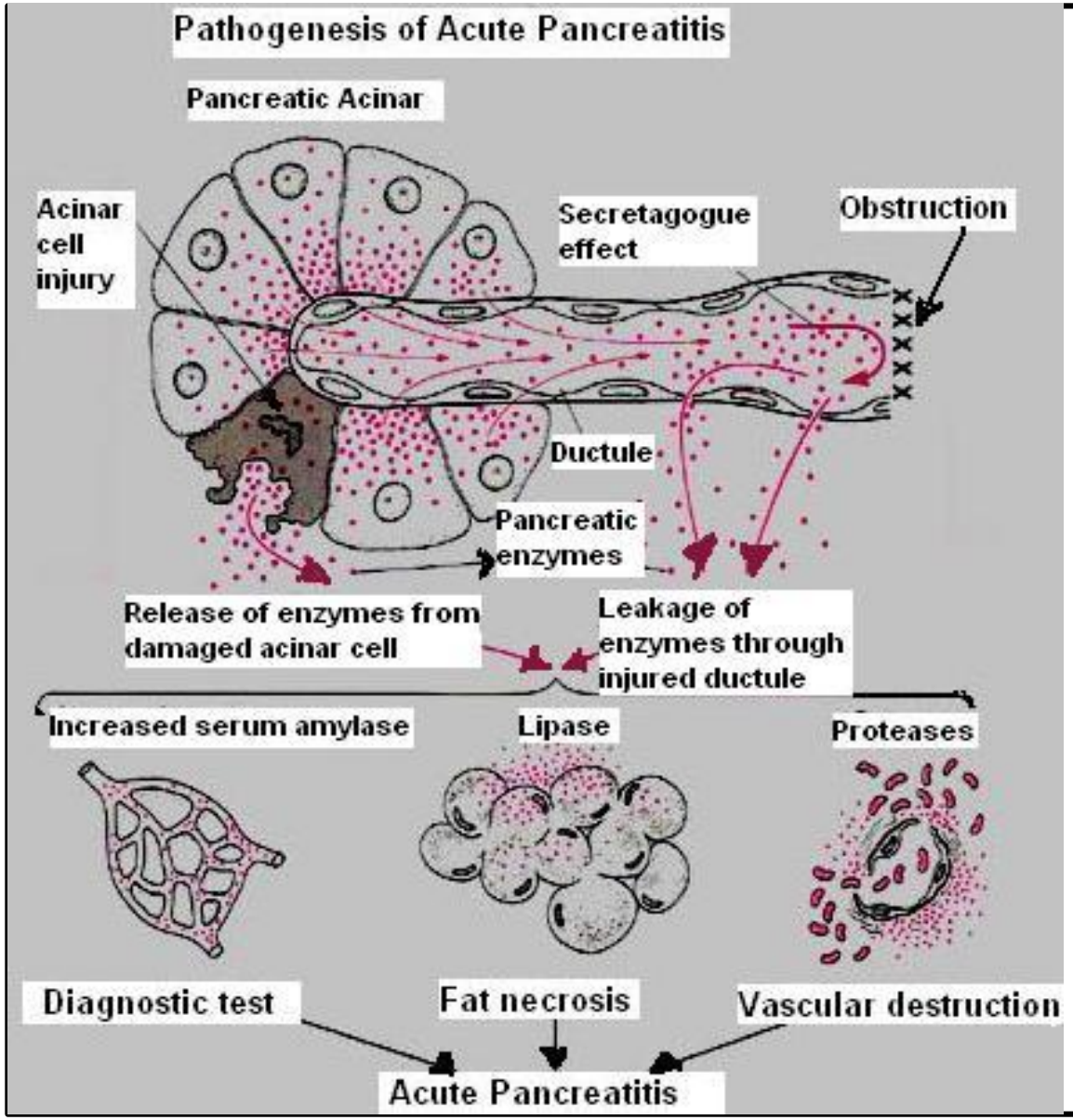
? ? Diagnosis

Investigations

- High WBC/DC
- Elevated serum amylase and lipase levels
- USS abdomen and CT showed
  - Oedematus pancreas
  - Peripancreatic fluid
  - Left side pleural effusion

Diagnosis was made as acute pancreatitis.

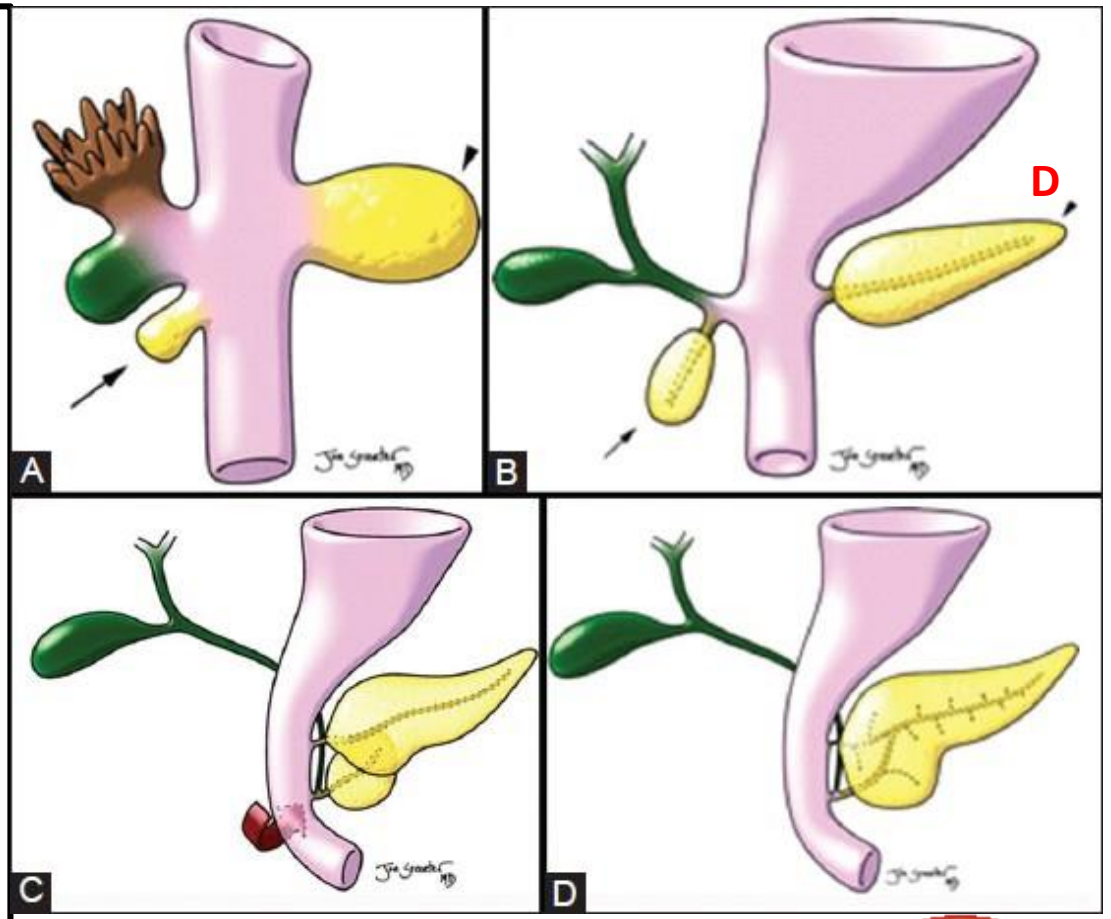
Clinical case



Pancreas in general

Development of pancreas

- Forms from the embryonic foregut and is therefore of endodermal origin
- Formation of a ventral and a dorsal pancreatic bud.
- Dorsal bud (larger, first), ventral bud (smaller, later)
- Dorsal pancreatic bud forms the head, body and tail
- Ventral pancreatic bud forms the uncinate process

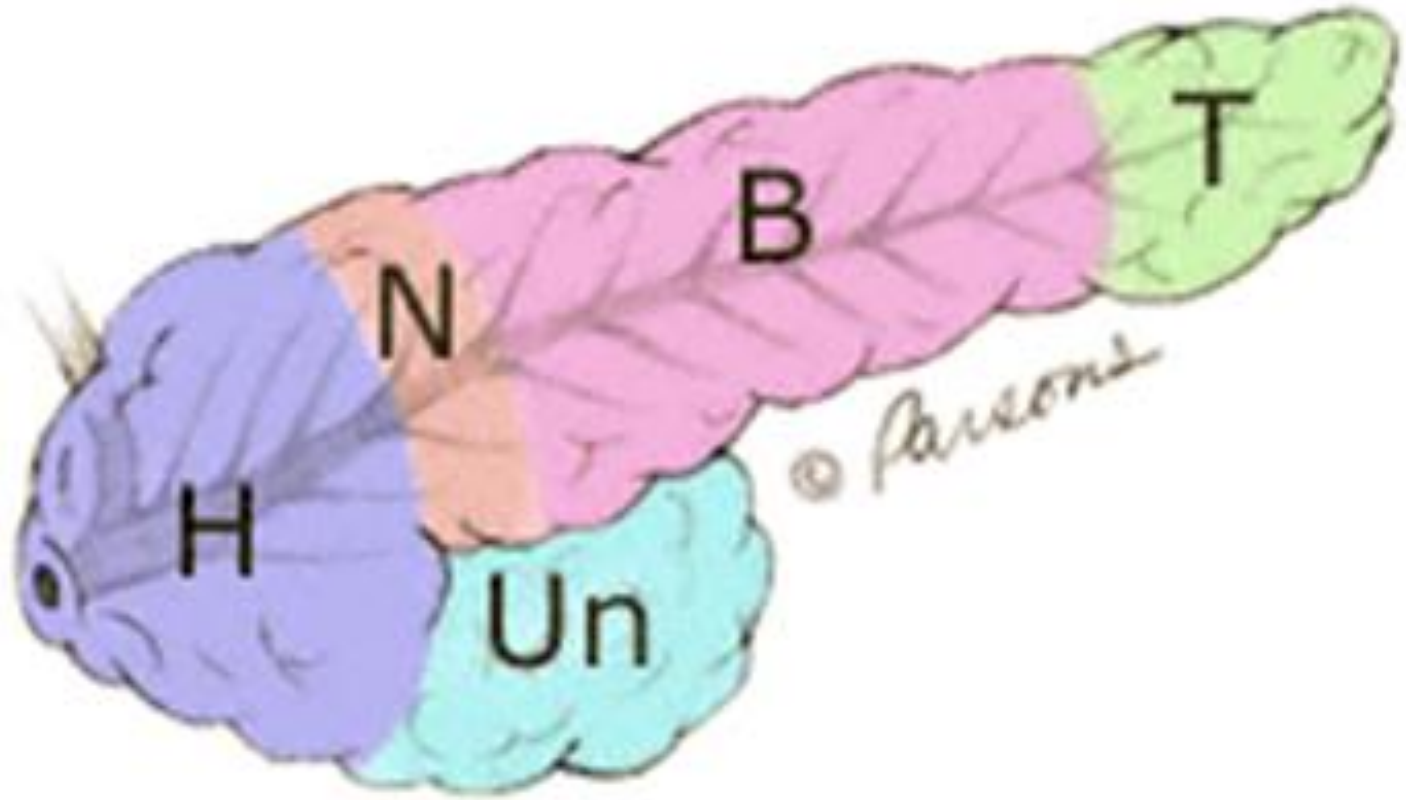


Introduction

- Gland with both exocrine and endocrine functions
- J shape
- 15-25 cm long
- 2.5 cm – 3.8 cm broad
- 60-100 g
- Location: Retro-peritoneum, 2nd lumbar vertebral level
- Extends in an oblique, transverse position

Parts of pancreas

B=body
H=head
N=neck
T=tail
Un=uncinate



Head of Pancreas

- Includes uncinate process
- Flattened structure, 2 – 3 cm thick
- Situated within C-Shape curve of duodenum
- Attached to the 2nd and 3rd portions of duodenum on the right

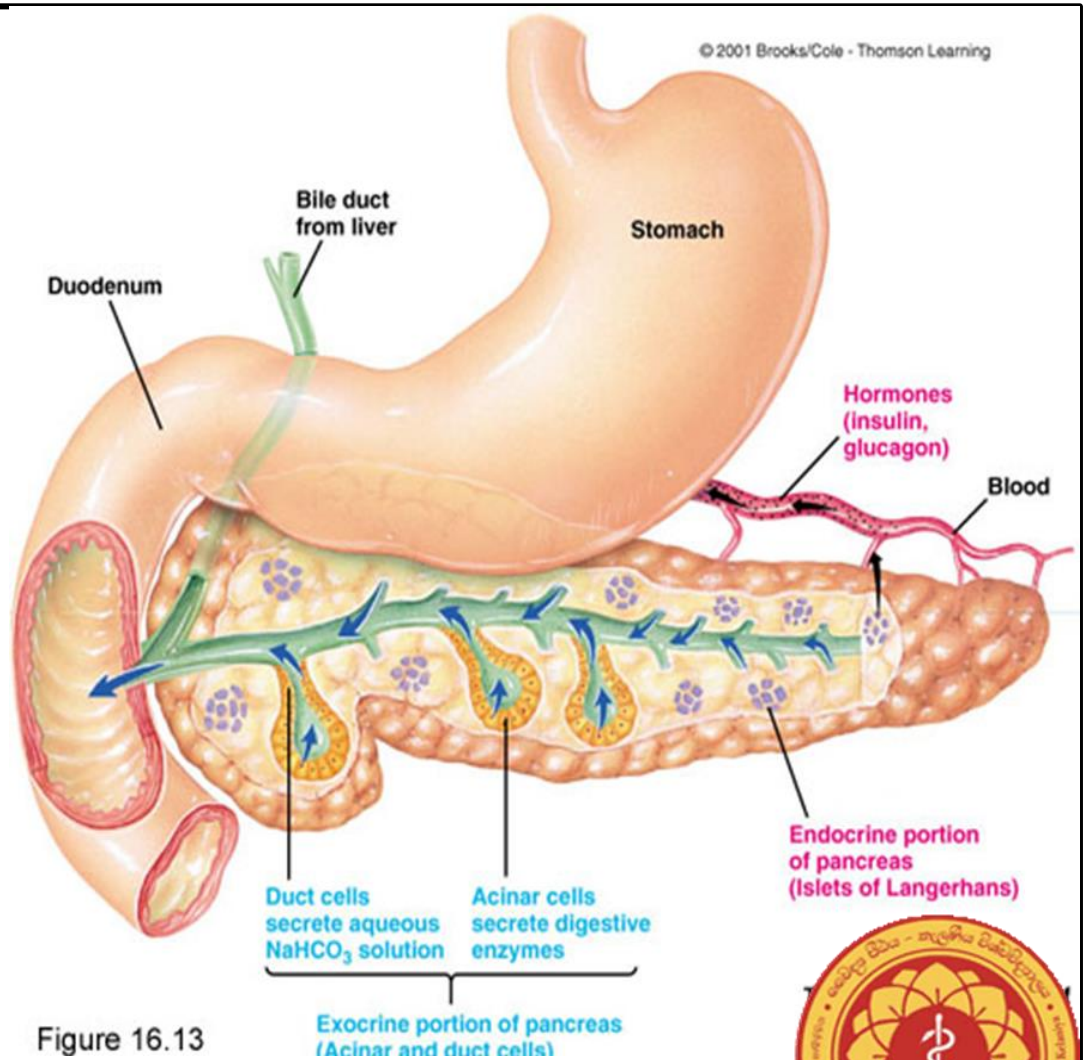
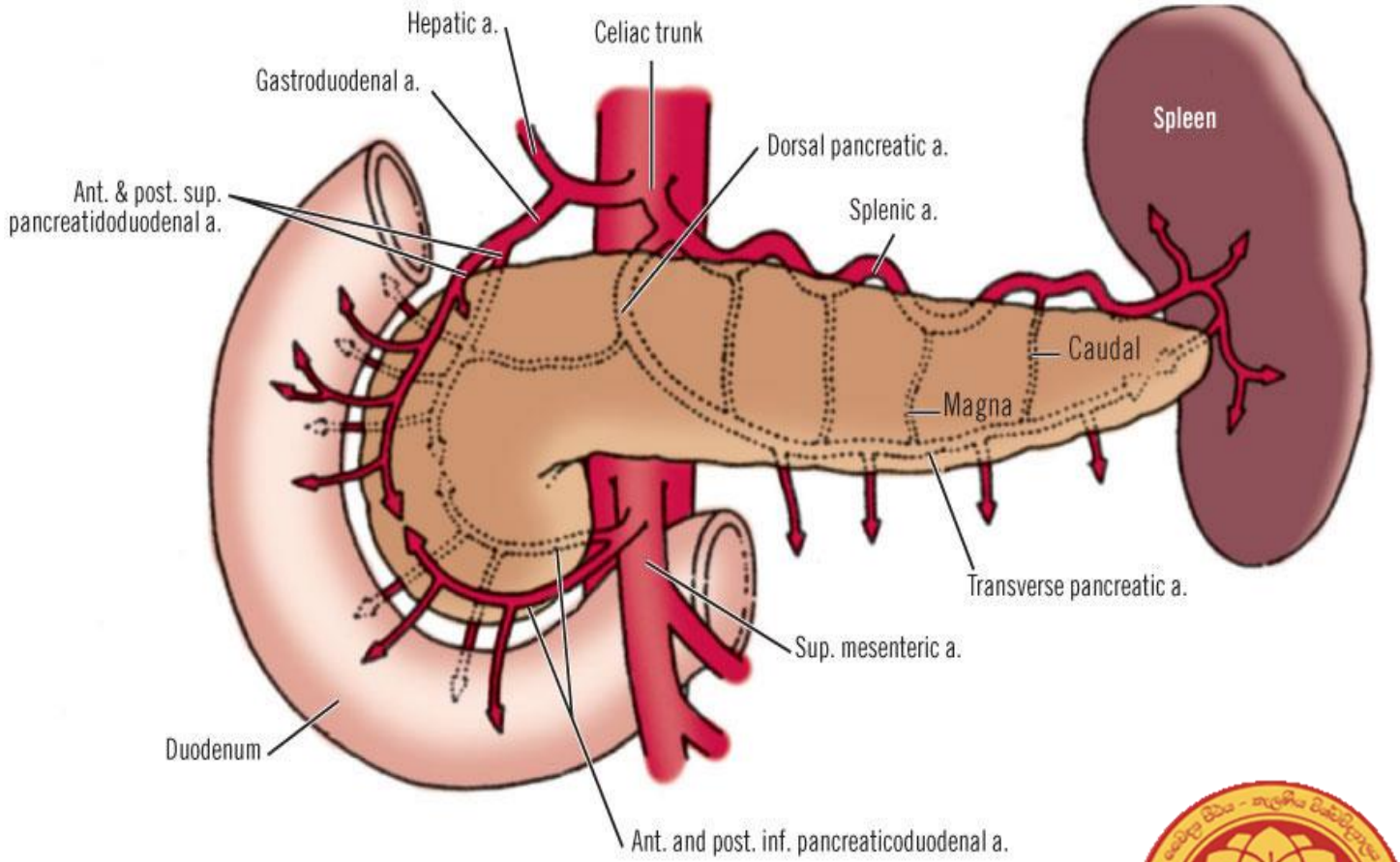


Figure 16.13

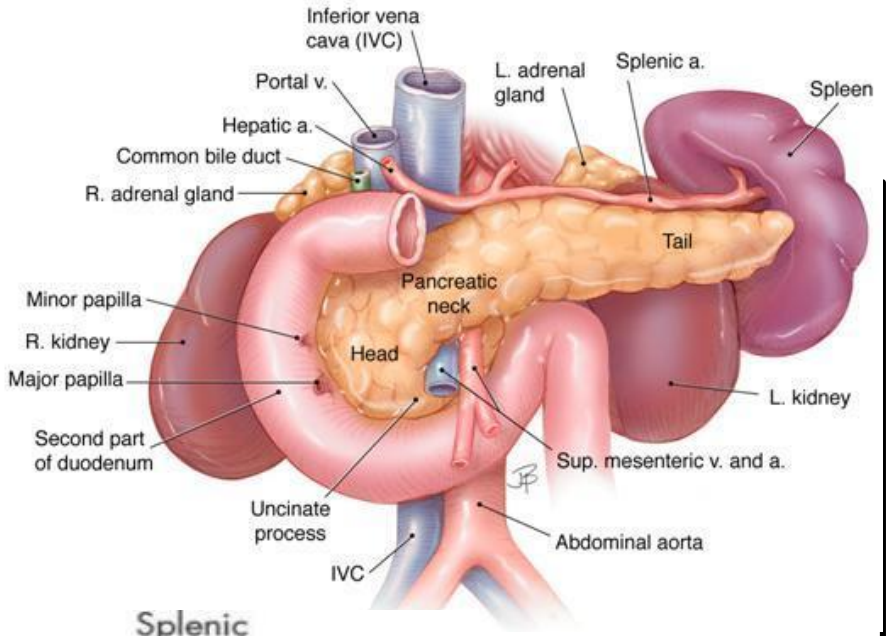
Head of Pancreas : Relations

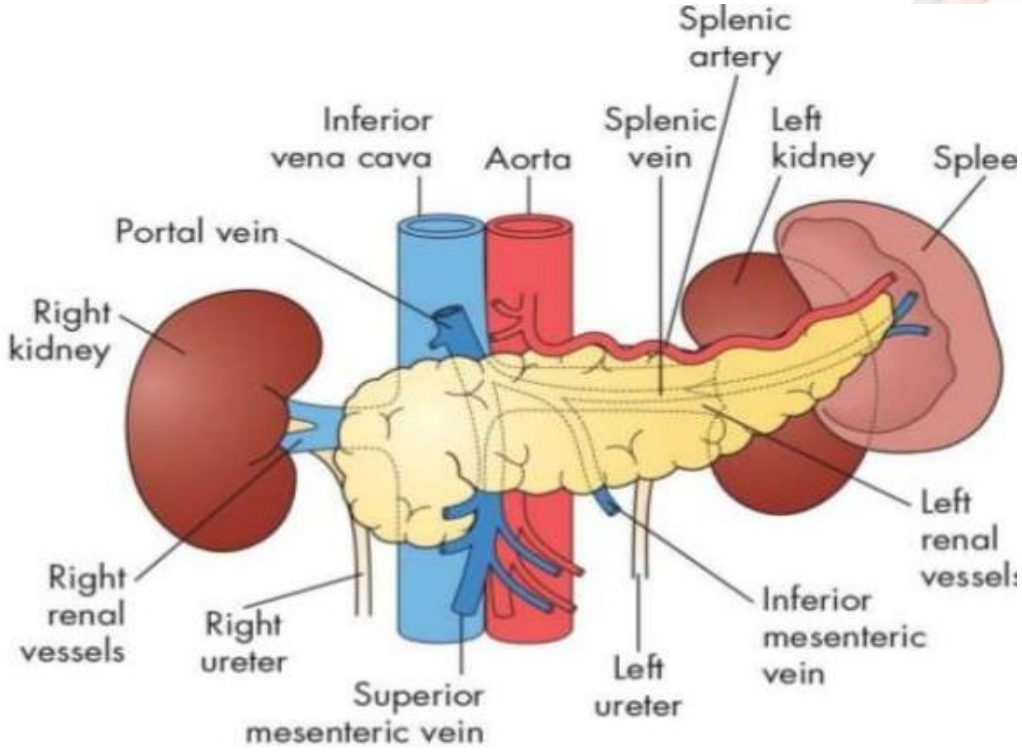
- **Right lateral border:**
  - 2nd part of Duodenum
  - Terminal part of bile duct
- **Superior border:**
  - Related to 1st part of Duodenum
  - SPDA (Sup pan duodenal art)
- **Inferior border:**
  - Related to 3st part of Duodenum
  - IPDA (infe pan duodenal art)



Head of Pancreas : Relations

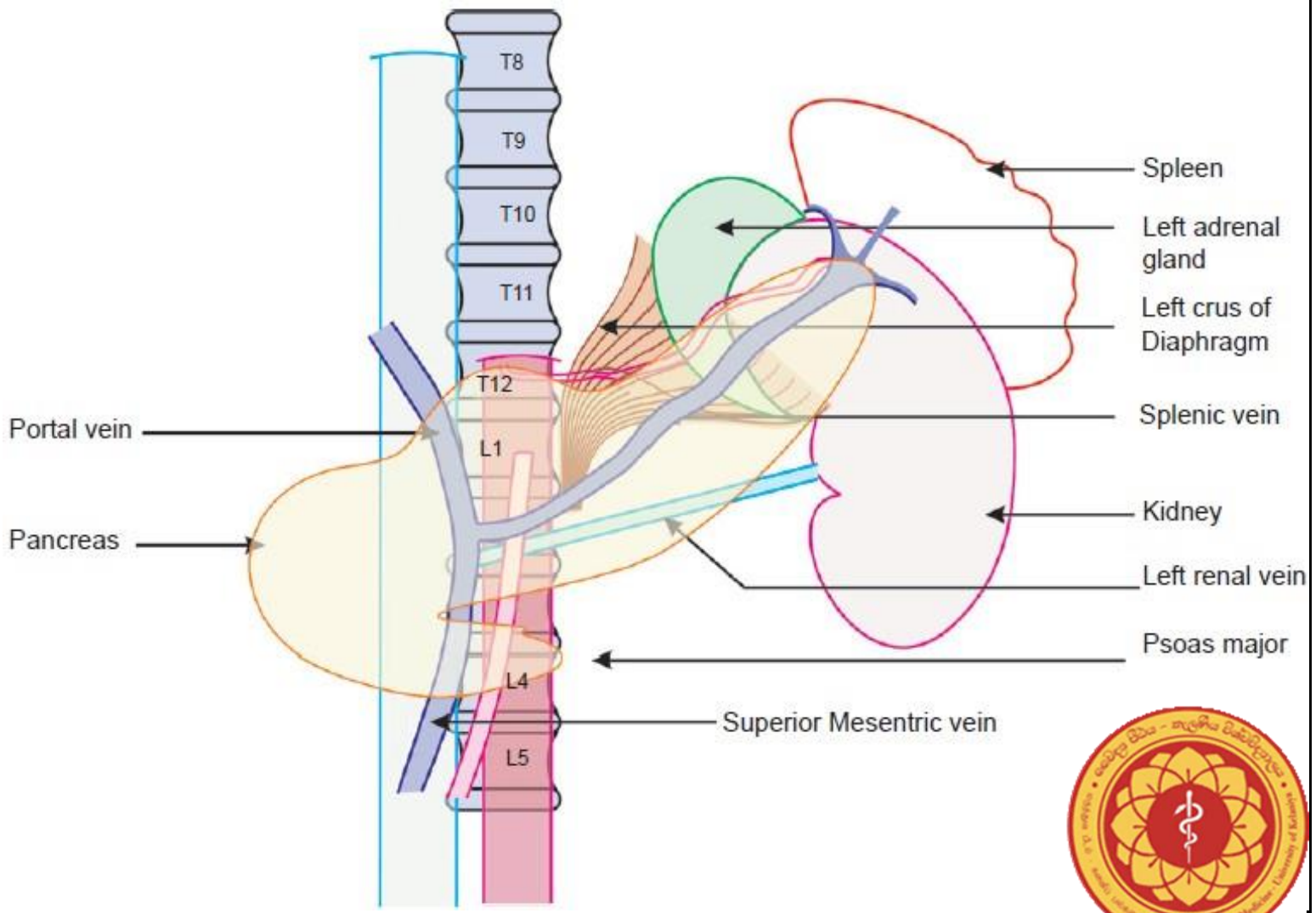
- **Anterior relations:**
  - First part of duodenum
  - Transverse colon
  - Jejunal loops
- **Posterior relations:**
  - IVC
  - Terminal parts of renal veins
  - Bile duct –Embedded in substance
  - R/crus of the diaphragm





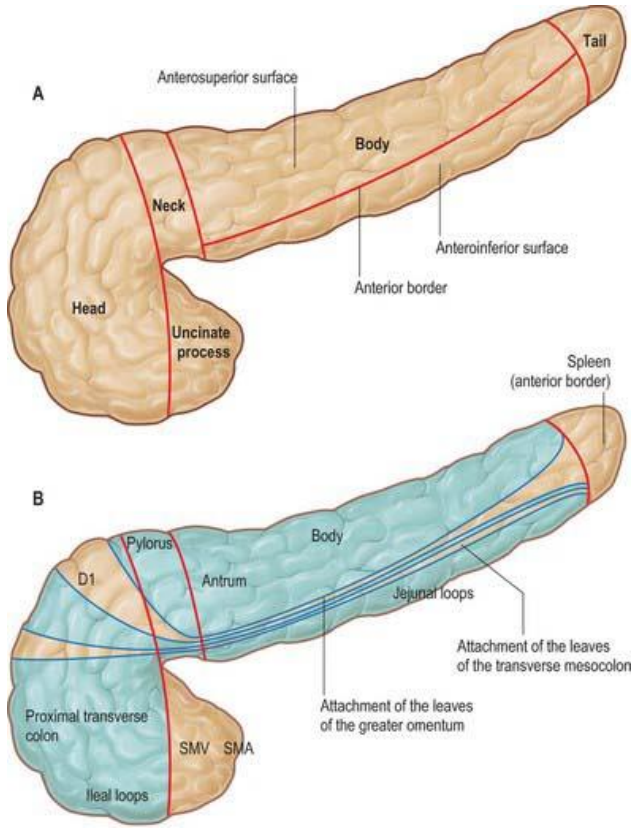
Neck of Pancreas : Relations

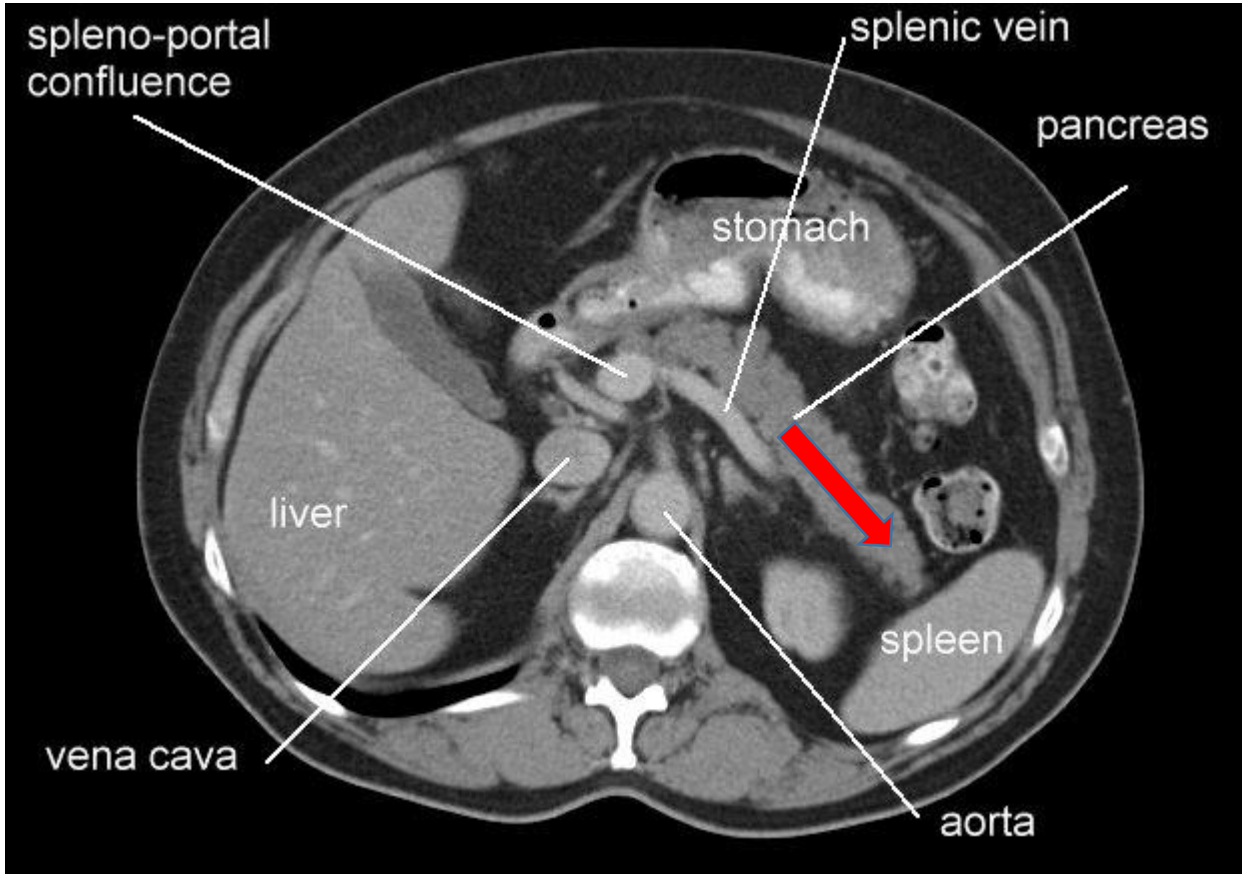
- **Posterior relations:**
  - Initial portion of SMA
  - Commencement of portal vein



Body of Pancreas

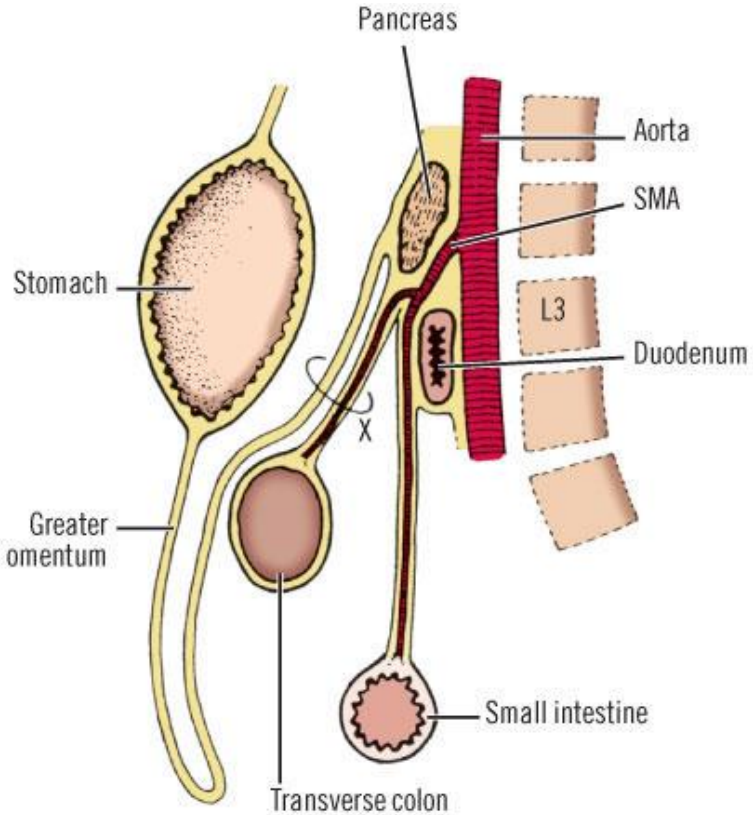
- Extends towards left , slight upward and backwards
- Triangular in cross section

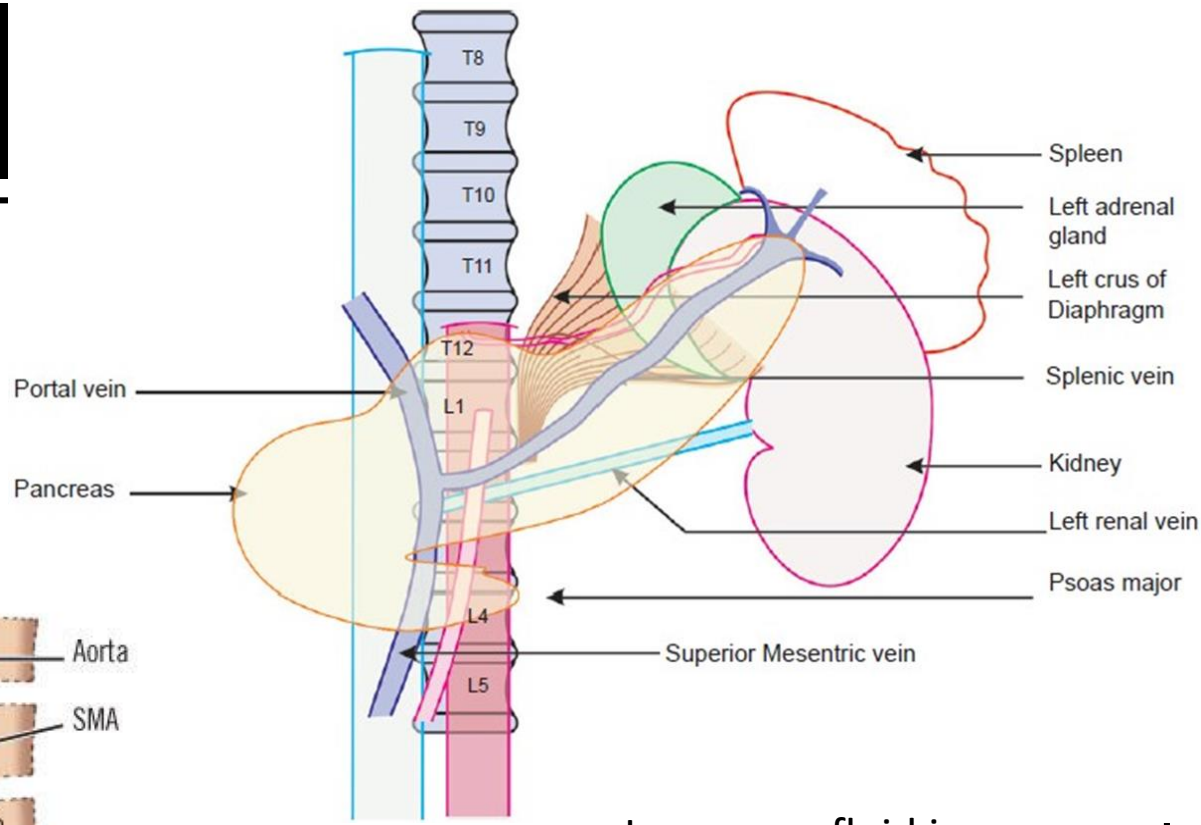




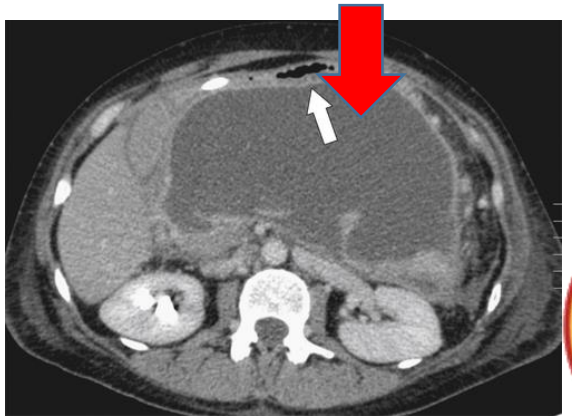
Body of Pancreas : Relations

- **Anterior relations:**
  - Transverse colon
  - Attachment of the transverse mesocolon
  - Lesser sac
  - Stomach
- **Posterior relations:**
  - Aorta
  - Origin of SMA
  - Left psoas muscle
  - Left suprarenal gland
  - Left kidney and vessels
  - Splenic nein



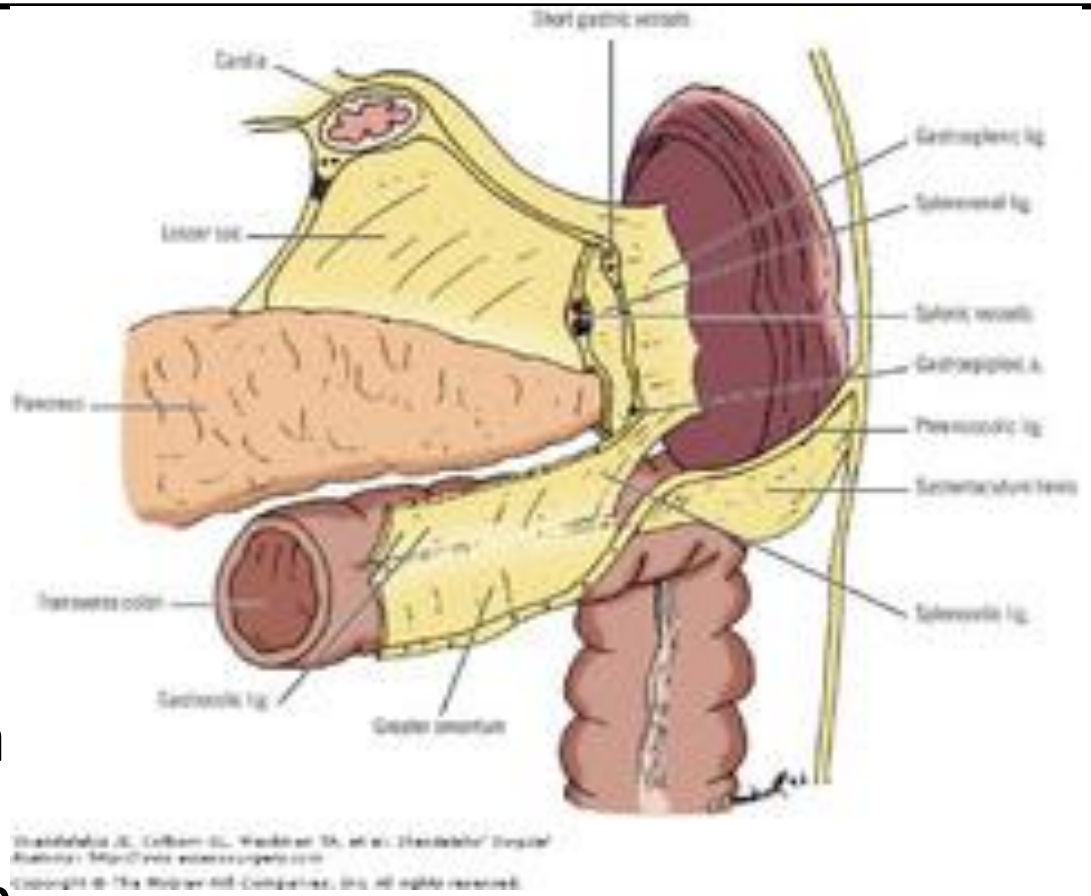


Lesser sac fluid in pancreatitis



Tail of pancreas

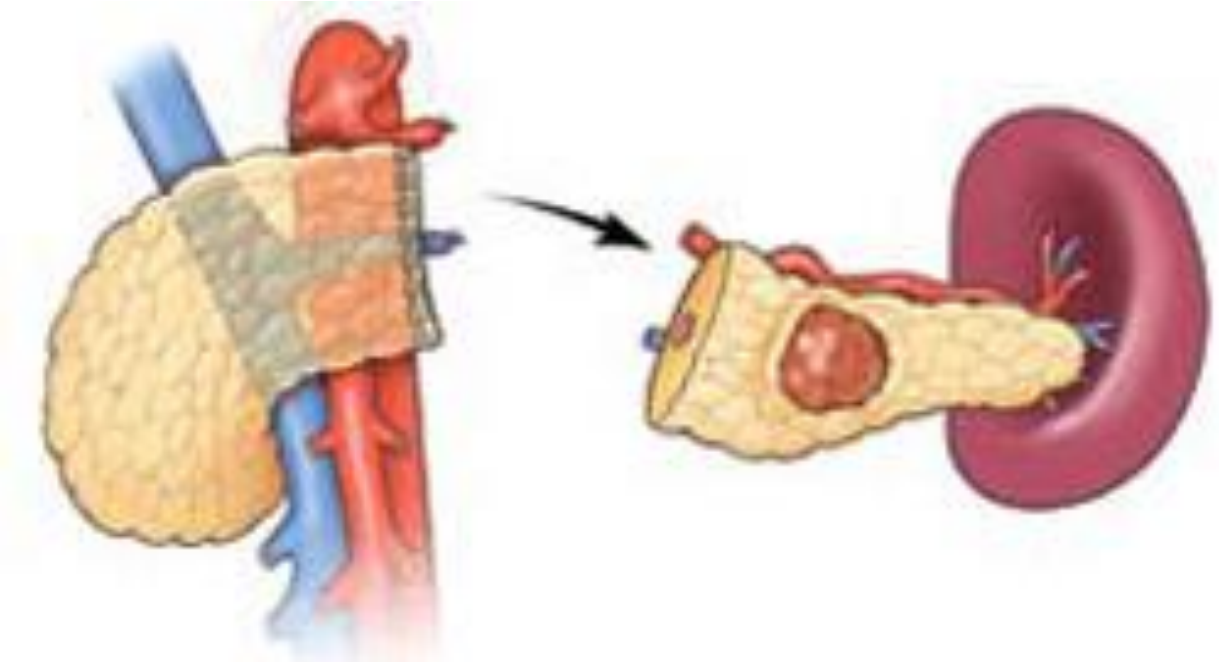
- Last part of the organ
- Lies in the Lienorenal ligament
- Contact with the hilum of spleen.
- Ends within the splenic hilum
- Lies at the level of the 12th thoracic vertebra
- Anteriorly, related to splenic flexure of colon
- May be injured during splenectomy (fistula)



Tail of pancreas

Distal pancreatic cancer- Mx

- Patients with body or tail tumours
- Suitable for a distal pancreatectomy.
- Remove body and tail & spleen.
- Technically a straightforward procedure
- Can be done open or laparoscopically.
- Complications are less frequent



In a Distal Pancreatectomy procedure with Splenectomy, the tail of the pancreas containing the tumor and the spleen are removed.

Ducts of the pancreas -Main duct

- Main duct (Wirsung) runs

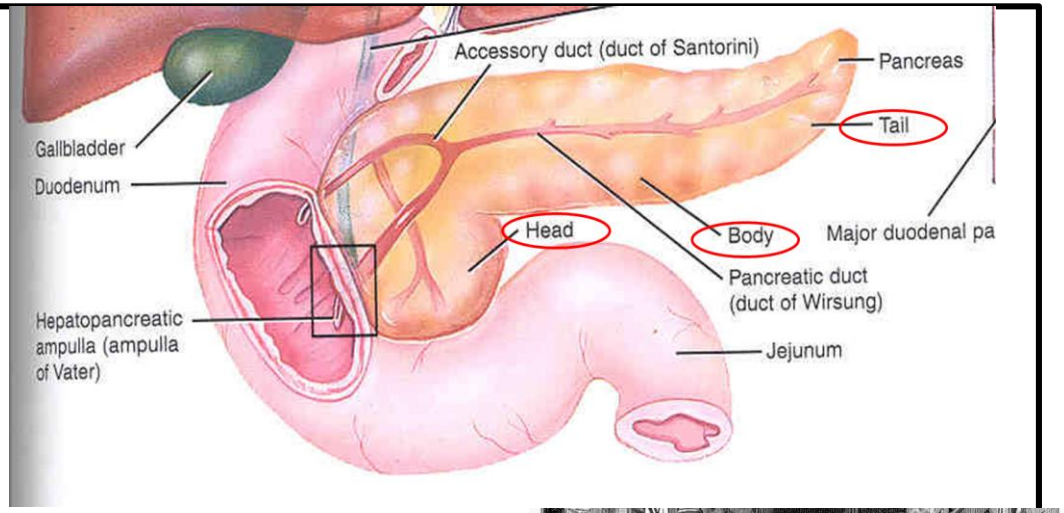
  the entire length of pancreas

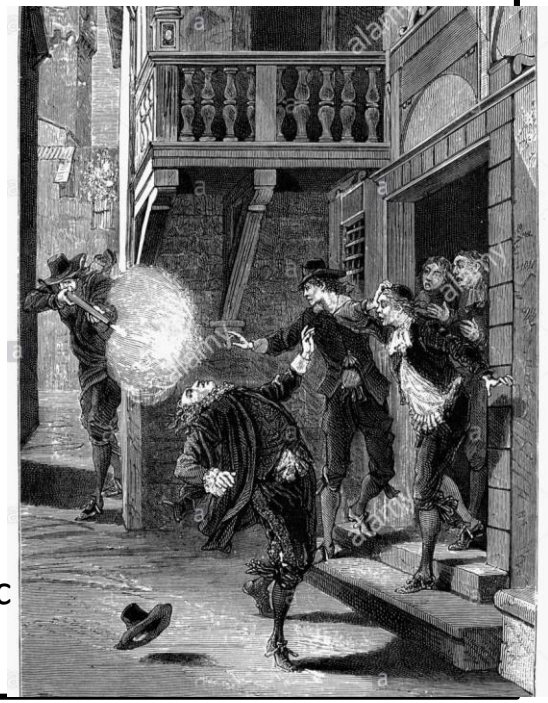
- Joins CBD at the ampulla of Vater

- 3 mm in diameter, 20 secondary branches

- Ductal pressure is 15 – 30 mm Hg (vs. 7 – 17 in CBD)

  - preventing damage to panc. duct



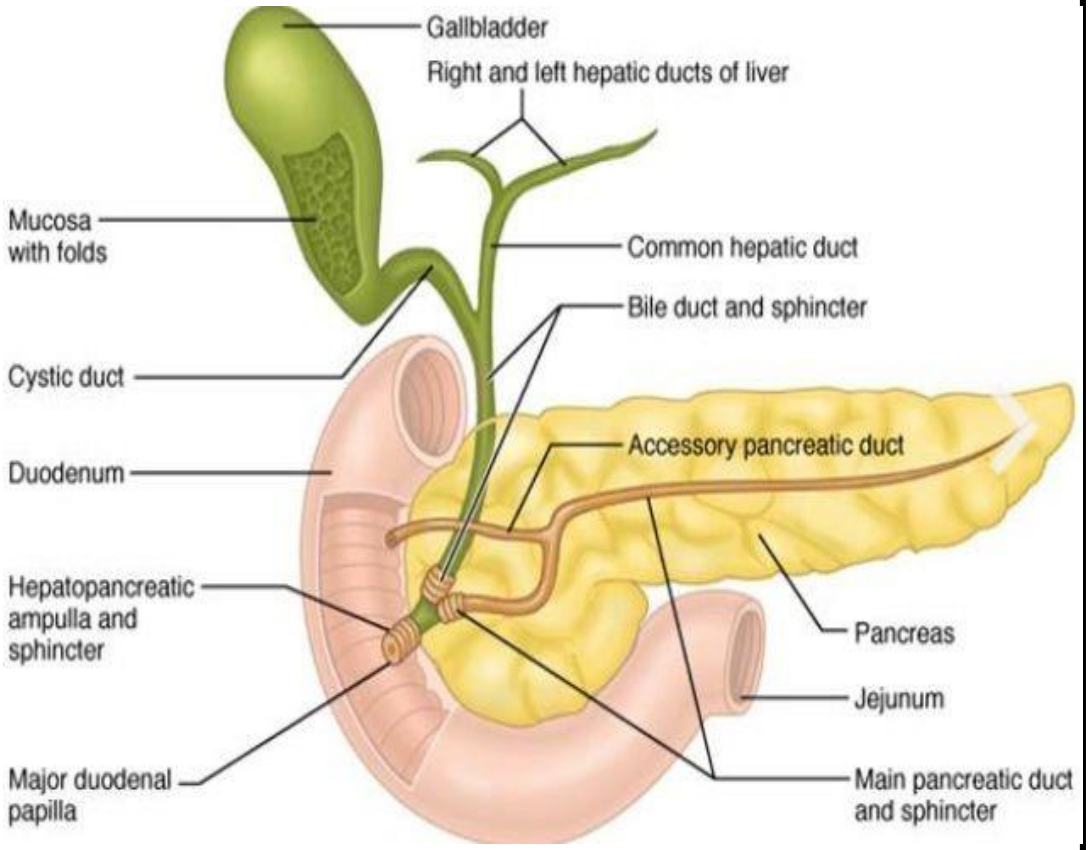


JOHANN GEORG WIRSUNG /n(1589-1643). The shooting of the German anatomist who discovered the pancreatic duct

Ducts of the pancreas -Accessory or Lesser duct

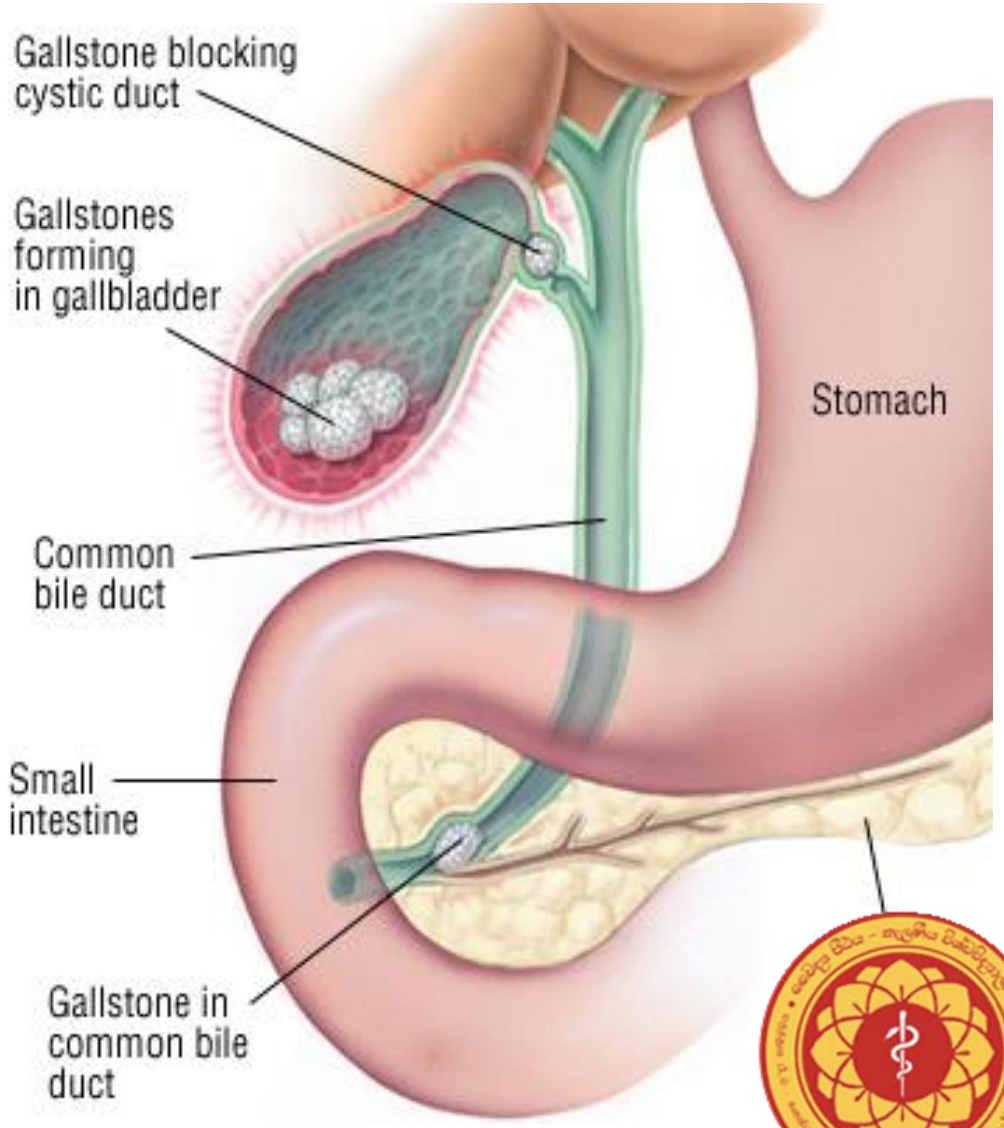
- Accessory or Lesser duct **(Santorini)**
- Drains superior portion of head
- Empties separately - 2nd part of duodenum
- Papilla situated 6-8 cm from pylorus.
- This papilla situated proximal

  and ventral to main papilla.
- Which drains the dorsal pancreatic bud during foetal development.



Ducts of the pancreas -Clinical significance

- Compression, obstruction or inflammation of the pancreatic duct may lead to acute pancreatitis.
- The most common cause for obstruction is choledocholithiasis, or gallstones in the common bile duct.
- Obstruction can also be due to duodenal inflammation in Crohn's disease.
- Bile backing up into the pancreatic duct may initiate pancreatitis.
- Pancreatic ductal carcinoma is a common form of pancreatic cancer



Blood supply to the pancreas

- Variety of major arterial sources : Celiac and SMA

Coeliac trunk

↓

Common Hepatic Artery

↓

Gastroduodenal Artery

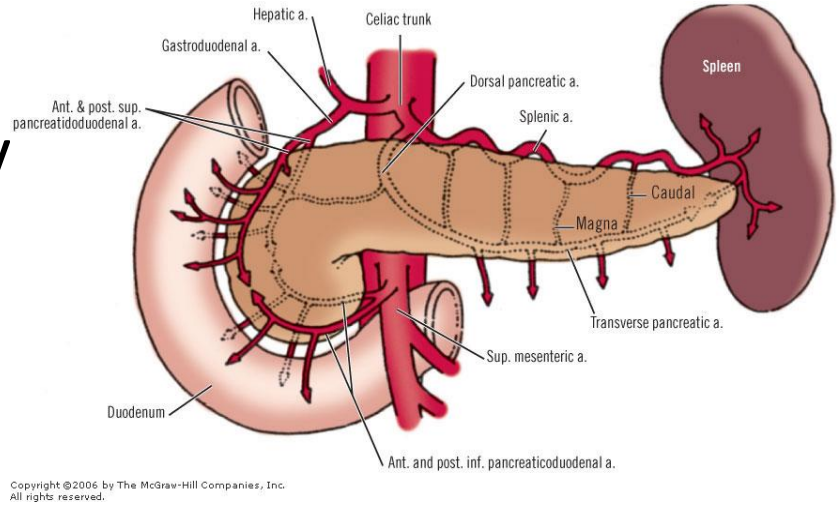
↓

Superior pancreaticoduodenal artery

↓

anterior and posterior branches

Arterial supply to head



SMA

↓

Inferior pancreaticoduodenal artery

↓

Anterior and Posterior branches

Blood supply to the pancreas

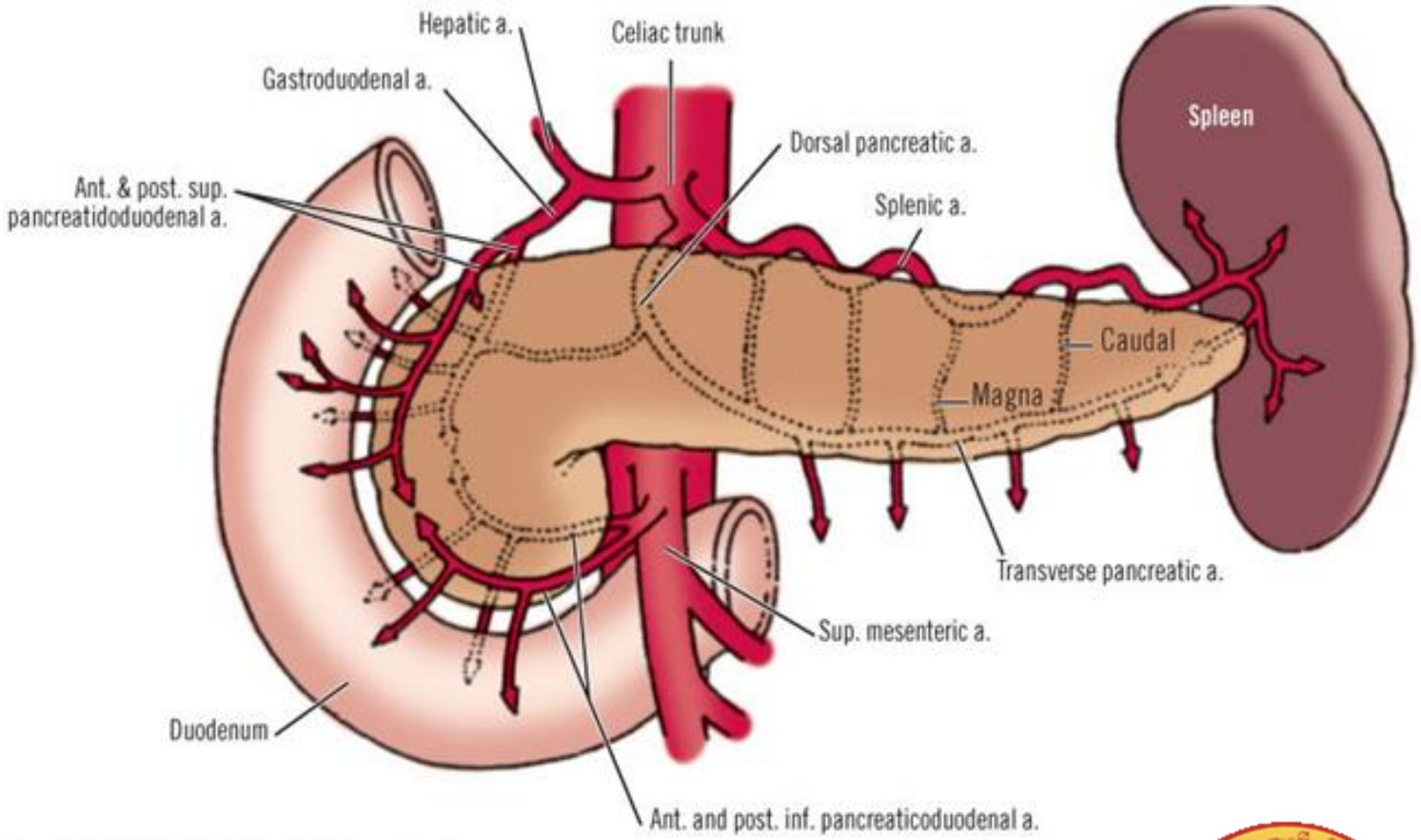
Coeliac trunk

↓

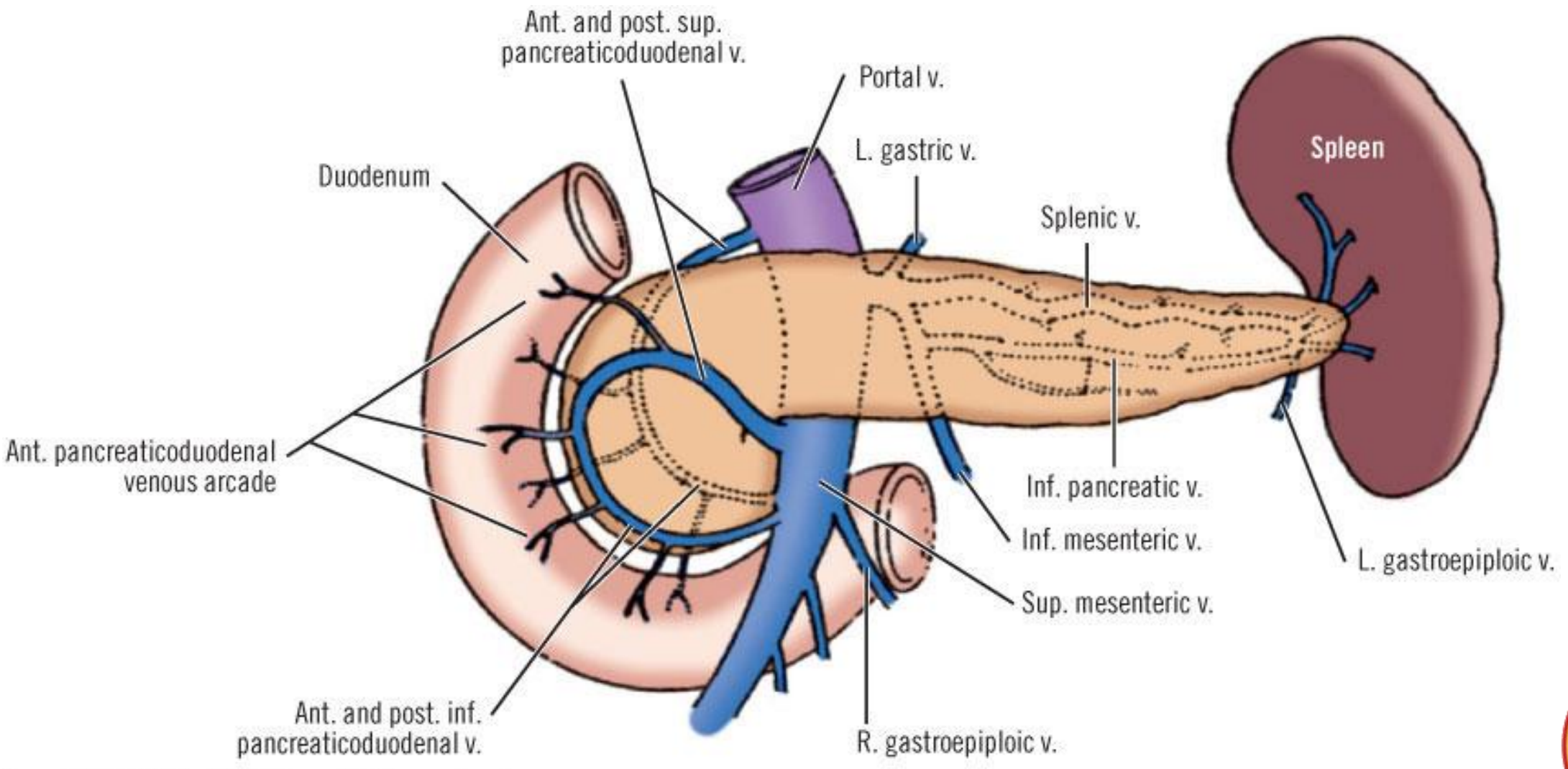
Splenic artery (Largest branch)

↓

Supply **neck, body and tail**



Pancreas –Venous supply

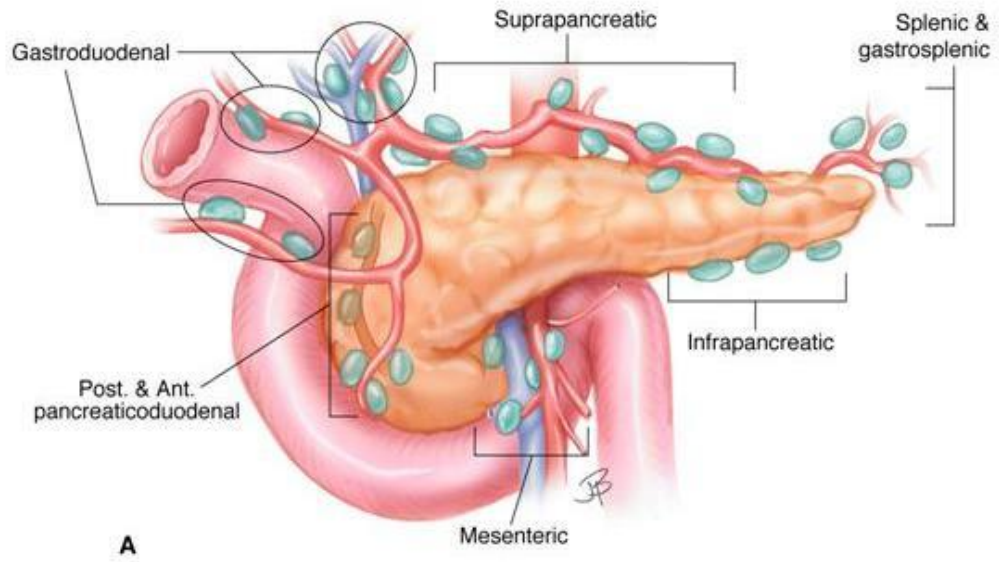


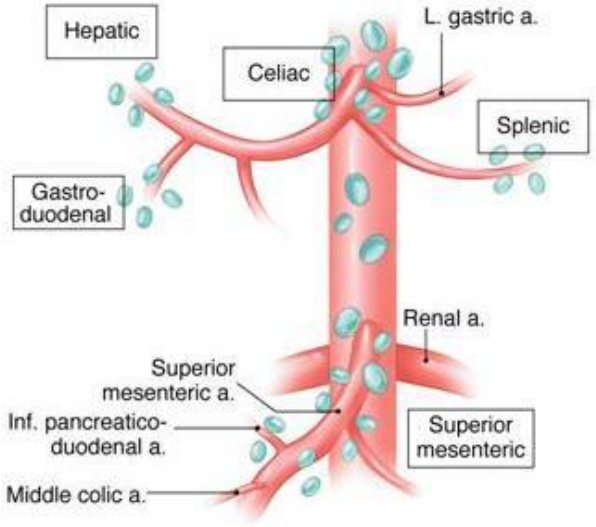
Pancreas –Lymphatic drainage

- **Lymphatics** follow the course of the arteries to the

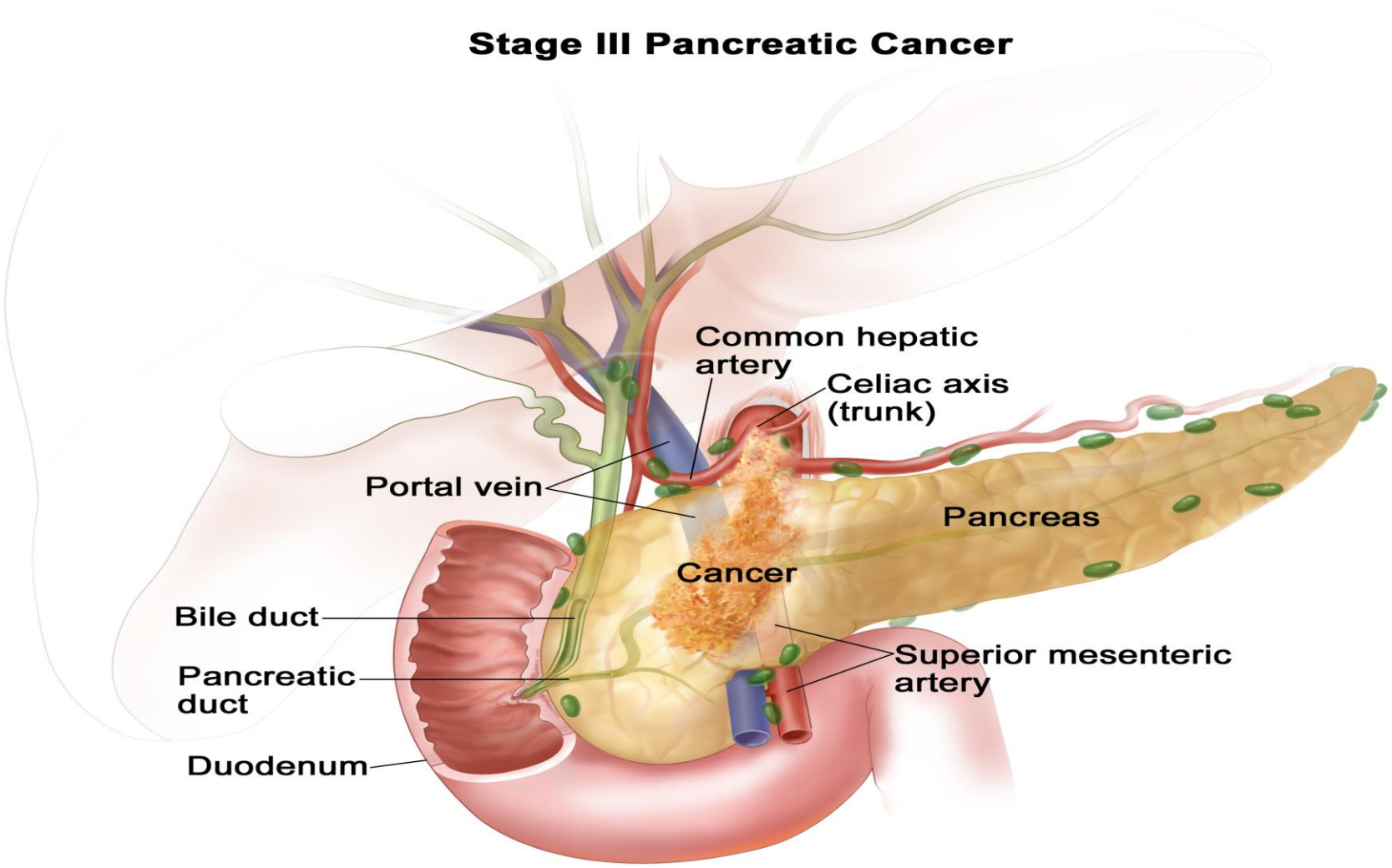
-Coeliac nodes

-Superior mesenteric lymph nodes



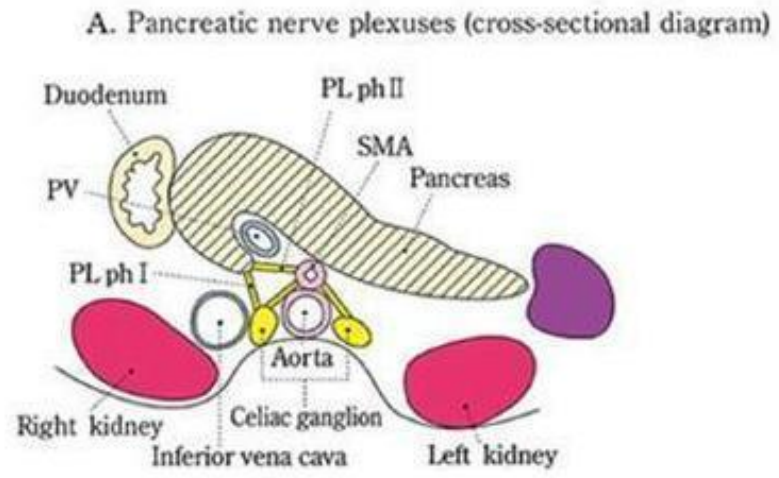


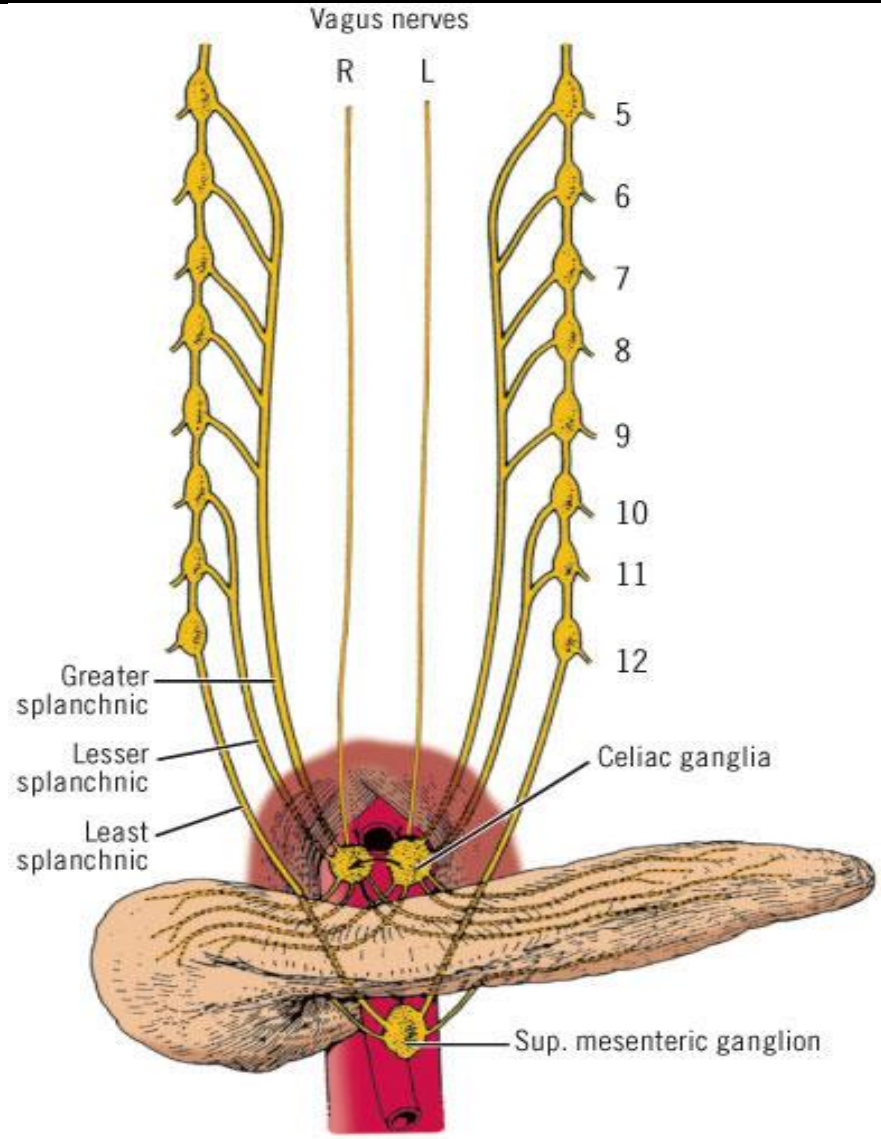
Pancreatic cancer and lymphatic drainage



Pancreas –Nerve supply

- Autonomic supply via **pancreatic plexus**
- **Sympathetic trunk branches** - from **T6-T10**
  - Are vasomotor
- **Parasympathetic nerve fibres** - from the **vagus nerve**
  - Control pancreatic secretion





Mx of severe pain in chronic pancreatitis/Ca pancreas.

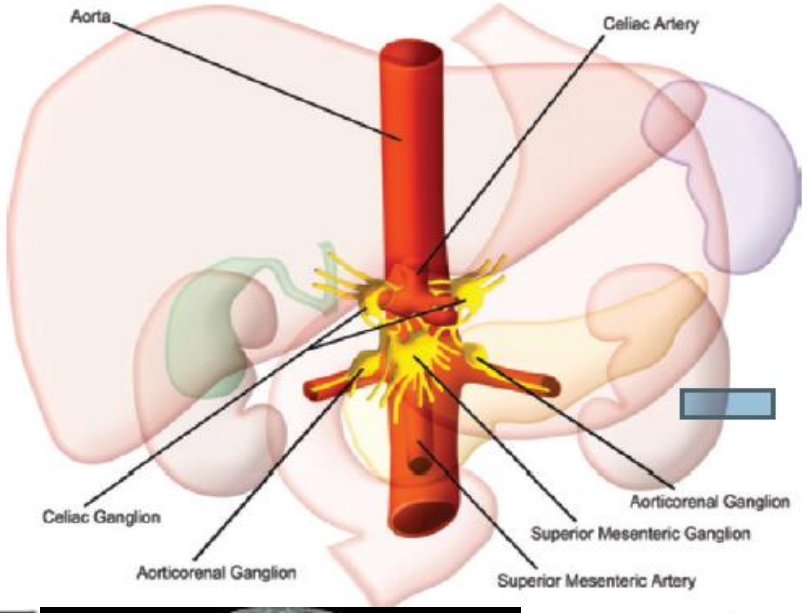
RadioGraphics

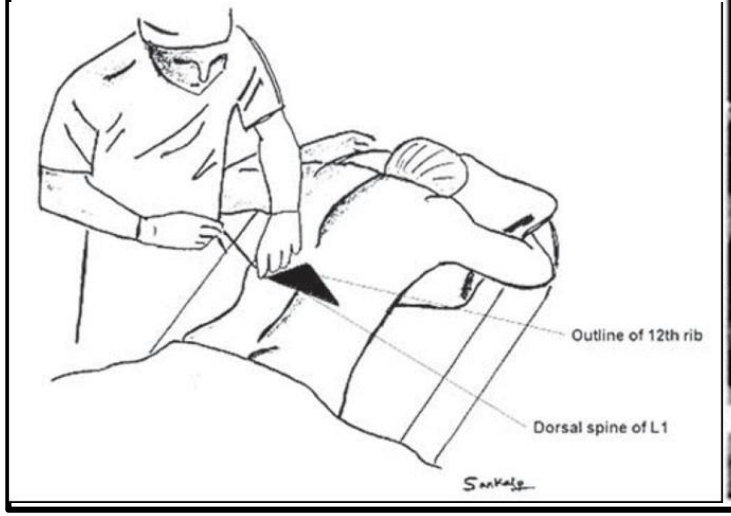
VASCULAR/INTERVENTIONAL RADIOLOGY 1599

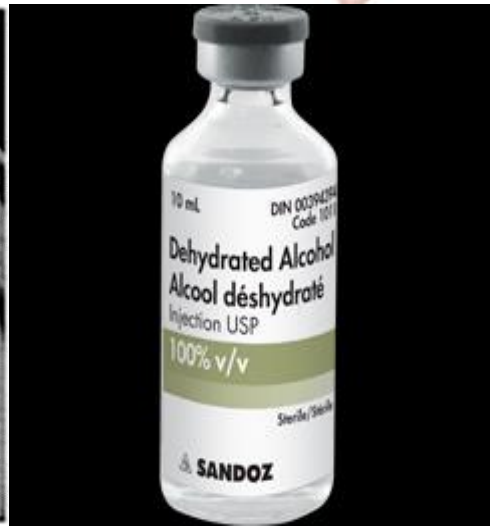
CT-guided Celiac Plexus Neurolysis: A Review of Anatomy, Indications, Technique, and Tips for Successful Treatment[1]

ONLINE-ONLY CME

Avinash Kambadakone, MD, FRCR • Ashraf Thabet, MD • Debra A. Gervais, MD • Peter R. Mueller, MD • Ronald S. Arellano, MD





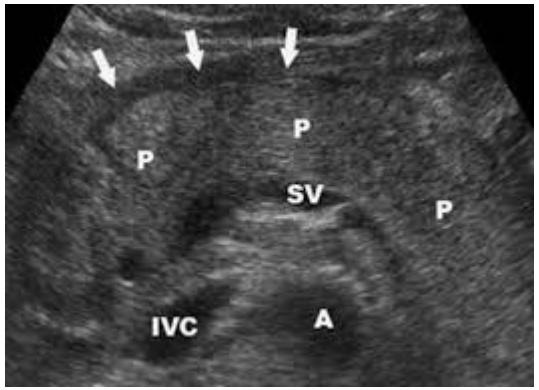


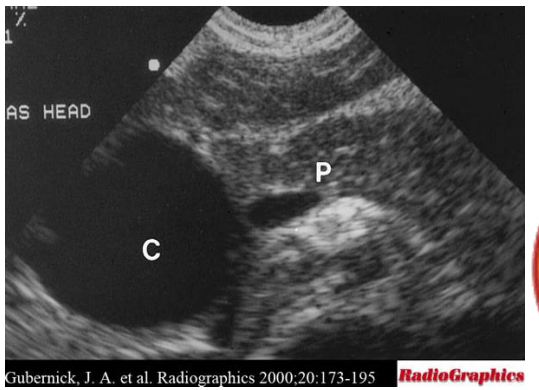
Radiological investigations of pancreas

- Ultrasound scan
- X Ray Abdomen.
- CT Scan
- MRI Scan
- MRCP
- ERCP

Ultrasound scan

- Good first line Ix.
- Appear as echogenic structure.
- Important in acute pancreatitis.
- May see pancreatic cancers/Ca++.
- Good Ix to see pancreatic pseudocyst.



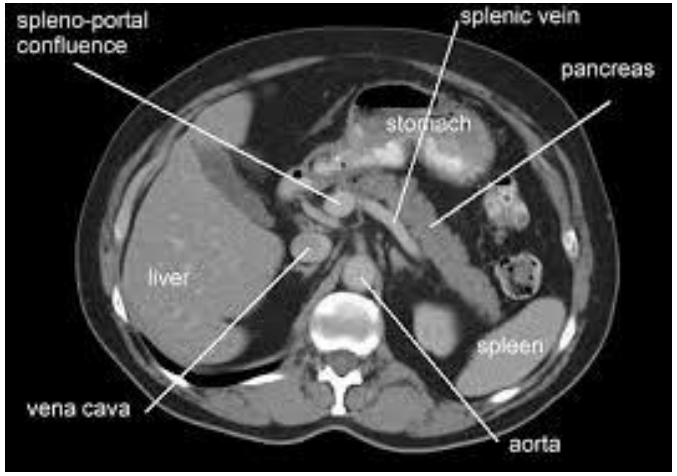


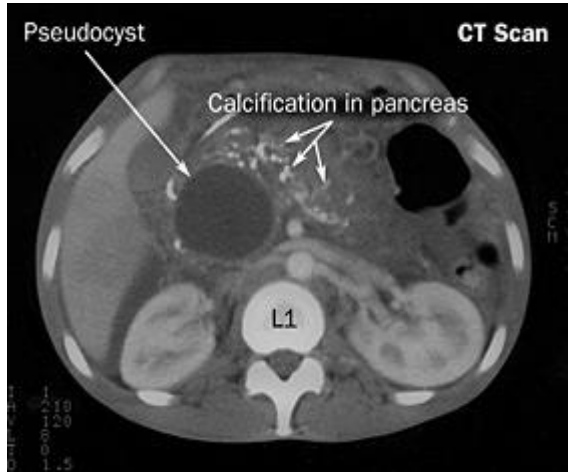
X Ray Abdomen

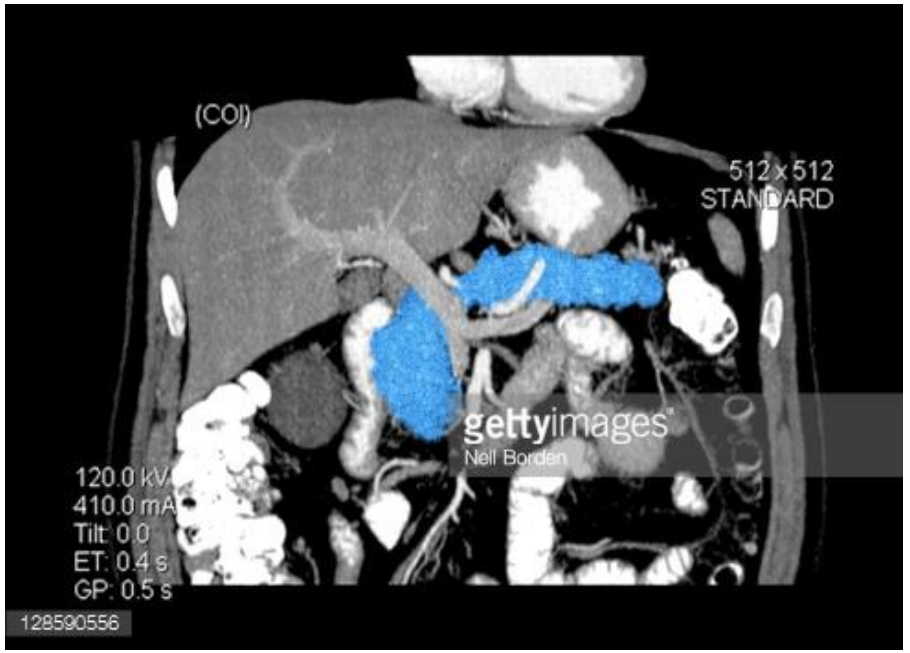
- Basic investigation to see pancreatic calcifications in chronic pancreatitis.

CT Scan

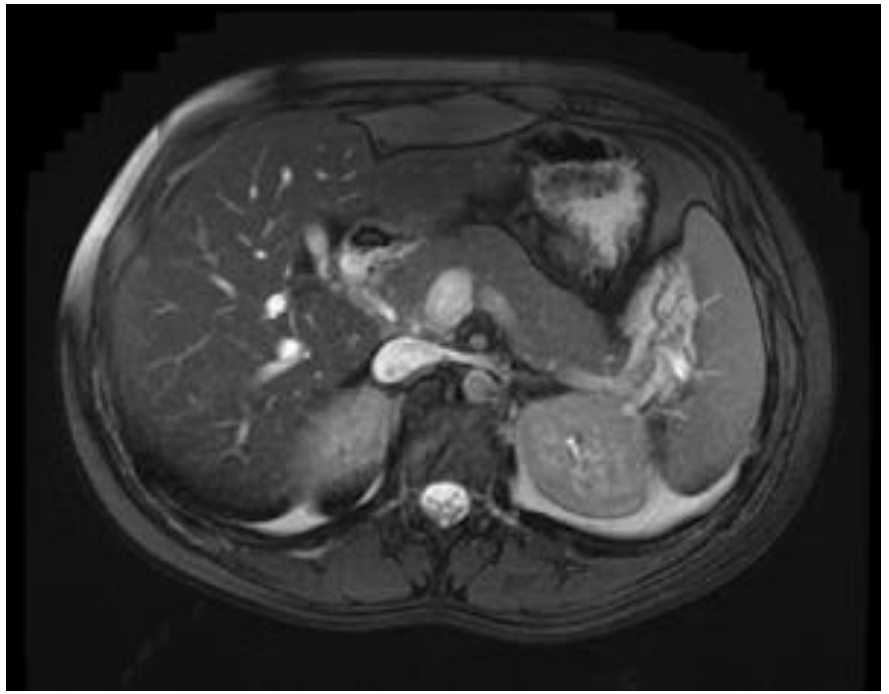
- Pancreas is well visualized.
- Can see dilated pancreatic duct /Ca++
- Important Ix in
  - acute and chronic pancreatitis
  - To see complications pancreatitis
  - Pancreatic cancers
  - Guided procedures.





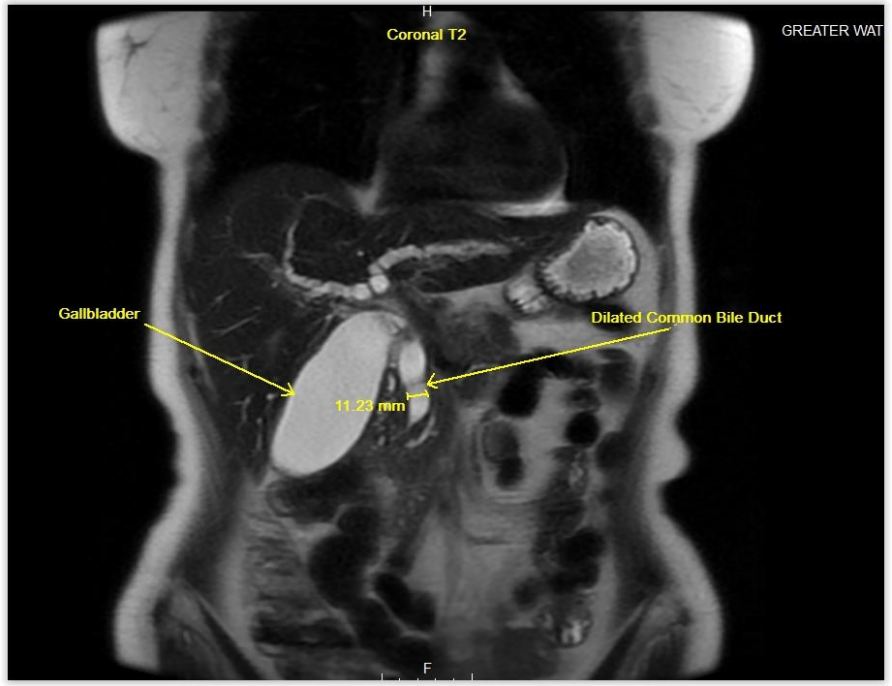


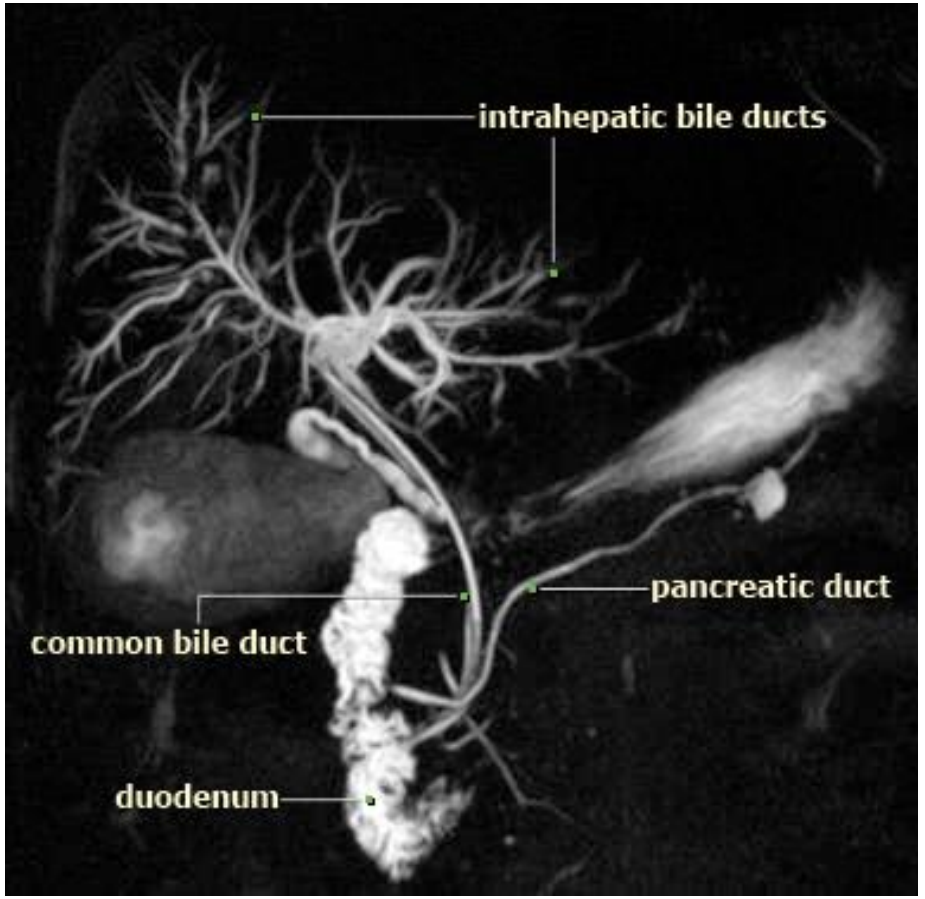
MRI Scan



Magnetic resonance cholangiopancreatography- MRCP

- Non-invasive technique
- Can see pancreatic and bile ducts
- Unlike ERCP, it <u>does not require an infusion of a contrast dye.</u>



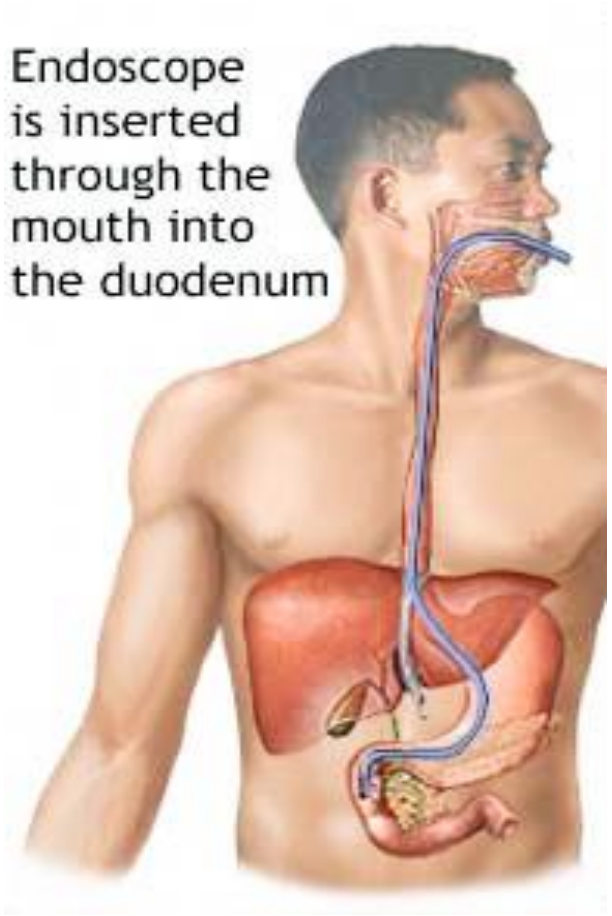


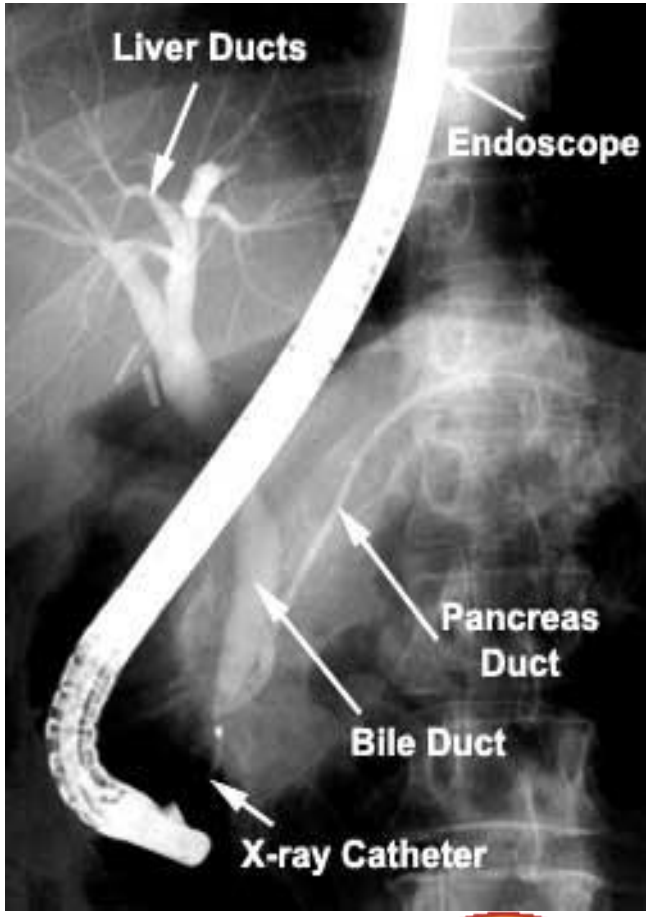
Magnetic resonance cholangiopancreatography

- Examine diseases of the liver, gallbladder, bile ducts, pancreas and pancreatic duct.
- Detect tumors, stones, inflammation or infection.
- Evaluate patients with pancreatitis to detect the underlying cause
- Help to diagnose unexplained abdominal pain.
- Provide a less invasive alternative to endoscopic retrograde cholangiopancreatography (ERCP).

Endoscopic retrograde cholangiopancreatography (ERCP)

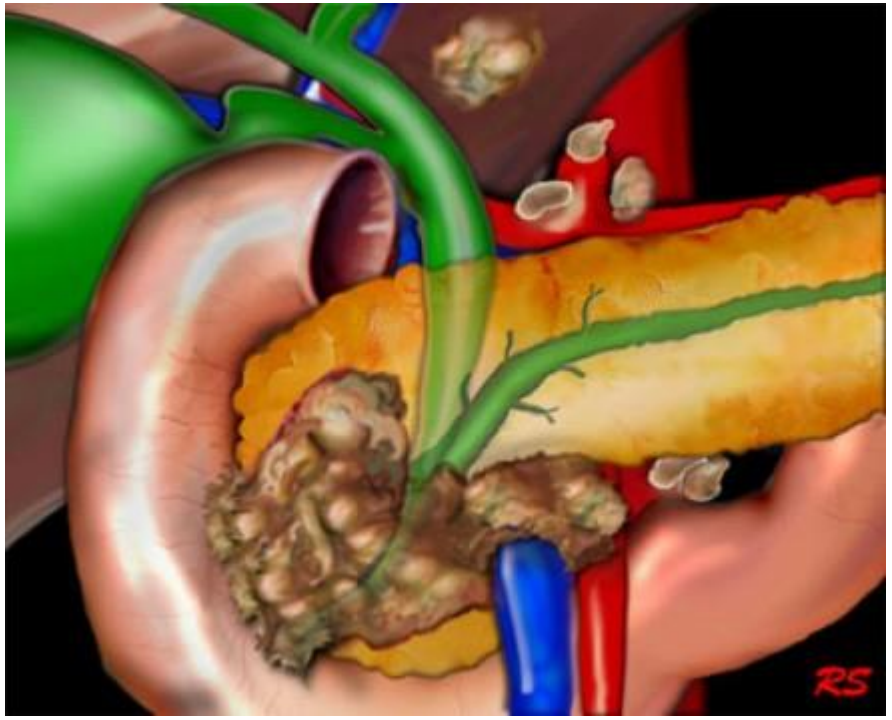
- An endoscope is passed through the mouth, esophagus, stomach and into the first part of the small intestine.
- A catheter is then inserted through the endoscope
- Contrast material is injected into the biliary ducts.
- X-rays are then taken.



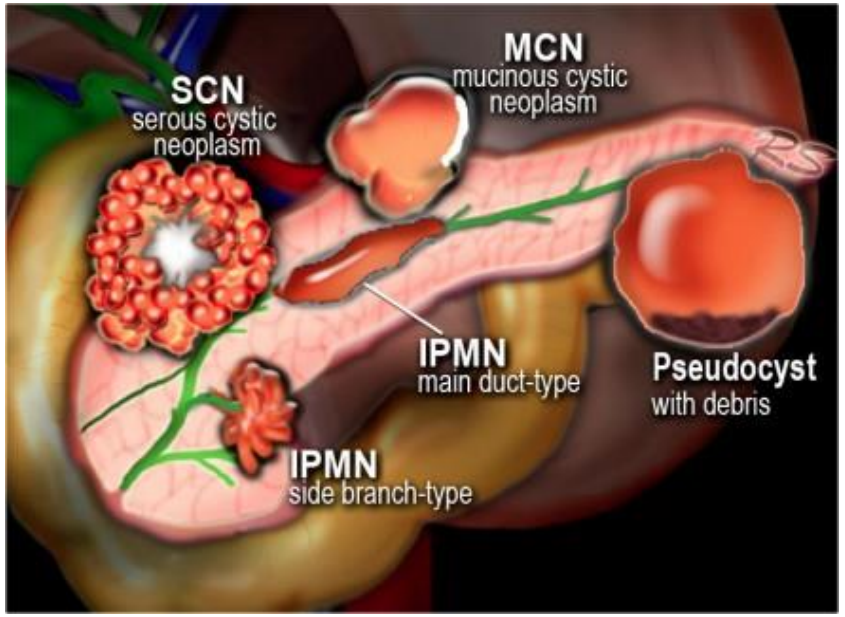


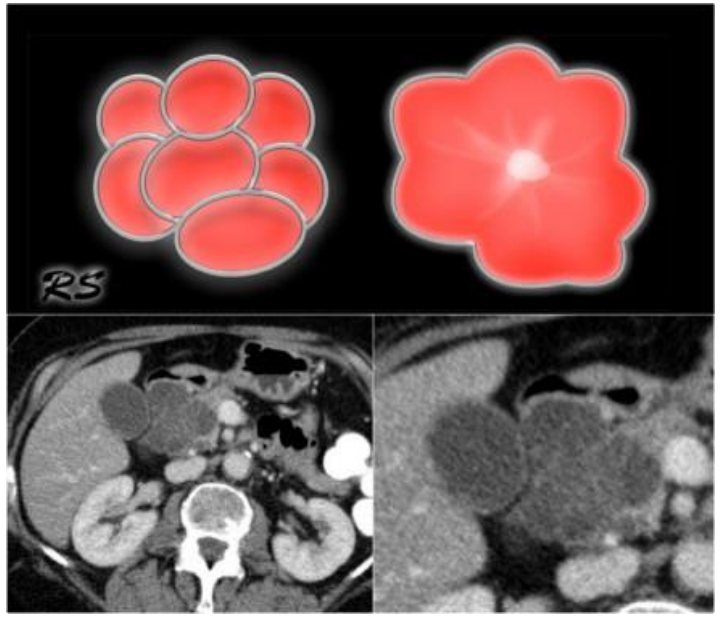
Carcinoma of pancreas

- Relatively common tumour
- men > women (men: woman 1,5:1)
- Age of 60 - 70 years
- 75 % occurs in pancreatic head.
- 80% of pancreatic head cancers are not eligible for resection at the time of diagnosis.
- This is due to advanced local tumour extension or the presence of distant metastatic disease



Cystic pancreatic tumors





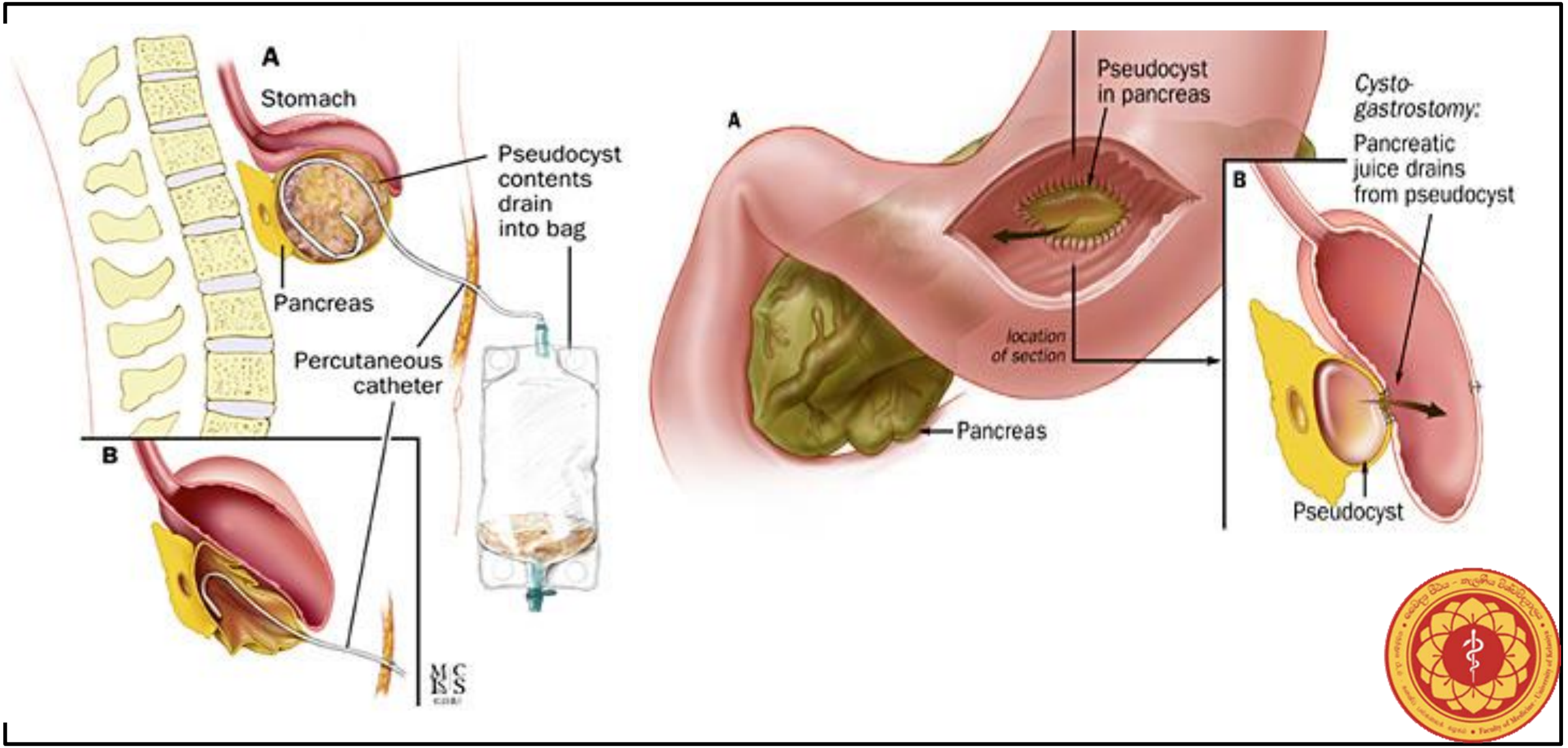
Pancreatic pseudocyst

- A circumscribed collection of fluid rich in pancreatic enzymes, blood, and necrotic tissue,
- typically located in the lesser sac of the abdomen.
- Pancreatic pseudocysts are usually complications of pancreatitis
- In children occurs after pancreatic trauma
- Complications: Secondary infection, rupture, haemorrhage, obstruction of other structures

Management of Pseudocysts

- USS guided percutaneous drainage
- Cystogastrostomy: connection is created between the back wall of the stomach and the cyst drains into the stomach.
- Cystjejunostomy: connection is created between the cyst and the small intestine -cyst fluid directly into the small intestine.
- Cystduodenostomy: connection is created between the duodenum -drainage of the cyst content into duodenum.
- Type of surgical procedure depends on the location of the cyst.

Management of Pseudocysts



MCQ

1. The pancreas

A. has a main duct which opens in to vertical part of duodenum

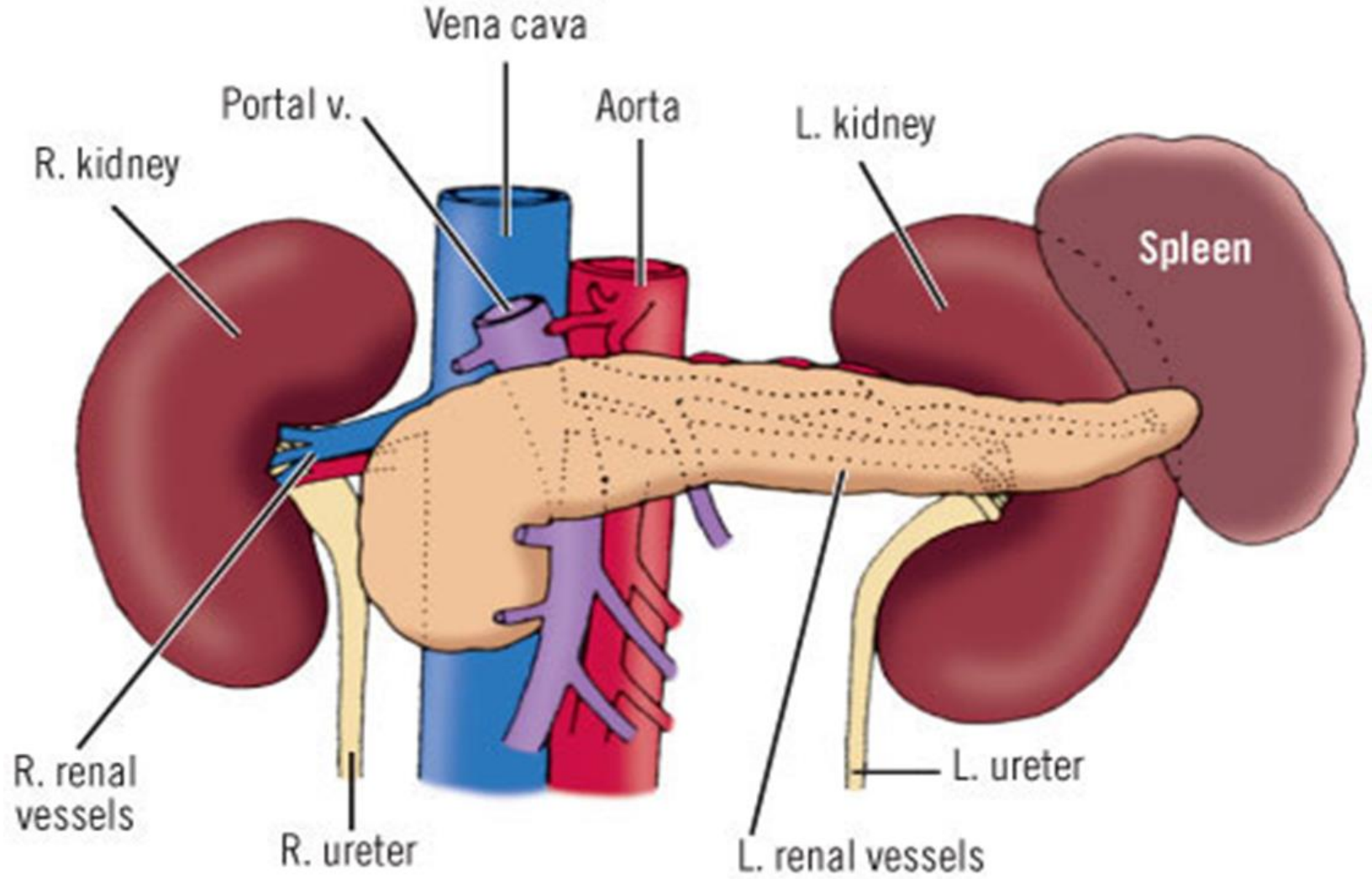
B. has a body which lies in front of the IVC

C. has a neck which lies anterior to the commencement of portal vein

D. has a head in front of the right kidney

E. pancreas is posterior to the splenic vein

MCQ



MCQ

- The pancreas

T A. has a main duct which opens in to vertical part of duodenum

F B. has a body which lies in front of the IVC

T C. has a neck which lies anterior to the commencement of portal vein

F D. has a head in front of the right kidney

F E. pancreas is posterior to the splenic vein

MCQ

2. The pancreas

A. develops from foregut

B. has a uncinated process which lies behind the SMV

C. has a tail which lies in the gastrosplenic ligament

D. lies behind the stomach

E. has a head which lies anterior to the bile duct

MCQ

2. The pancreas

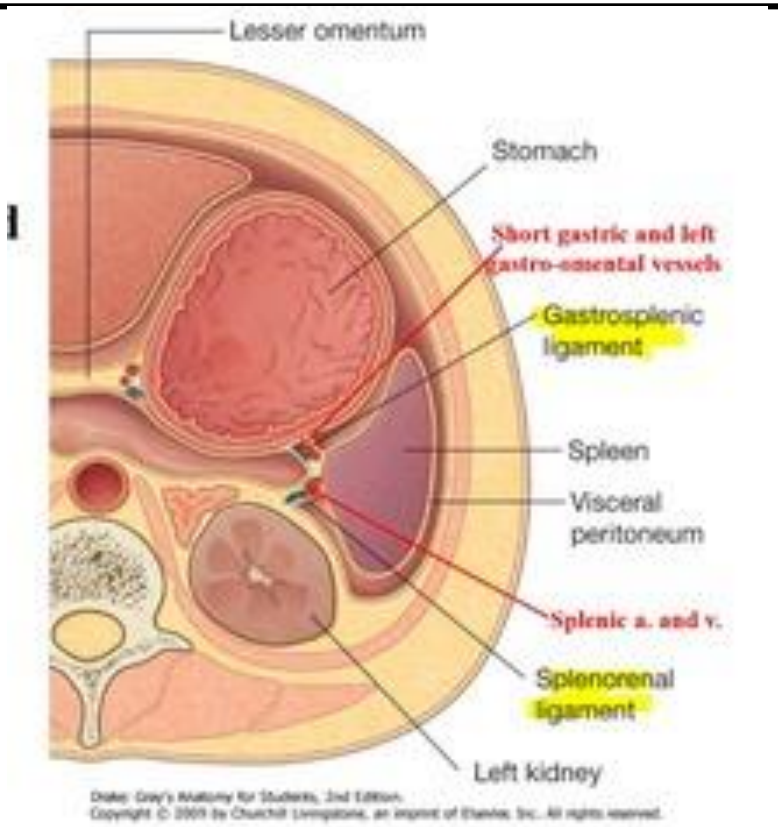
T A. develops fro foregut

T B. has a uncinated process which lies behind the SMV

F C. has a tail which lies in the gastrosplenic ligament

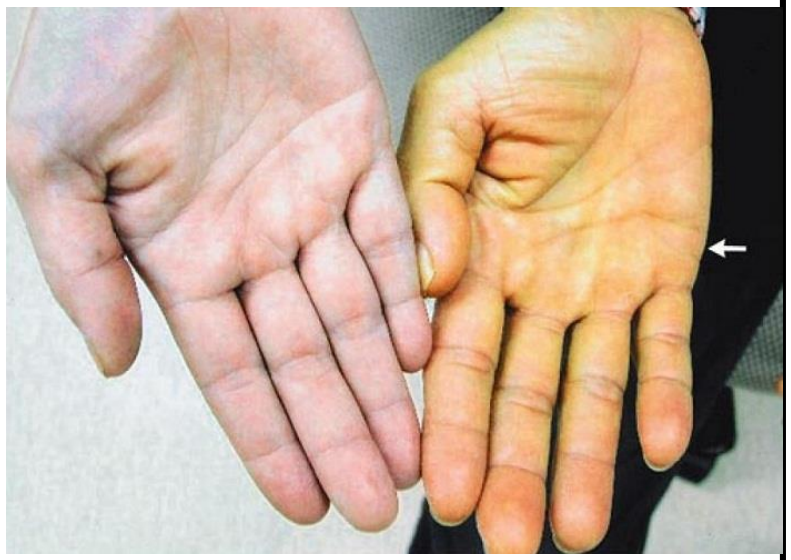
T D. lies behind the stomach

T E. has a head which lies anterior to the bile duct



SBA

A 50-year-old female patient with severe jaundice was diagnosed with pancreatic cancer. If you suspect a tumor of pancreas , which portion of the pancreas is most likely get this tumour?



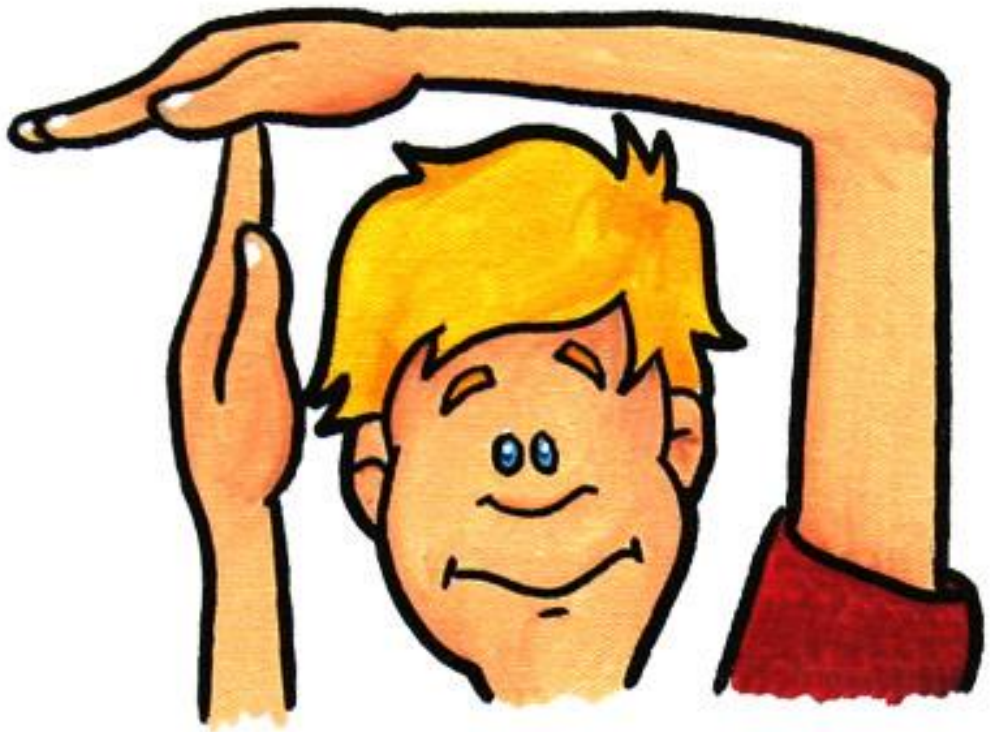
A. Head

B. Neck

C. Body

D. Tail

E. Linorenal ligament.



TIME
FOR A
BREAK