Pancreatic carcinoma

Clinical vignette

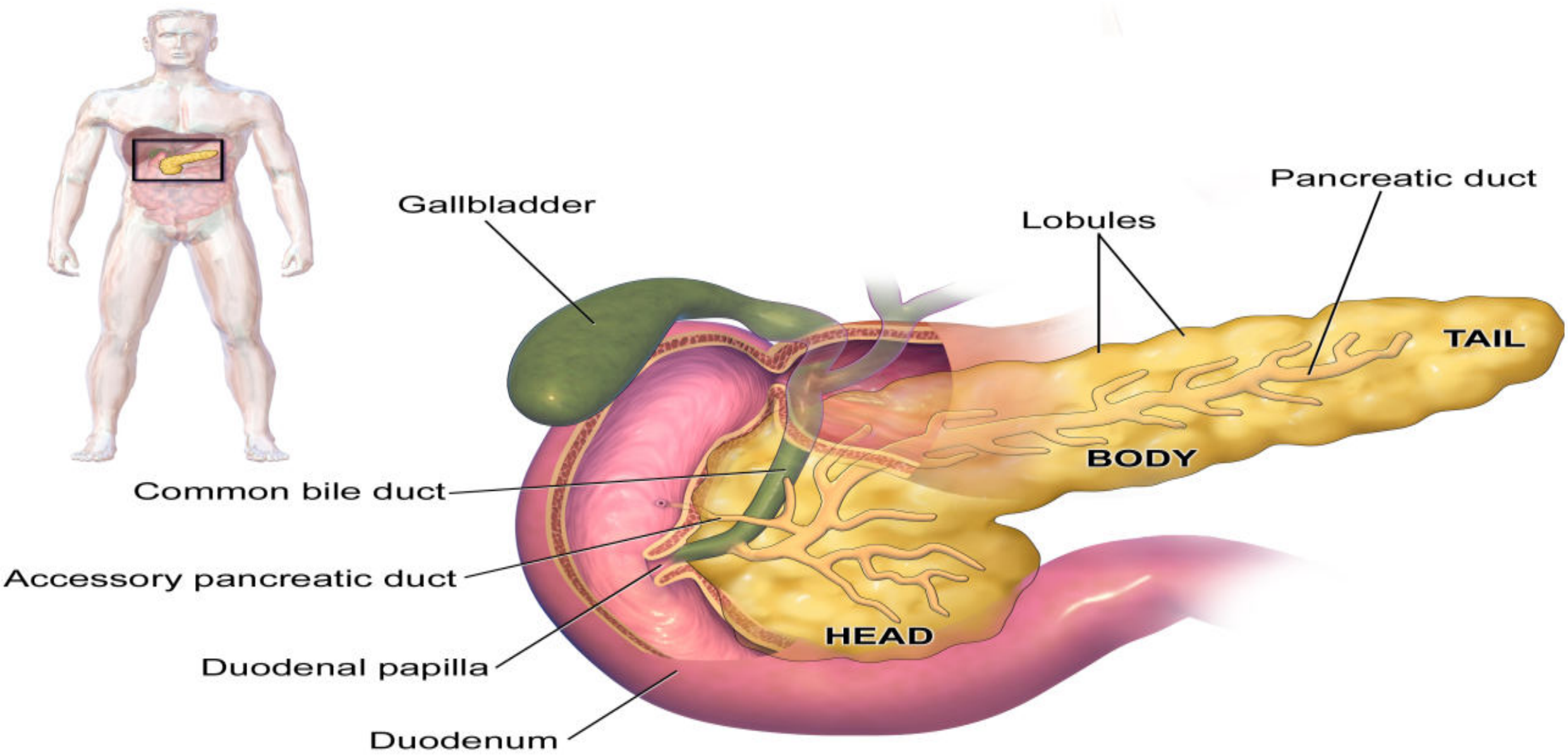
- 72 years old man presented with jaundice for 7 days with dull abdominal discomfort for 2 months. He gives H/O loss appetite and loss of weight.
- He is passing clay color stools.
- He has a 50+ pack year smoking history before quitting last year.
- He was recently diagnosed with type 2 diabetes, but has no other medical problem

O/E: He has a yellow hue to his eye and tongue, along with scratch marks on his skin

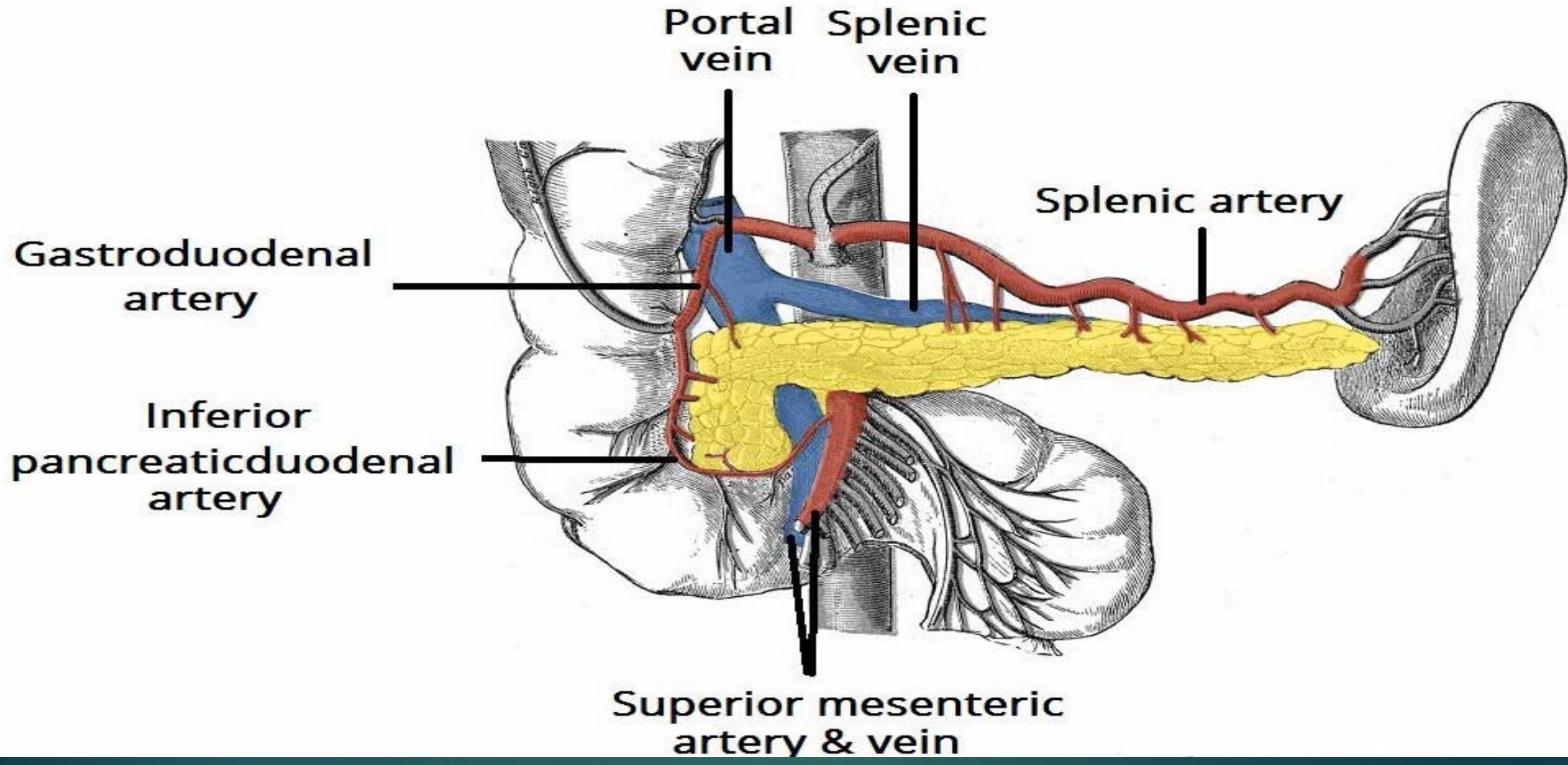
- A non-tender globular mass is palpable in right upper outer quadrant of the abdomen

- Ix : Laboratory testing reveals total and direct bilirubin of 18 mg/dl(normal 0.2-1.3 mg/dL) and 17.2 mg/dL (<0.3 mg/dL), respectively.

- Alkaline Phosphatase (ALP) elevated at 215 µ/L (33-131 µ/L). AST & ALT mildly elevated.



Anatomy of pancreas



Blood supply of pancreas

INTRODUCTION

- 3rd most common GIT cancer.
- 4th most common cause of cancer death
- Male to female ratio 2:1
- Peak age 65 to 75 years
- More common in African-American males

Risk Factors

- Cigarette smoking
- Diabetes mellitus
- Chronic pancreatitis

Contd.

- Family H/o Pancreatic cancer in more than 2 first degree relatives
- Increased fat intake
- Chronic familial relapsing pancreatitis.
- Familial breast cancer (BRCA-2)
- Peutz Jegher syndrome

Contd.

- HNPCC (Hereditary non polyposis colorectal cancer)
- Gardener syndrome

Pathology

Site:- 55% head of pancreas; 25 % body; 15% tail; 5 % periampullary

Macroscopic : Growth is hard & infiltrating

Histology:

- 90% ductal adeno ca
- 9% cystic neoplasms
- 1% endocrine neoplasms

Spread:

Local Spread

- To adjacent structure like duodenum, portal vein , superior mesenteric vein, retroperitoneum.

- Spread is more likely in carcinoma head of pancreas than in periampullary carcinoma

- Perineural spread is common

Nodal Spread:

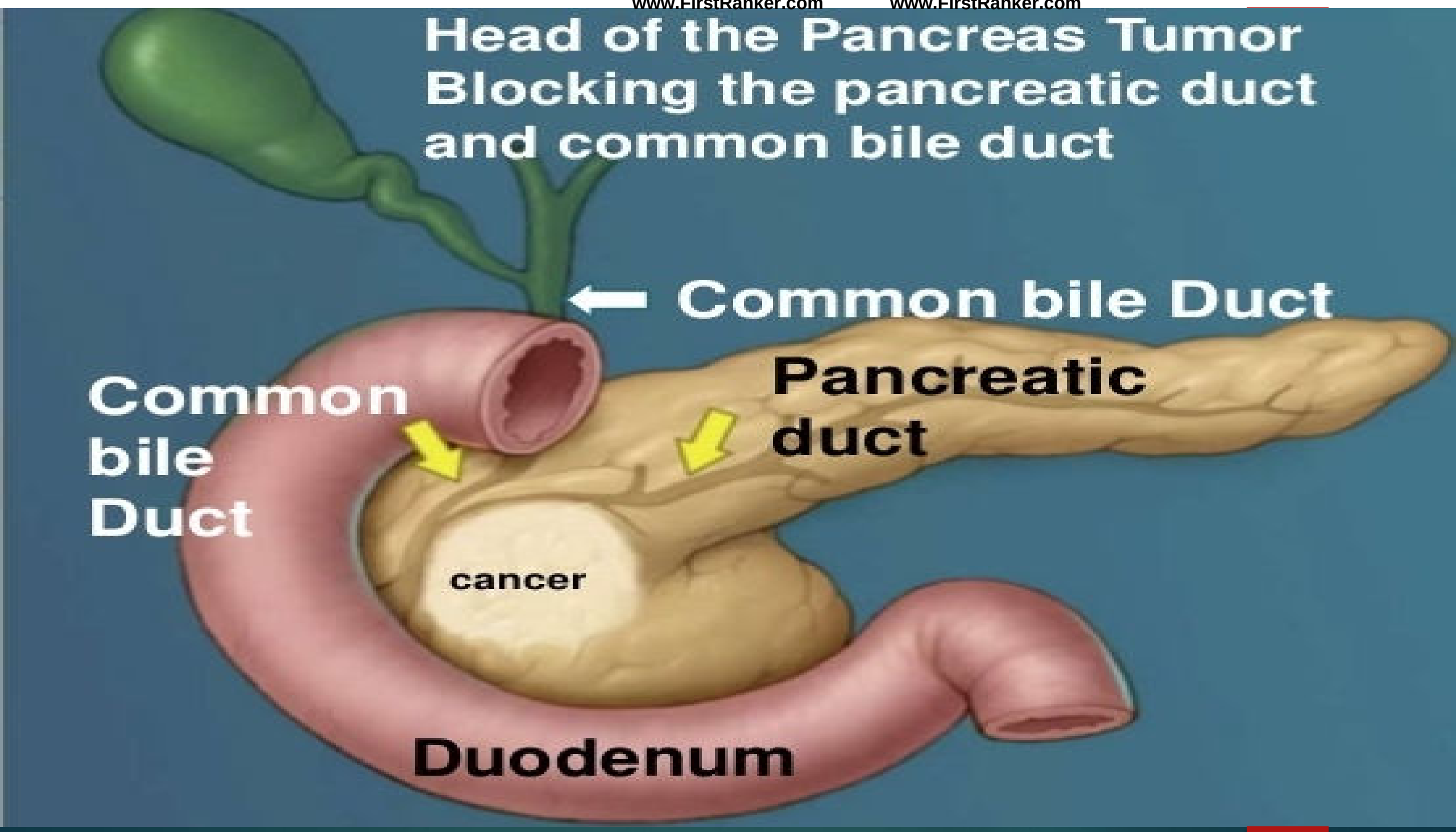
- Usually to **perihepatic nodes** around the duodenum and CBD, subpyloric, celiac nodes.

- Hard dark greenish nodes are typical. Often nodal enlargement

Distant Spread:

- To Liver as multiple secondaries

- Occasionally to lungs, adrenals, brain and bone etc.



Clinical Features

Head & Periampullary : Painless progressive jaundice with palpable GB – " **Courvoisier's Law**";

Vomiting due to duodenal obstruction

Ampullary tumors mainly present with jaundice and weight loss

CA head of pancreas and neck present with weight loss and jaundice

Cystadenoadenoma present with pain and weight loss and mass.

- **Jaundice**
  - obstructive
  - progressive
  - A/w pruritis (due to deposition of bile salts in the skin which releases histamine).
  - Waxing and Waning (due to necrosis of tumor jaundice is relieved thus being intermittent).

Contd.

- **Pain** in the right hypochondrium, epigastrium
- Back pain d/t involvement reteropancreatic nerves , pancreatic duct obstruction or stasis, disruption of nerve sheath
- Diarrhoea, steatorrhea, alcoholic stools, tea colored stools
- Loss of appetite and weight
- Scratch marks on back

Contd.

- Silvery stools
- Loss of appetite and weight
- Scratch marks on back
- Left supraclavicular lymph node.

- Migratory Superficial thrombophlebitis- Trousseau's sign is due to release of platelet aggregating factors from tumor or its necrotic material.

Contd.

- Ascitis
- Secondaries in reterovesical pouch (blummer shelf)
- Hydrohepatosis
- Splenic vein thrombosis with splenomegaly

- **INVESTIGATIONS**

- Liver function tests: Serum bilirubin, direct component (conjugated) is increased. Serum albumin is decreased

- Prothrombin time is increased

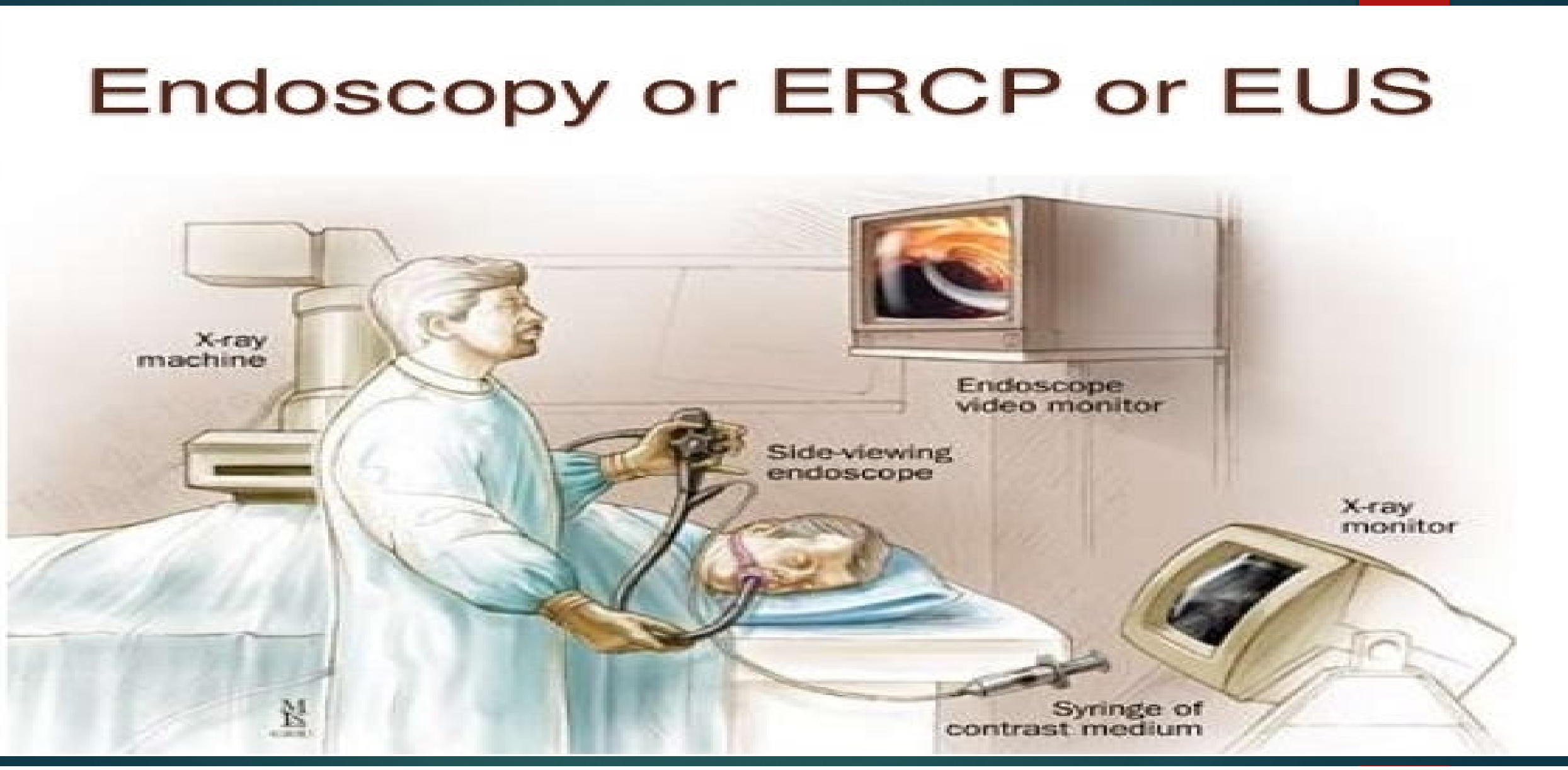
- Ultrasound Abdomen– findings

Contd.

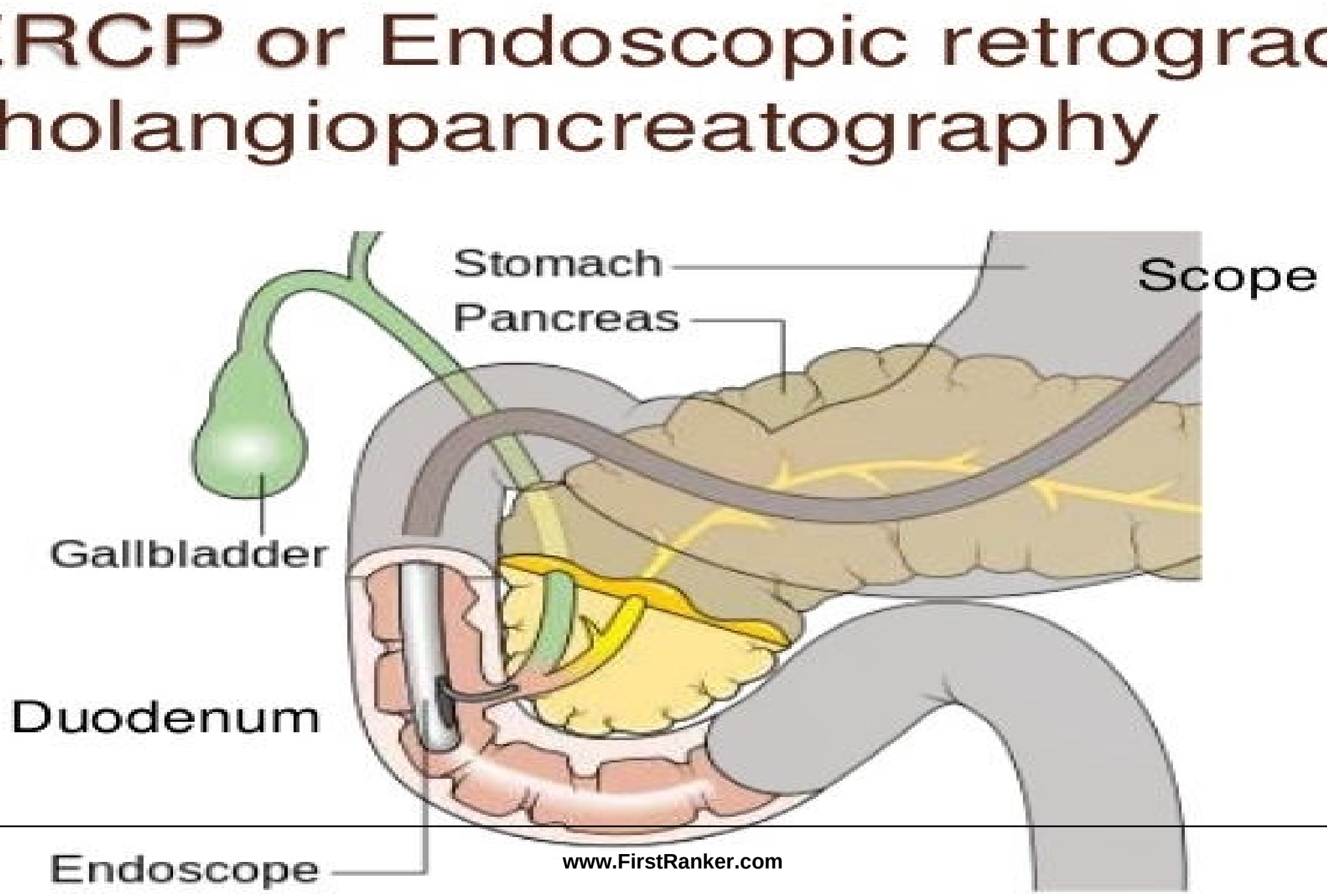
- Barium meal shows widened duodenal "C" loop – pad sign reverse 3 sign is seen in carcinoma – periampullary region

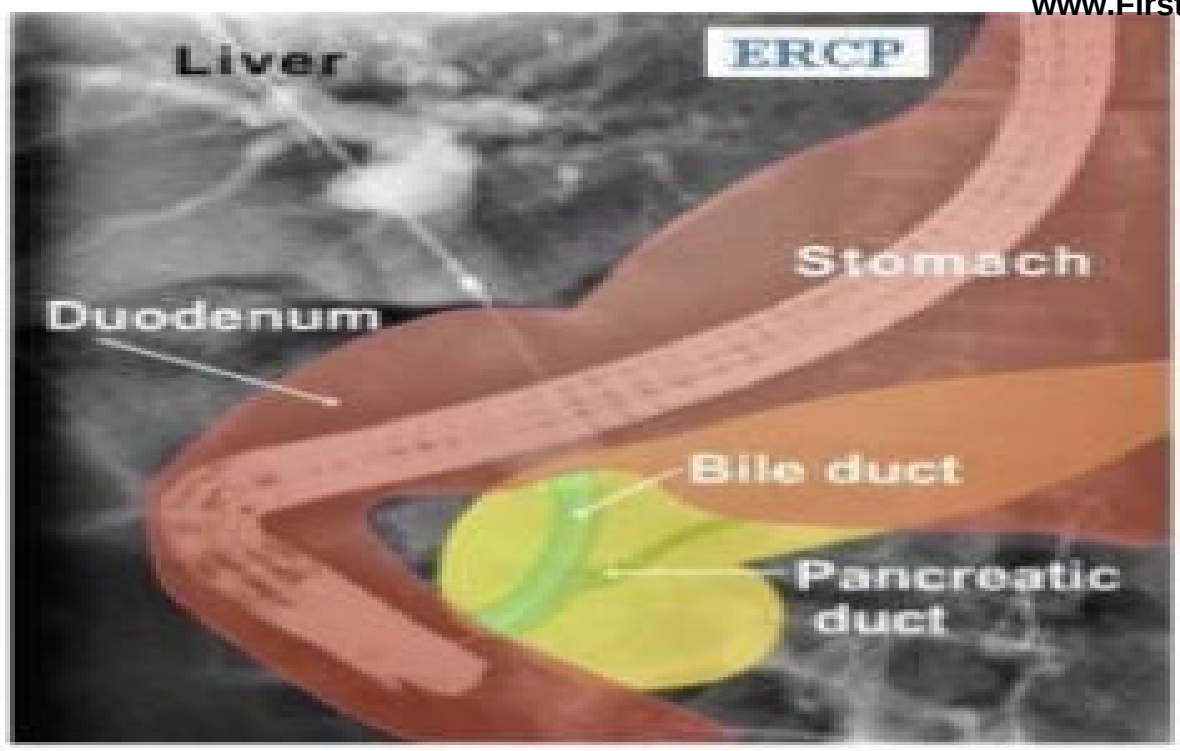
- Spiral CT Scan – shows portal vein infilteration, reteroperitoneal L.N and tumor size

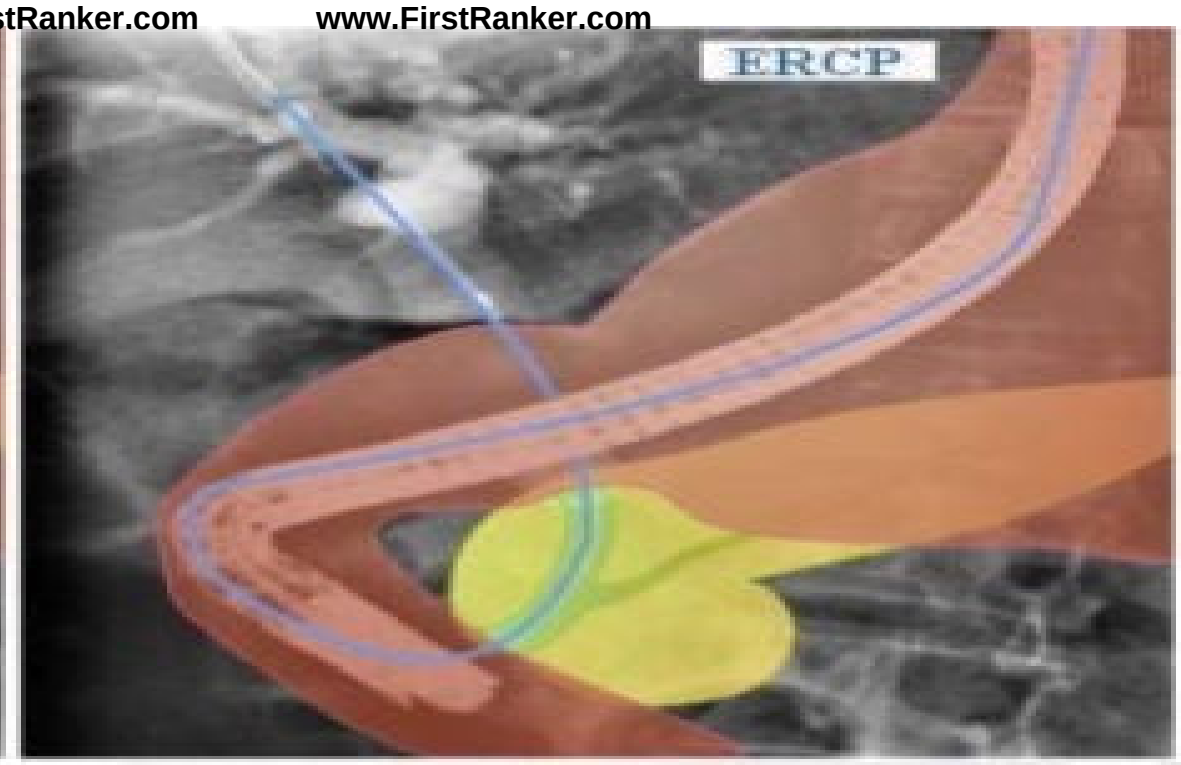
ERCP



ERCP or Endoscopic retrograde cholangiopancreatography

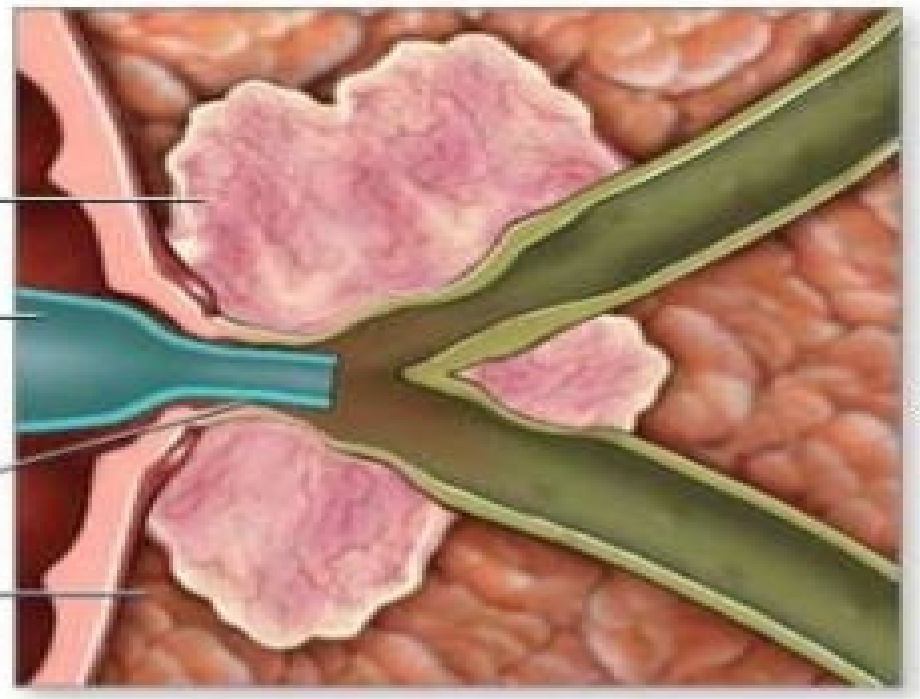


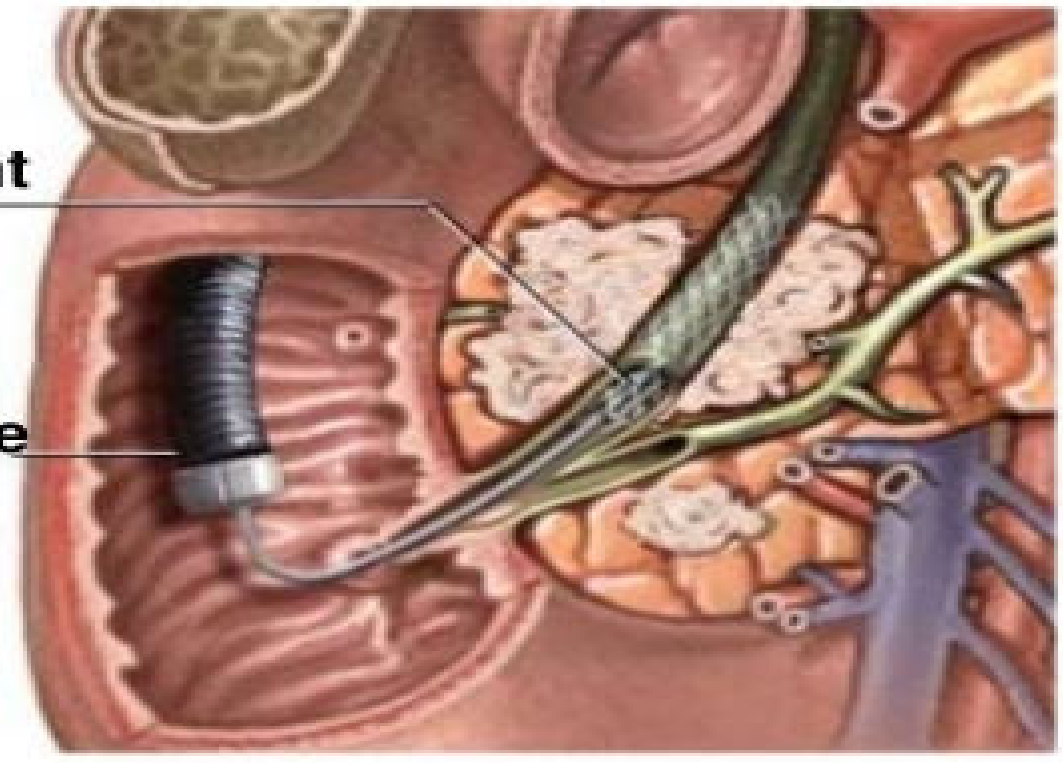




ERCP
Inject dye into the duct system

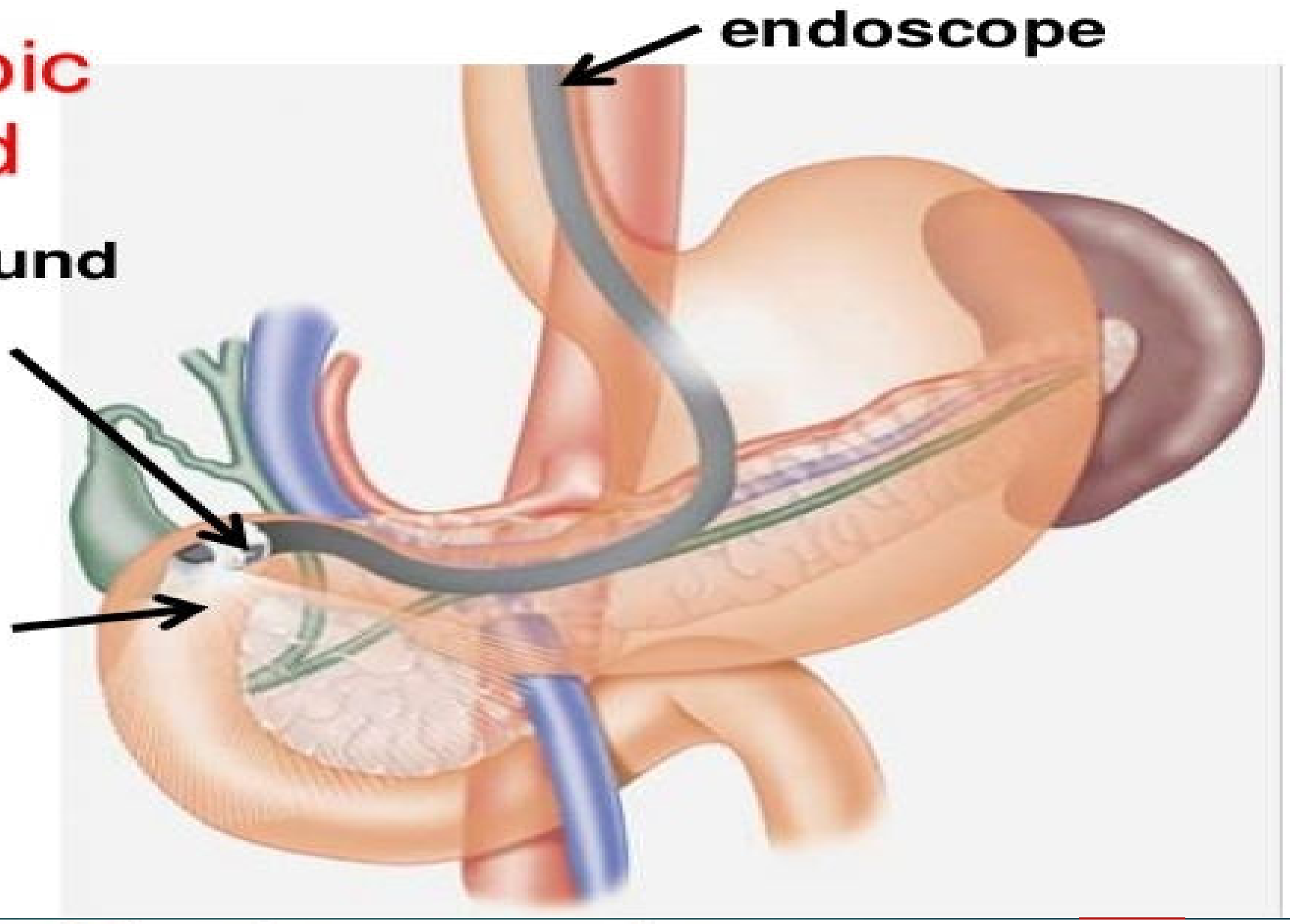
Endoscopic Placement of a Stent



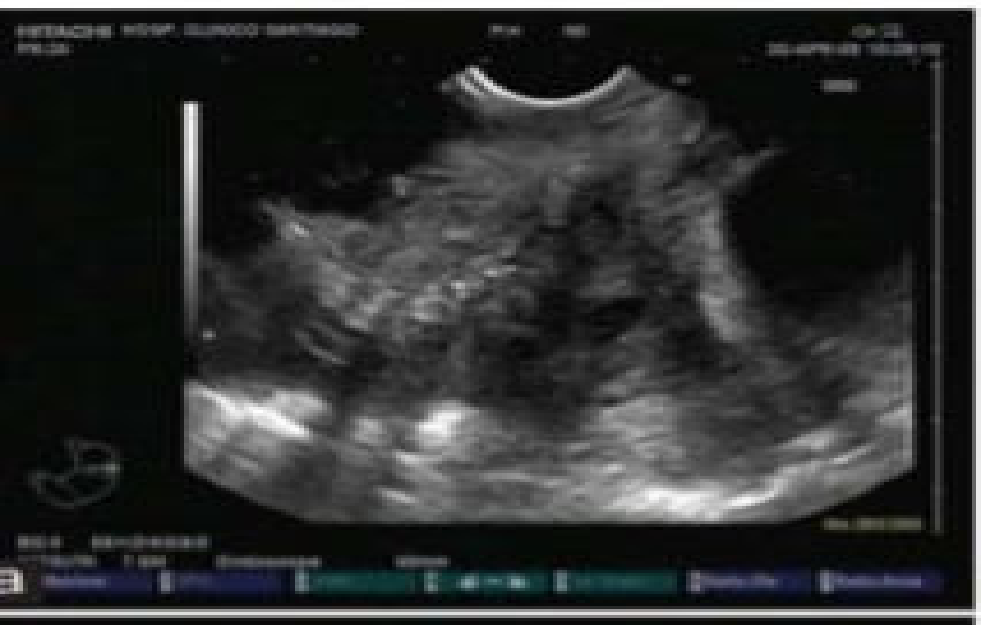


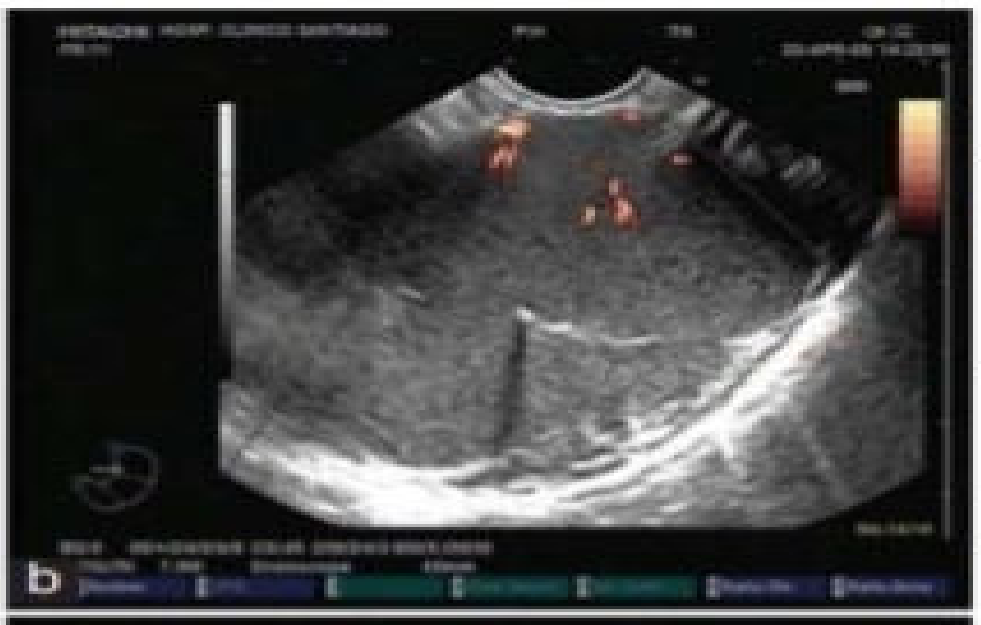
Endoscopic ultrasound technique

EUS
(Endoscopic
Ultrasound



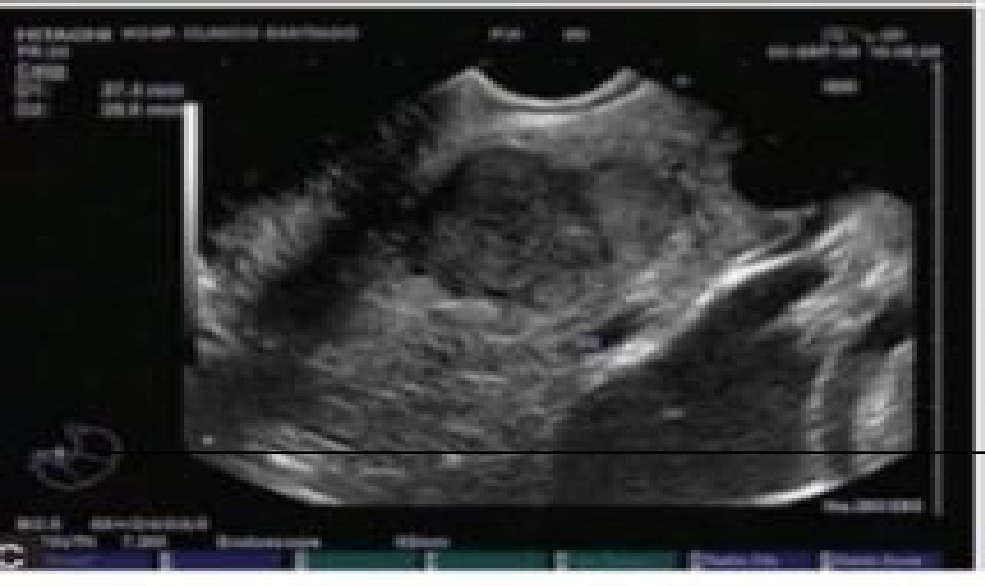
EUS or Endoscopic Ultrasound



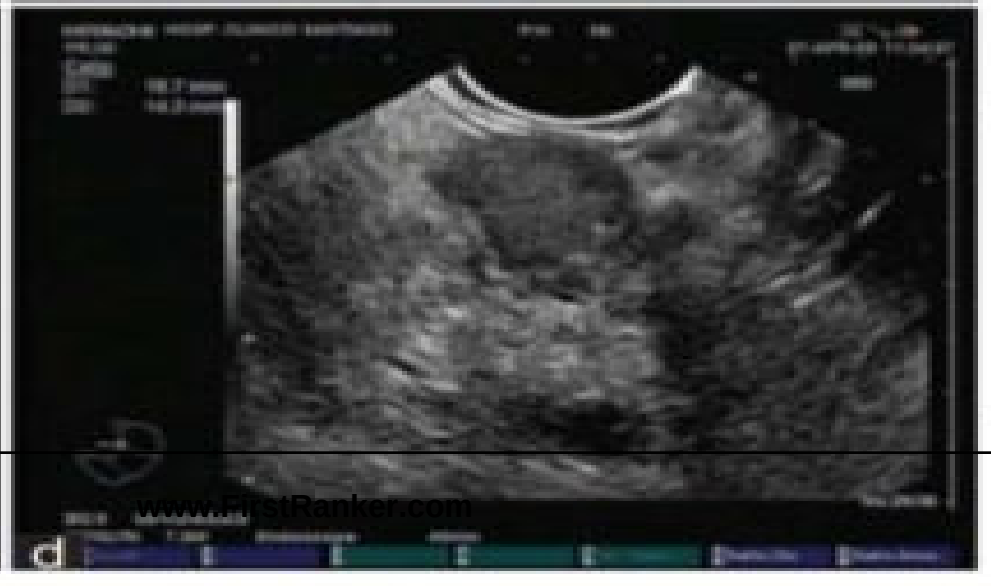


A: met to the pancreas head

B: lymphoma in tail



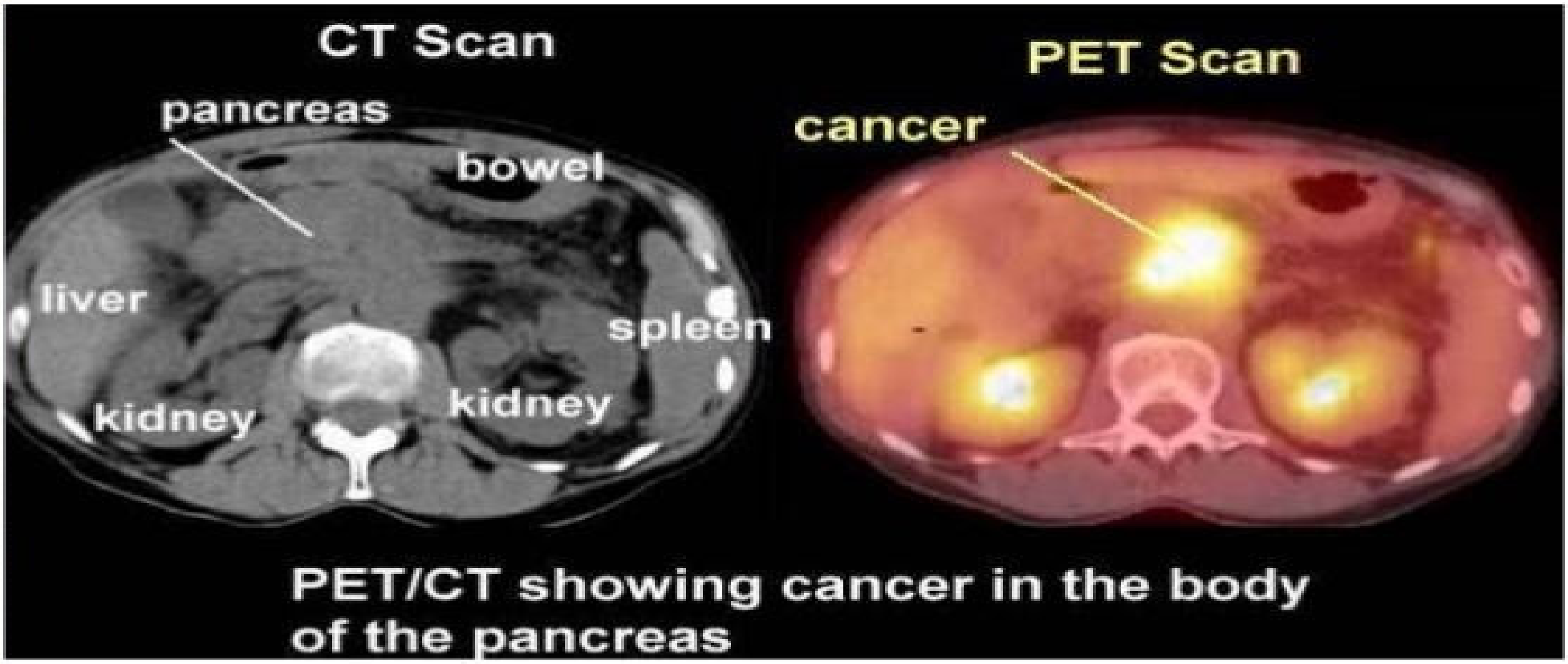
C: endocrine tumor in isthmus



D: insulinoma in body

From Endoscopic Ultrasound 2014:3

CT or PET Scan



Contd.

- MRCP
- CA19-9 : - more than 37 units/ml
- Endosonography
- Gastroduodenosocopy
- Urine test

Contd.

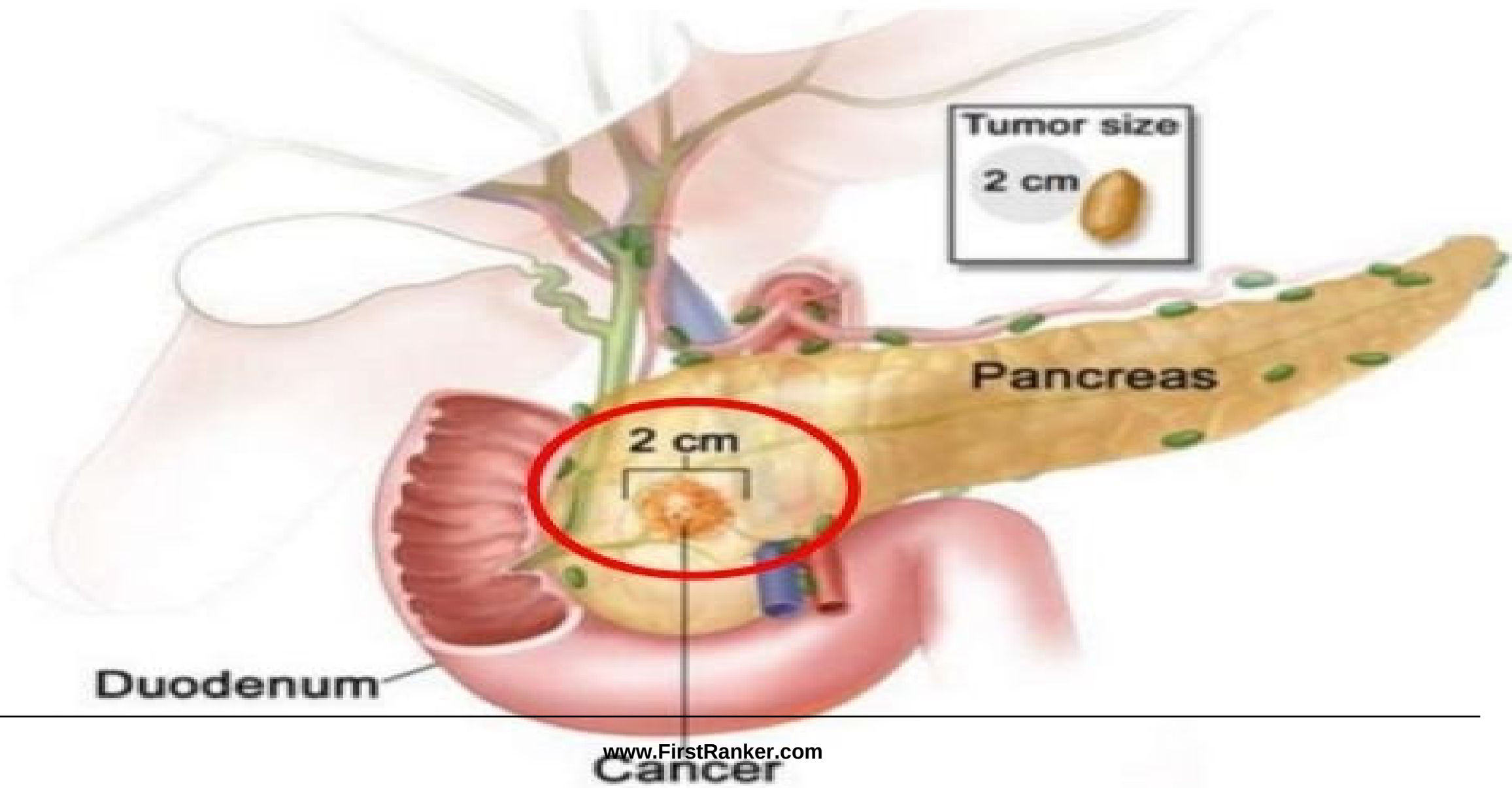
- Trucut biopsy is not advised
- Diagnostic laparoscopy
- CT angiogram
- PTC – if ERCP fails if lesion is proximal

Staging

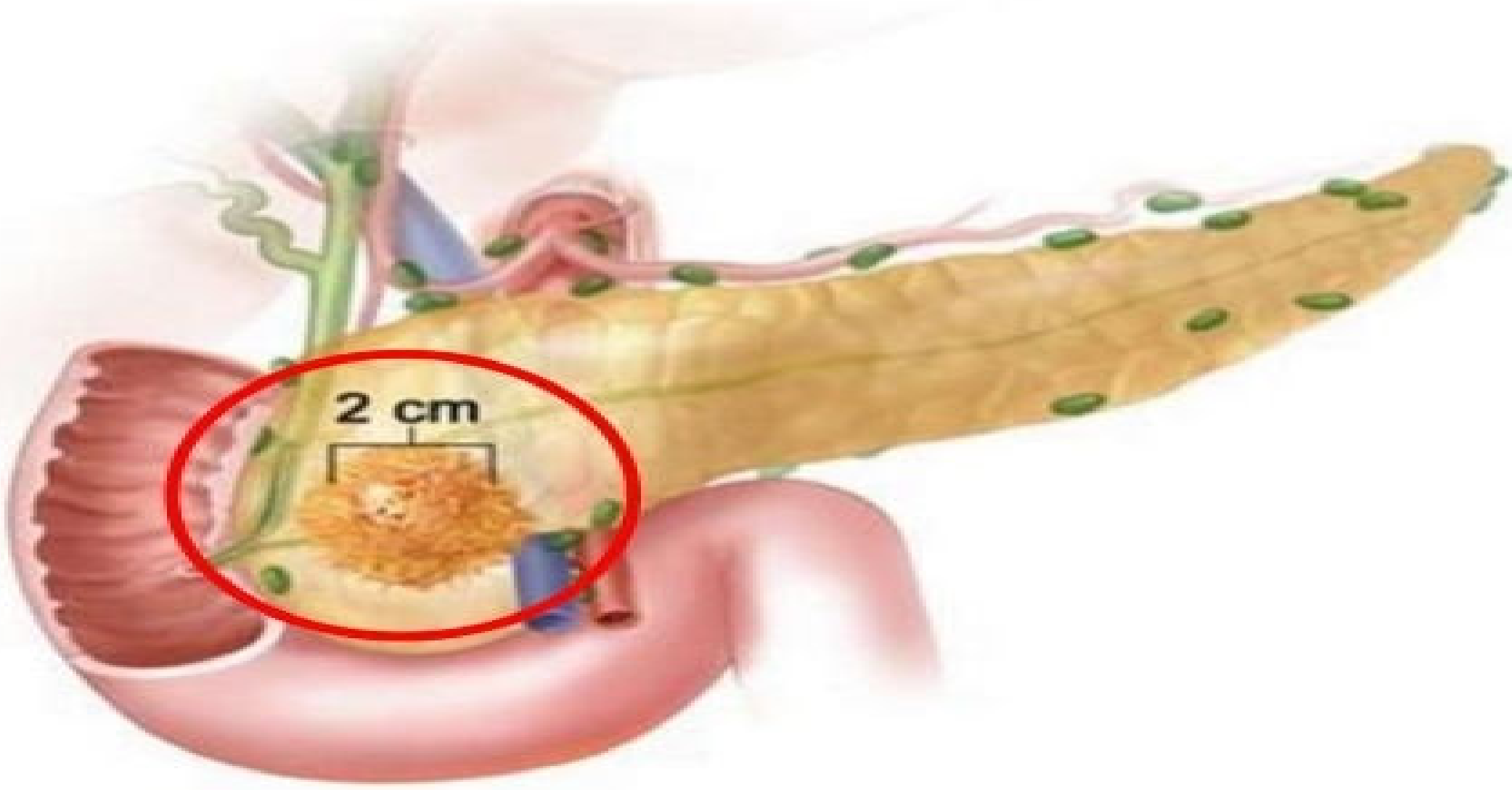
T – Tumor	N – Nodal status	M - Metastasis
Tx- Primary cannot be assesed	Nx- - Regional node cannot be assesed	Mx- Cannot be assesed
T0- No evidence of tumor	N1- No nodal spread	M0- No distant spread
Tis-carcinoma in situ	N2- Nodal spread present	M1- Distant metastasis present
T1- limited to pancreas <2 cms		
T2-limited to pancreas >2 cms		
T3- extension to duodenum or bile duct		
T4- Extension to portal vein,SMV,Stomach,spleen,colon, celiac plexus		

R0- No residual tumor found after resection
R1- Microscopic residual after resection
R2- Macroscopic residual after resection

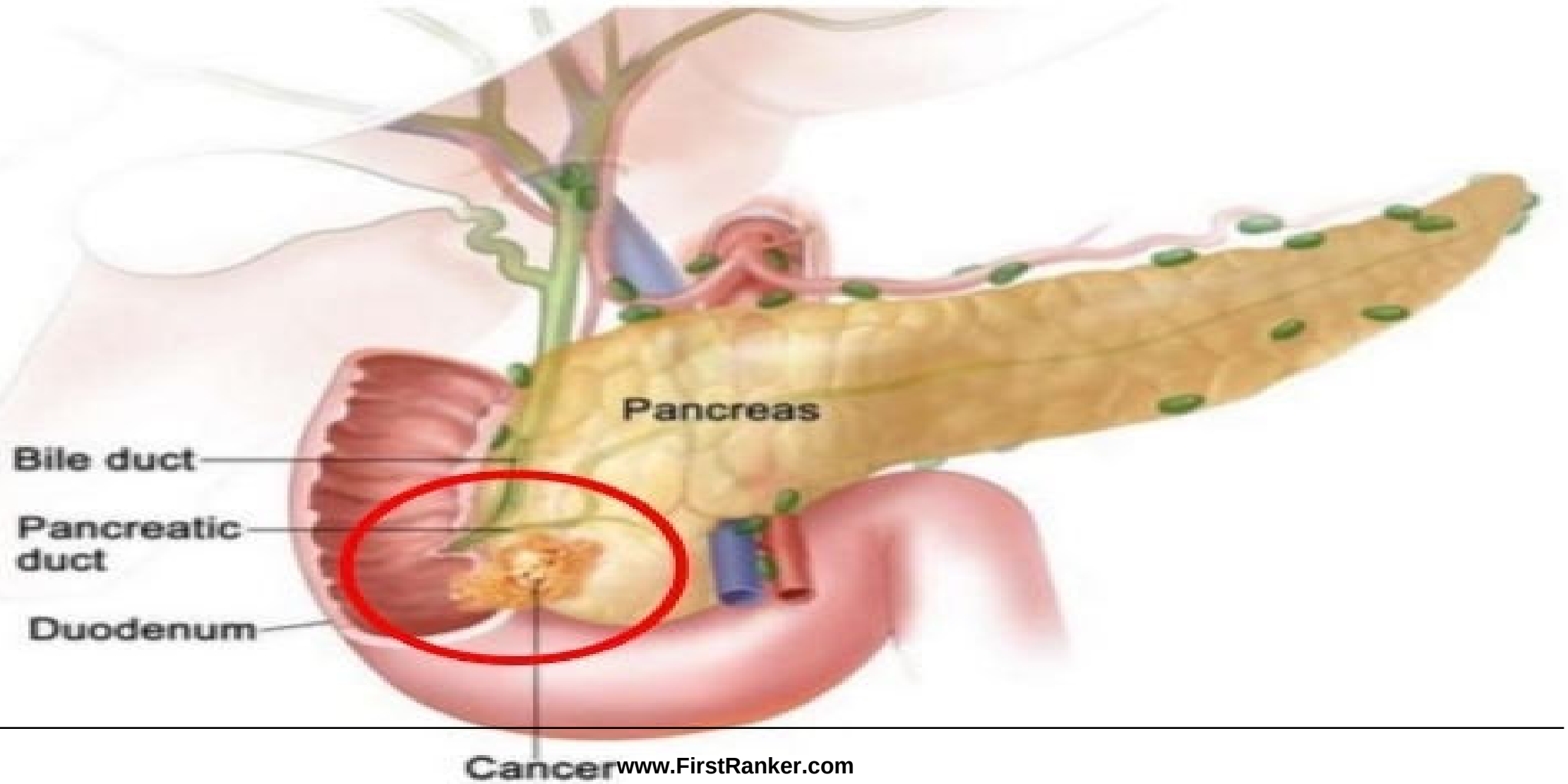
Stage IA (T1aN0M0)



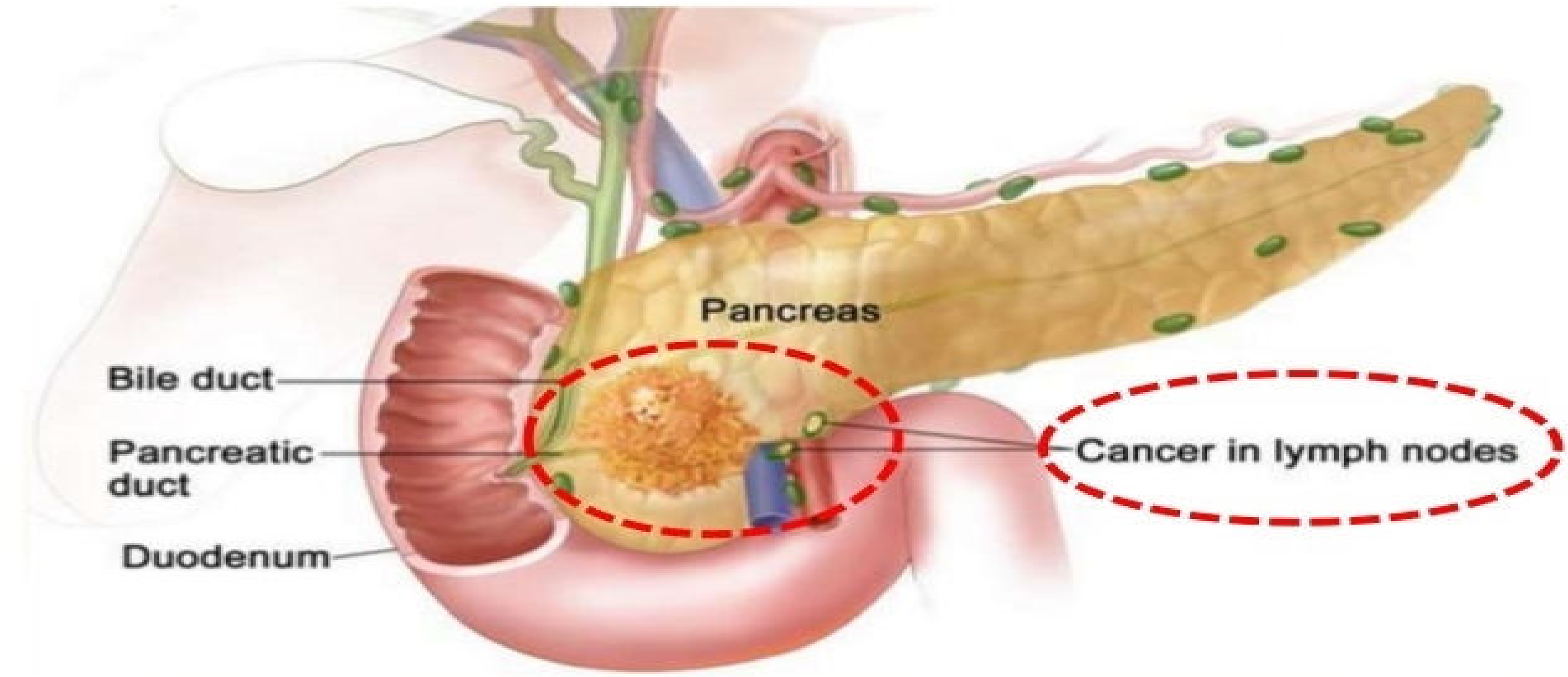
Stage IB (T2N0M0) over 2cm, limited to pancreas



Stage IIA (T3N0) beyond the pancreas

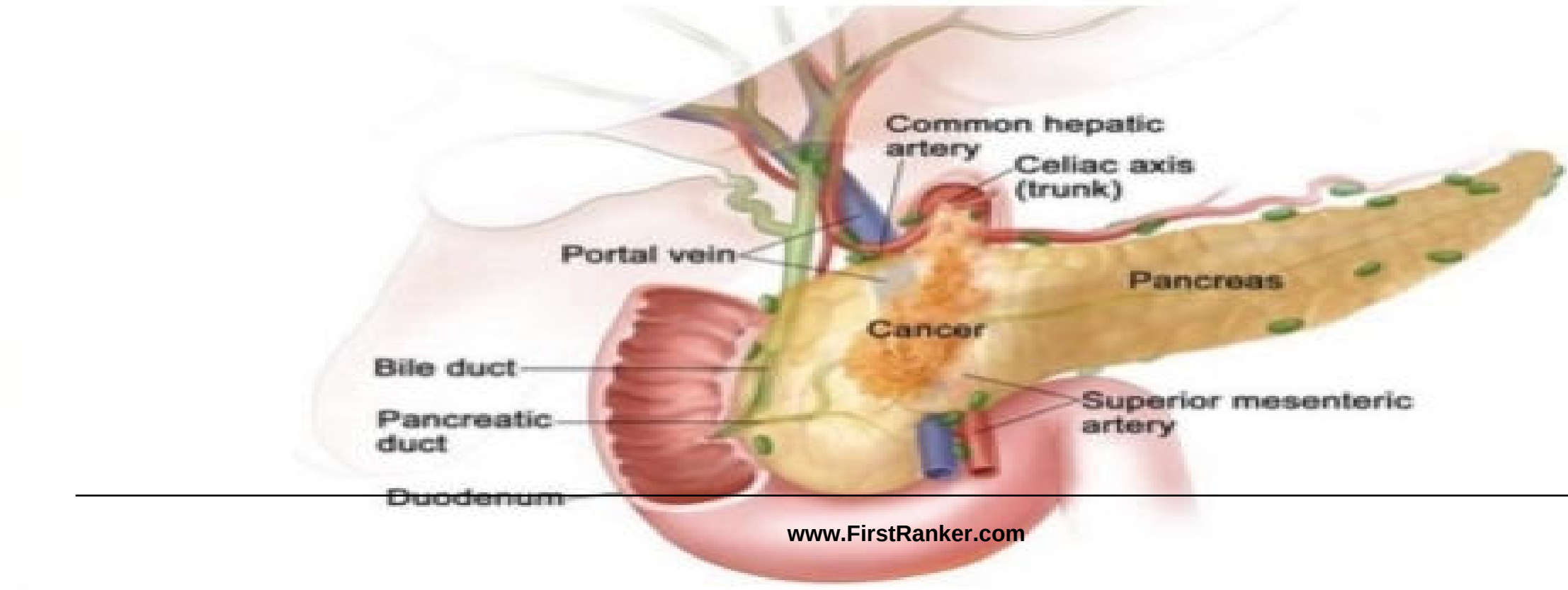


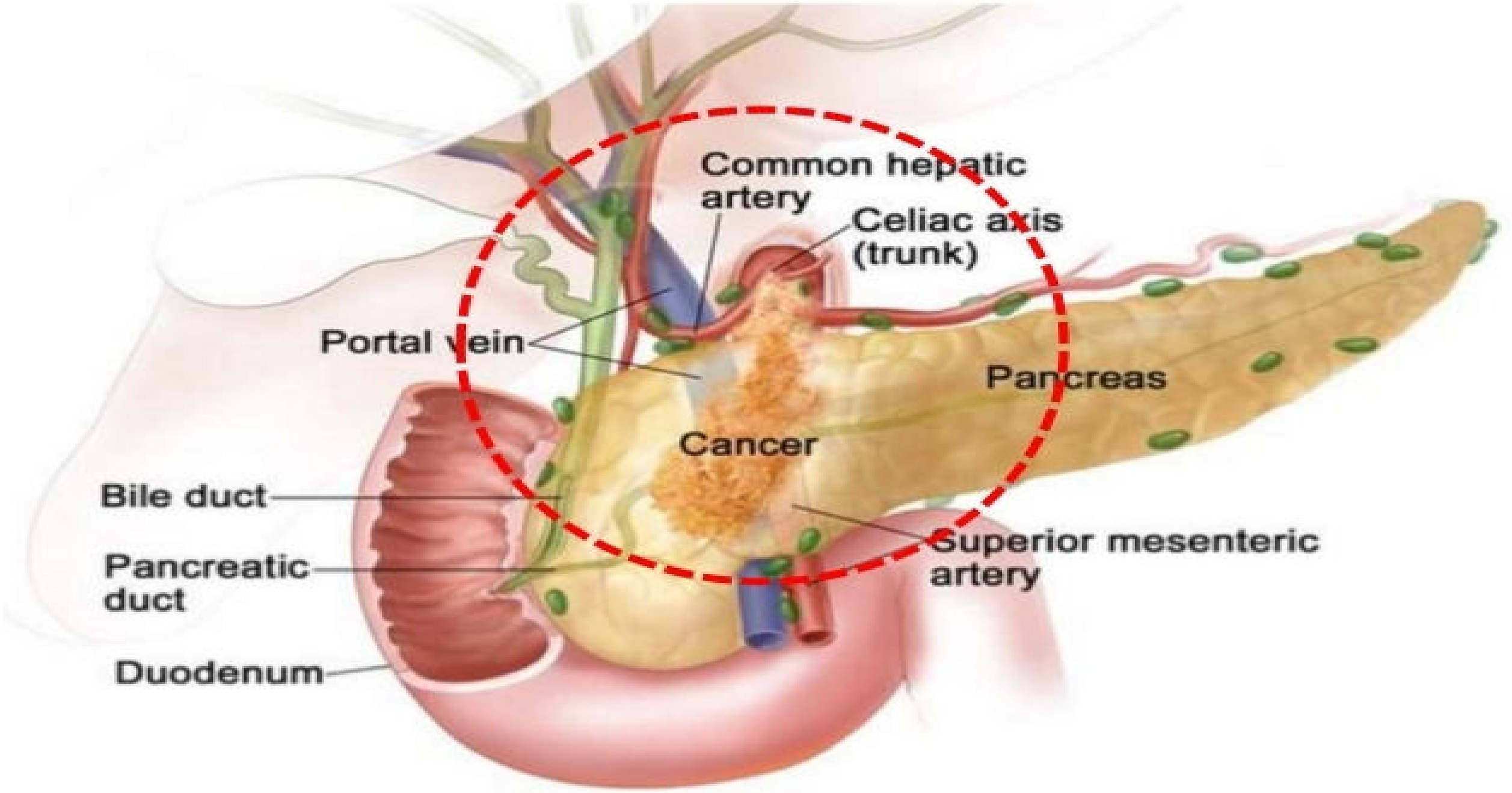
Stage IIB (T1-3N1M0)



Stage III (T4) Unresectable

Cancer has spread to the major blood vessels near the pancreas. These include the superior mesenteric artery, celiac axis, common hepatic artery, and portal vein.





S. no.	Differences between features of carcinoma head of pancreas & periampullary carcinoma of pancreas		
		Carcinoma of head of pancreas	Periampullary carcinoma
1	Pain and weight loss	Early features	late features
2	Jaundice	Persistent and progressive	Waxing and waning
3	Occult blood in stool	Absent	Present stools are silvery
4	Endoscopic examination	Growth not visible	Growth visible
5	Prognosis	Not good	Good

Pre- operative preparation

- Adequate hydration
- Glycogen reserve in liver will be inadequate so preop glucose in given orally or intravenously
- Pts are prone to hepatorenal syndrome so. Mannitol needs to be started before surgery
- Inj. Vit. K to given to optimize PT-INR.
- ERCP stenting- maybe done in severe obstructive jaundice

Contd.

- Antibiotics
- TPN can be given pre and post operatively
- Improve pulmonary function
- Respiratory physiotherapy

Treatment

- Only 10 – 15 % pancreatic carcinoma are operable.
- 40 -50% are locally advanced
- 40-50% will have distant spread

Criteria for resection

- Tumour size less than 3 cm
- Periampullary tumors
- Growth not adherent to portal system

- In operable cases

Whipple operation

Areas removed :-

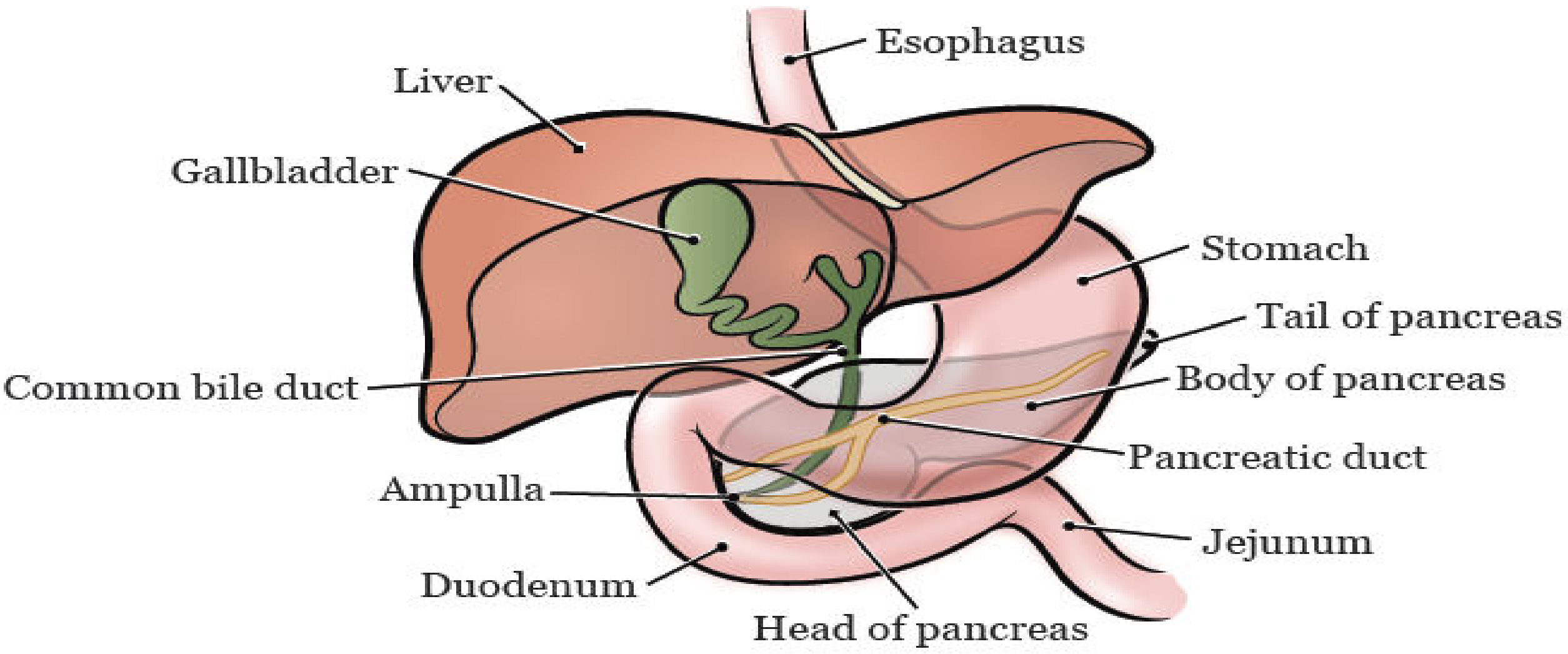
- Head and neck of pancreas
- C loop of duodenum

Contd.

- 40% of distal stomach
- 10 cm proximal jejunum
- Lower end of bile duct
- Gall bladder
- Peripancreatic, pericholedochal, paraduodenal, perihepatic nodes

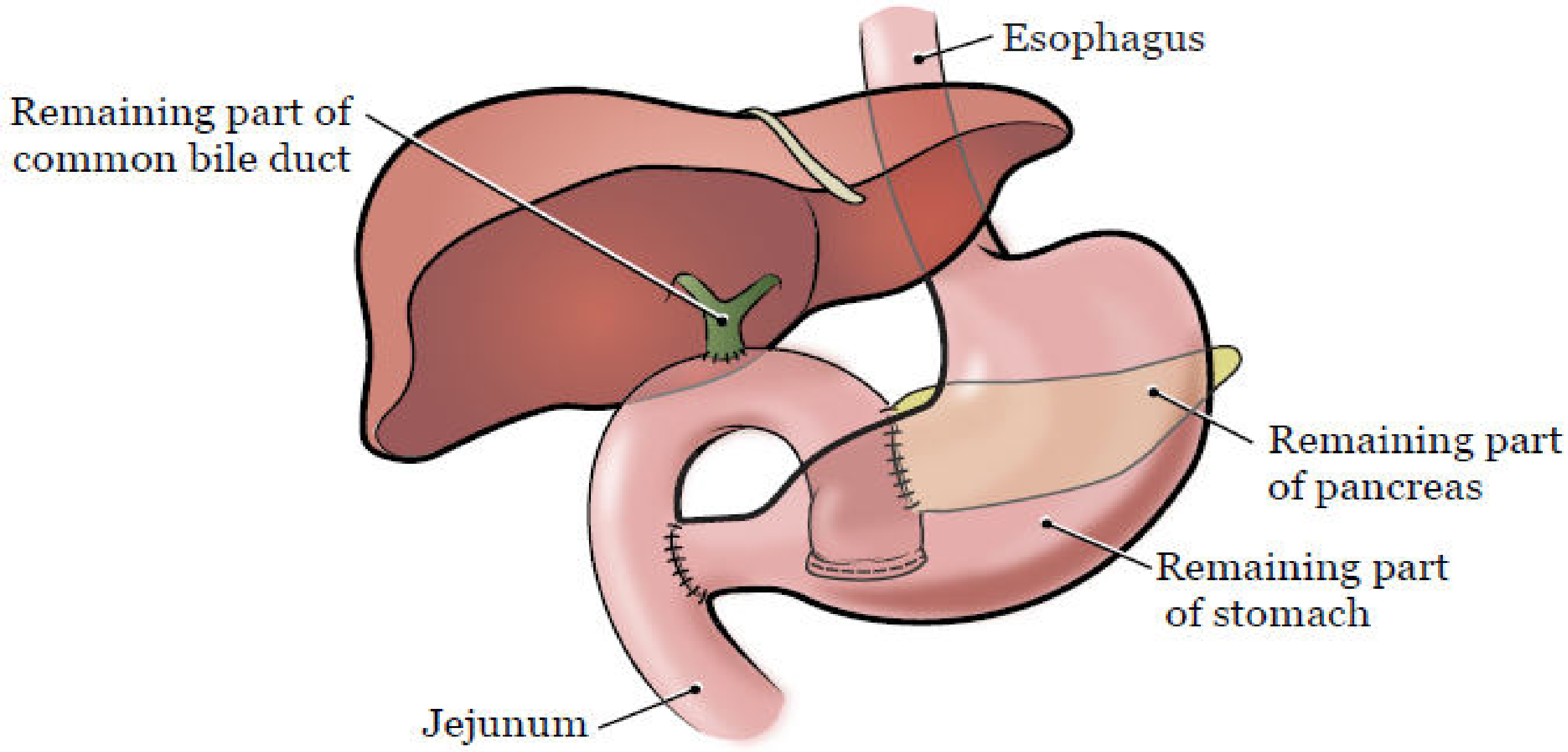
Anastomoses done :-

- Choledochojejunostomy
- Pancreaticojejunostomy
- Gastrojejunostomy
- jejunostomy



Normal Anatomy

Resected specimen



After whipple procedure

Other procedures

- **Transverso-longermire pylorus preserving pancreaticoduodenectomy**
- Duodenum is cut 2 cms distal to pylorus and then anastomoses with jejunum

- **Fortner's regional pancreatectomy (extended Whipple)**
- Whipple procedure + removal of segment of superior mesenteric vein and clearance of all regional lymph nodes and portal vein . Vascularity is maintained by vascular graft.

Contd.

- **Total pancreatectomy**

Distal pancreatectomy or central pancreatectomy or total pancreatectomy for cystadenocarcinoma depending upon extent and size of tumor

Inoperable cases

- **For palliative obstructive jaundice , duodenal obstruction and pain**
- Roux-en-Y Choldechodchojejunostomy along with gastrojejunostomy after doing cholecystectomy
- ERCP and stenting is done to drain bile
- Chemotherapy
- Steatorrhea is treated with enzymes

Adjuvant therapy

- Adjuvant chemotherapy :- using gemcitabine, 5 fluorouracil, mitomycin, vincristine, cisplatin, docetaxel oxaliplatin
- Radioactive iodine seeds I^{125}
- External Radiotherapy
- Immunotherapy

Other endocrine tumors

- **Insulinoma**

- Commonest endocrine tumor arising from β - cells of pancreas.

- c/f:- Abdominal discomfort, discomfort, trembling, sweating, hunger, diplopia, hallucinations, weight gain, neurological deficit

- **Whipple triad** :-
- Attack of hypoglycemia
- Blood sugar 45 mg% during attack
- Symptoms relived by glucose

Gastrinoma

- Arising from non beta cells (G – cells) of pancreas

- Associated with MEN syndrome

- **C/f**:- Multiple ulcer, resistant ulcer, jejunal ulcer, recurrent ulcer

- **Investigation** :- Gastrin assay , gastroscopy, Ultrasound MRI, Angiogram, Increased gastrin level

- **Treatment** :- Enucleation of tumor, distal pancreatetctomy, Pancreaticoduodenectomy, subtotal pancreatectomy, often total gastrectomy

glucaginomas

- Arising from alpha cells of pancreas
- Commonly in body and tail
- common in females

Contd.

- C/f:- necrolytic migratory erythema, Diabetes, diarrehea, stomatitis, anaemia
- Investigations:- MRI, CT scan, Angiogram, Increased serum glucagon levels
- Treatment:- distal pancreatectomy
- Occasionally whipple procedure