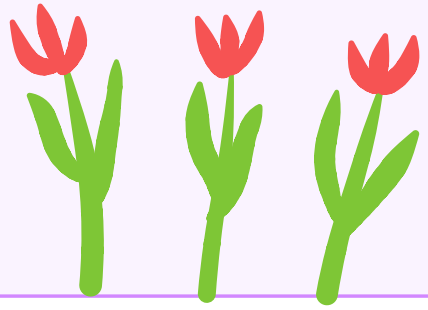
تبييض محاضرة

Pancreatic diseases

(Acute pancreatitis + pancreatic tumors)

د. محمد نوفل

Done by :



Pancreatic diseases

* Any tumor from the neck toward the spleen is treated by distal pancreatectomy sometimes with spleenectomy. (without reanastomsis)

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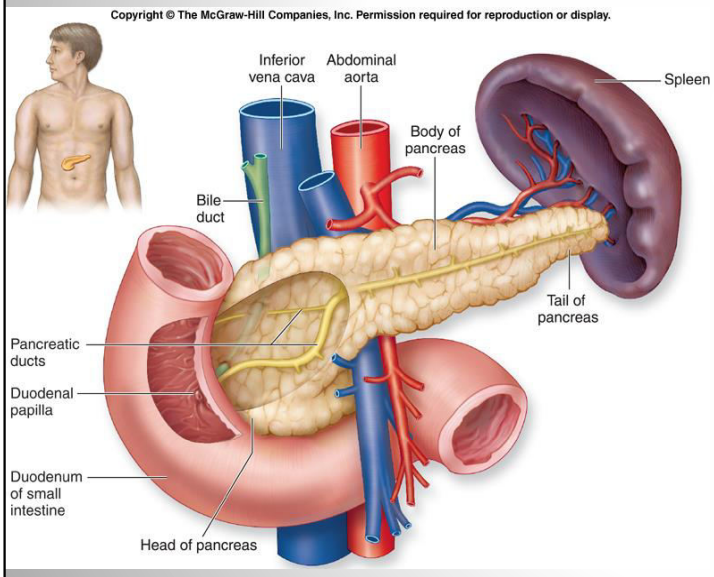
*If the tumor is in the head, the head is resected and adjacent duedenum is resected, Gall bladder is removed, 3 anastomosis are done between bowel, liver, stomach and pancreas.

Anatomy



Retroperitoneal Organ

Weighs 75 To 100 G

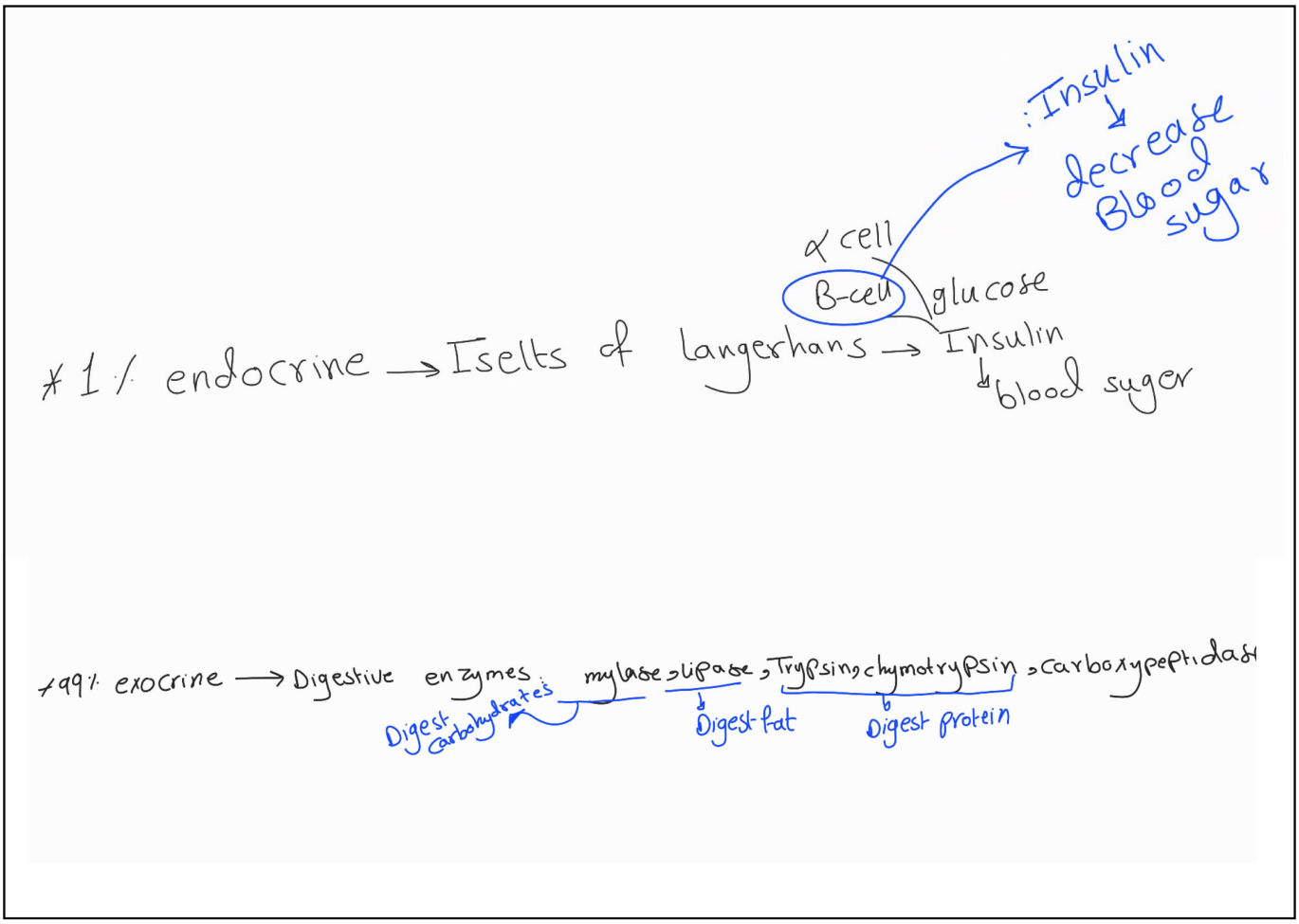
15 To 20 Cm Long

Head

Neck → Above the vessles

Body

Tail → Toward the spleen



What is Pancreatitis?

- **Inflammation or infection of the pancreas**
  - Normally digestive enzymes secreted by the pancreas are not active until they reach the SI. → small intestine
  - When the pancreas is inflamed, the enzymes damages the tissue that produce them. attack and

2 types:

How they are activated? by autoactivation

1. **Acute Pancreatitis**
2. **Chronic Pancreatitis**

Acute Pancreatitis

* Normally, pressure inside pancreatic duct is 62, inside common bile duct=17.
So, secretions of pancreas move towards the duct then into duodenum.

* In case of stones in CBD, it rises the pressure inside biliary tree more than 62, so fluid from bile move toward the pancreatic duct, which makes the media alkaline → Lead to activation of enzymes inside pancreas then enzymes damage the tissue.

⇒ Huge amount of fluid loss from third space
⇓
Dehydration
⇓
should give the patient IV. fluids.

Definition and Incidence

- Inflammatory disease with little or no fibrosis.
- Initiated by several factors:

90% of acute pancreatitis is secondary to acute cholelithiasis or ETOH abuse

- Develop additional complications

300,000 cases occur in the united states each year leading to over 3000 deaths.

choledocholithiasis ⟹ Presence of stones in CBD.

Etiology: (GET SMASHED)

G: Gallstone
E: Ethanol
T: Trauma
S: Steroid
M: Mump
A: Autoimmune
S: Scorpion bits لدغة عقرب
H: Hyperlipidemia TG>1000
E: ERCP Endoscopic retrograde cholangiopancreatography. (iatrogenic cause) → used when there is stones in CBD that arises the pressure, the procedure is done through ampulla of vater to remove stones
D: Drugs (Tetracyclin, steroid, estrogen)

Clinical Presentation

- **Abdominal pain**
  - Epigastric
  - Radiates to the back
  - Worse in supine position → (when become in contact with the peritoneum).
- **Nausea and vomiting**
- **Garding**
- **Tachycardia, Tachypnea, Hypotension, Hyperthermia** ⇒ Due to dehydration
- **Elevated Hematocrit & Pre renal azotemia**
- **Cullen's sign**
- **Grey Turner's sign**

} caused by retroperitoneal bleeding

↑ blood urin nitrogen

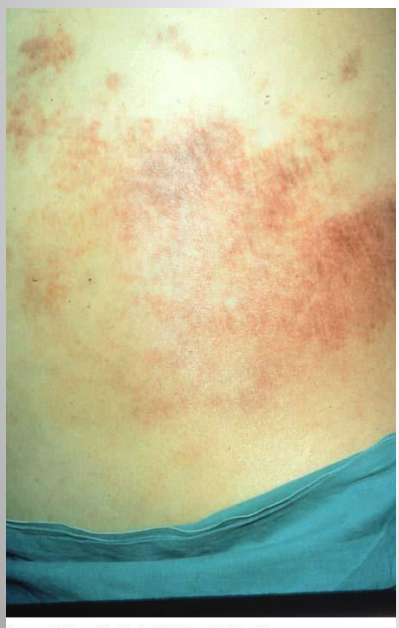
*Give the patient IV. fluid until they reach the normal urin output.

*Pain relif with leaning forward

*Death may occure due to severe dehydration.

*It is called Fox's sign
*It is found in the inguinal region.

Grey Turner sign



Source: Lichtman MA, Shafer MS, Felgar RE, Wang N:
Lichtman's Atlas of Hematology: http://www.accessmedicine.com
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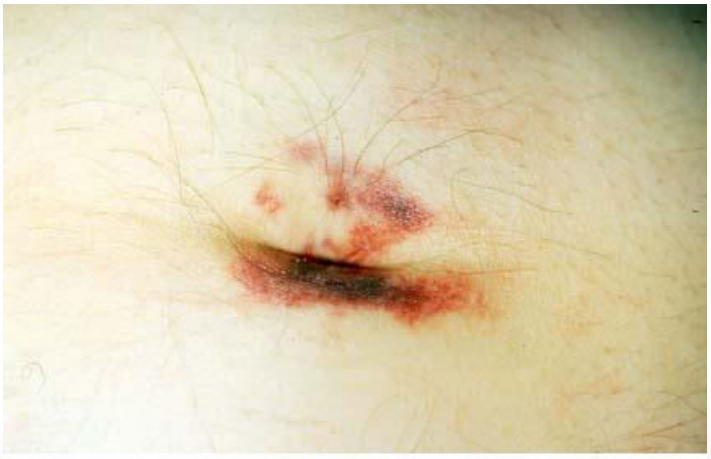
Cullen's sign



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Diagnosis: Biochemical

- **serum amylase**
  - Nonspecific
  - Returns to normal in 3-5 days
  - Normal amylase does not exclude pancreatitis
  - Level of elevation does not predict disease severity
- **Urinary amylase**
- **P-amylase**
- **Serum Lipase** : specific

amylase and lipase will increase 3 times

ما الهم تأثير على ال severity

- **CBC**
  - Increased Hb
  - Thrombocytosis
  - Leukocytosis
- **Liver Function Test**
  - Serum Bilirubin elevated
  - Alkaline Phosphatase elevated
  - Aspartate Aminotransferase elevated

Assessment of Severity

- **Criteria**
- 1.ranson
- 2.APACHE-2
- **Biochemical Markers**
- **Computed Tomography Scan**

Ranson Criteria

Criteria for acute gallstone pancreatitis

- **Admission**
  - Age > 55
  - WBC > 16
  - Glucose > 200
  - LDH > 350
  - AST > 250
- **During first 48 hours**
  - Hematocrit drop > 10
  - Pao2 less than 60mm Hg
  - Serum calcium < 8
  - Base deficit > 4
  - Increase in BUN > 5
  - Fluid sequestration > 6l

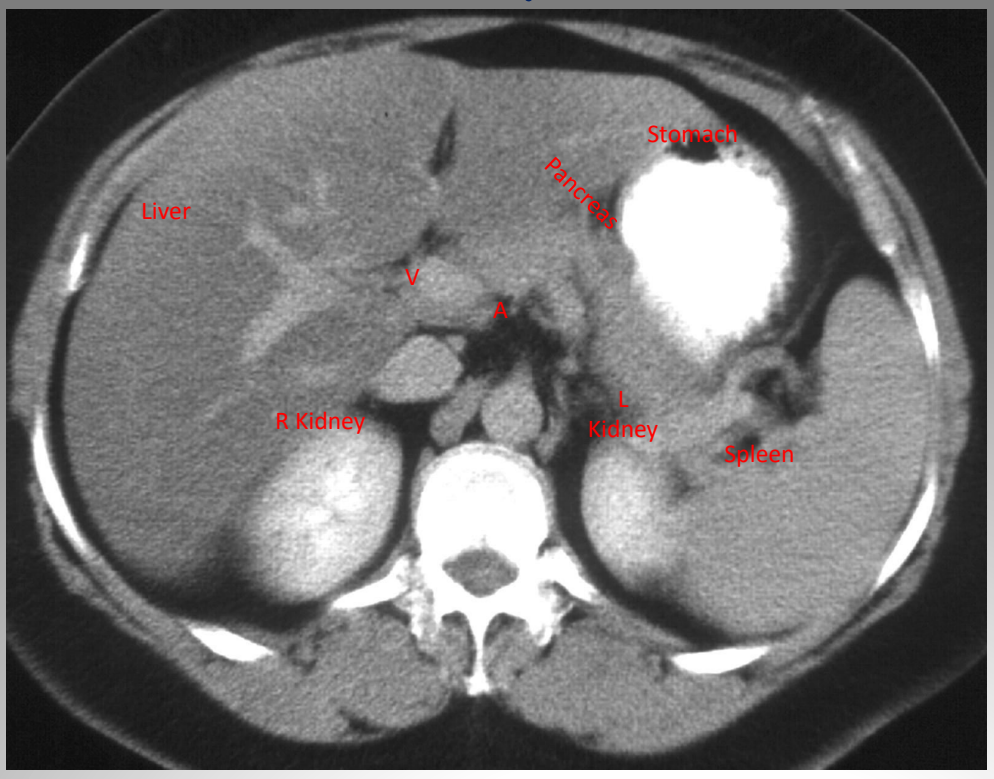
1-2 → floor

>3 → ICU

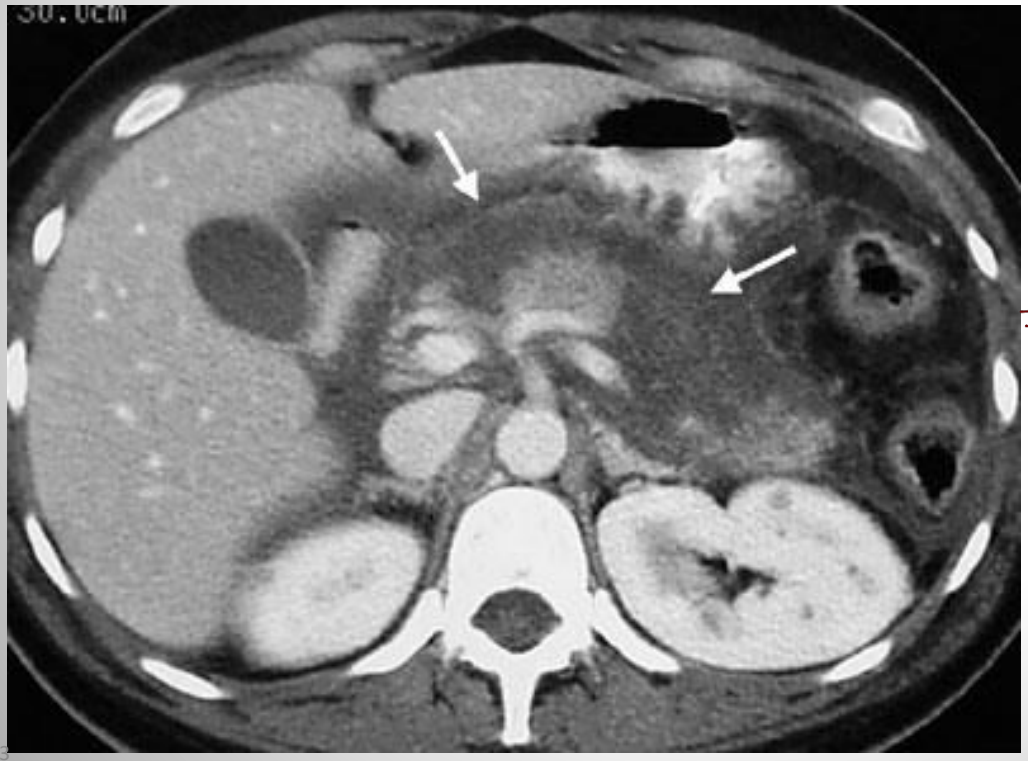
موجودان 5 → Mortality >90 %

On admission (Remember LEGAL)	48 hours after admission (ABCD)
Leucocytes: Above 16000/uL	Arterial PO_2 : Less than 60mmHg
Enzyme AST : Above 250 IU/L	Blood urea nitrogen(BUN): Above 5 mg/dL
Blood glucose :Above 200mg/dL	Base deficit : Above 4 Eq/L
Age : Above 55 years	Serum Calcium :Less than 8mg/L
LDH enzyme: Above 350 IU/L	HematoCrit decrease : more than 10%
	Fluid sequestration more than 6L

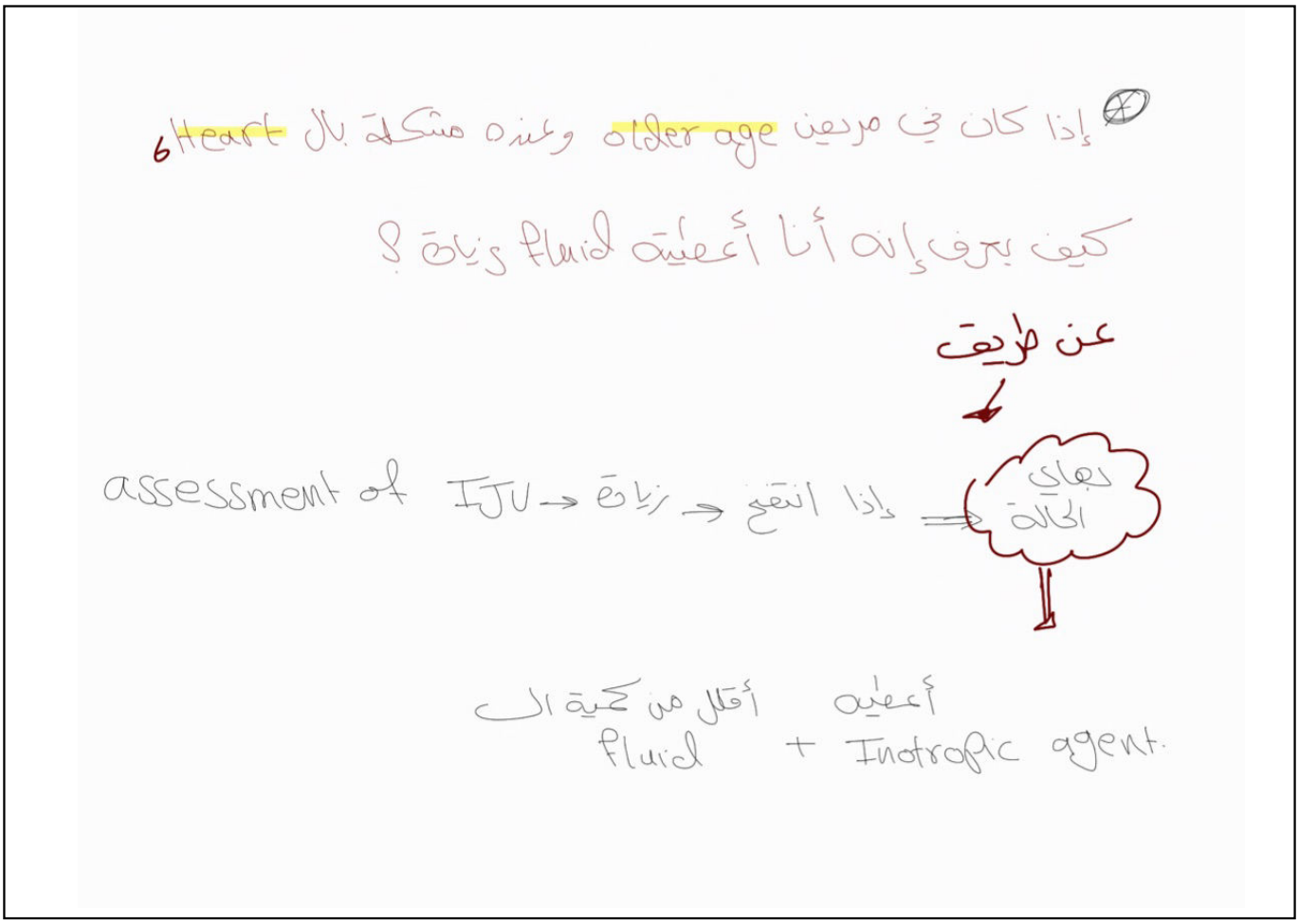
CT scans of normal kidneys and pancreas



Pancreatic Necrosis



Arrow:
dirty fat plane ?
Indicate inflammation of pancreas.



Treatmaent of Mild Pancreatitis

1. Pancreatic rest
2. Supportive care
   - fluid resuscitation – watch BP and urine output
   - Pain Control
   - NG tubes and H_2 blockers or PPIs are usually not helpful
3. Refeeding (usually 3 to 7 days) If:
   - Bowel Sounds Present
   - Patient Is Hungry
   - Nearly Pain-free (Off IV Narcotics)
   - Amylase & Lipase Not Very Useful

Isotonic fluid (RL, NS)

when you give fluids, urine output reach normal → خلص مابعطي

use NG (Nasogastric) tube in case of ilus.

Treatment of Severe Pancreatitis

- Pancreatic Rest & Supportive Care
  - Fluid Resuscitation – may require 5-10 liters/day
  - Careful Pulmonary & Renal Monitoring → ICU
  - Maintain Hematocrit Of 26-30%
  - Pain Control – PCA pump → patient controlled Analagesia
  - Correct Electrolyte Derangements (K^+, Ca^{++}, Mg^{++})
- Contrasted CT scan at 48-72 hours
- Prophylactic antibiotics if present → Increase of abcess? necrosis
- Nutritional support
  - May be NPO for weeks → nothing by mouth
  - TPN → Total Parenteral nutrition.

ZR

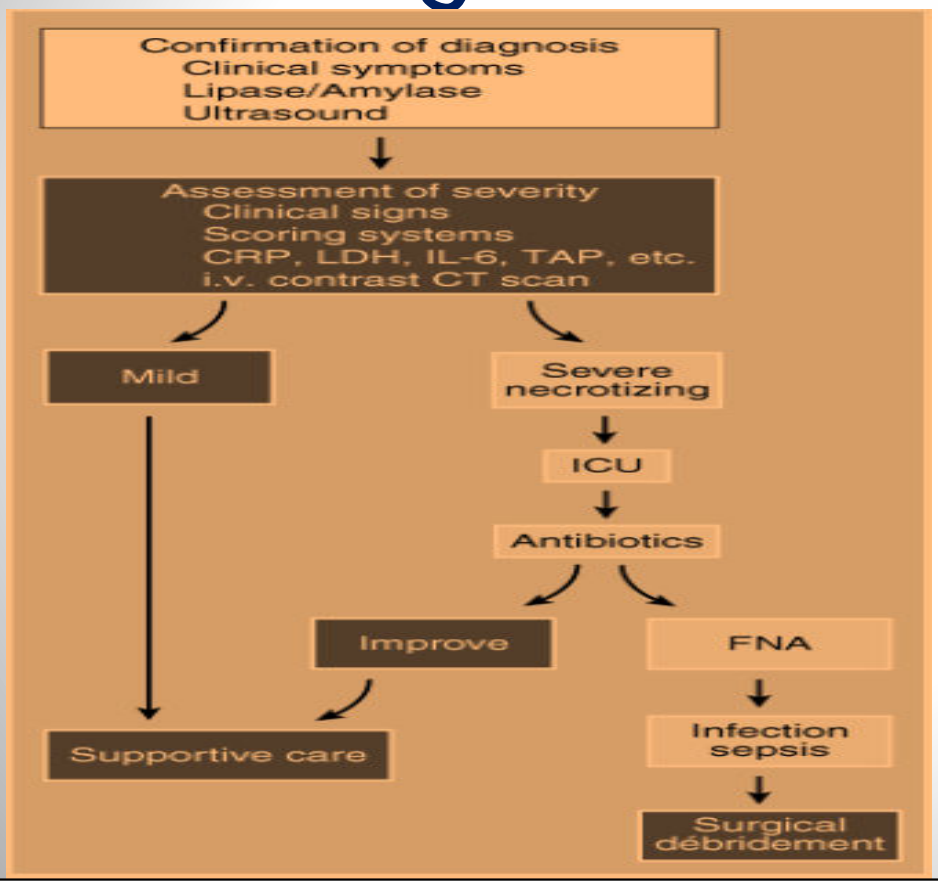
Complications

- **Local**
  - Phlegmon, Abscess, Pseudocyst, Ascites → Pancreatic enzymes surrounded by fibrosis. → Encapsulated collection of Pancreatic fluid
  - Involvement of adjacent organs, with hemorrhage, thrombosis, bowel infarction, obstructive jaundice, fistula formation, or mechanical obstruction
- **Systemic**
  - A. Pulmonary: pleural effusions, atelectasis, hypoxemia, ARDS.
  - B. Cardiovascular: myocardial depression, hemorrhage, hypovolemia.
  - C.Metabolic:Hypocalcemia,hyperglycemia,Hyperlipidemia,coagulopathy
  - D. GI Hemorrhage
  - E. Renal
  - F. Hematologic
  - G. CNS
  - H. Fat necrosis

* what is the waiting period before a pseudocyst should drained?

It takes 6 weeks for pseudocyst walls to "mature" or become firm enough to hold sutures, and most will resolve during this period if they are going to.

Management



Chronic Pancreatitis

↳ Loss of endocrine and exocrine tissue

Definition and Prevalence

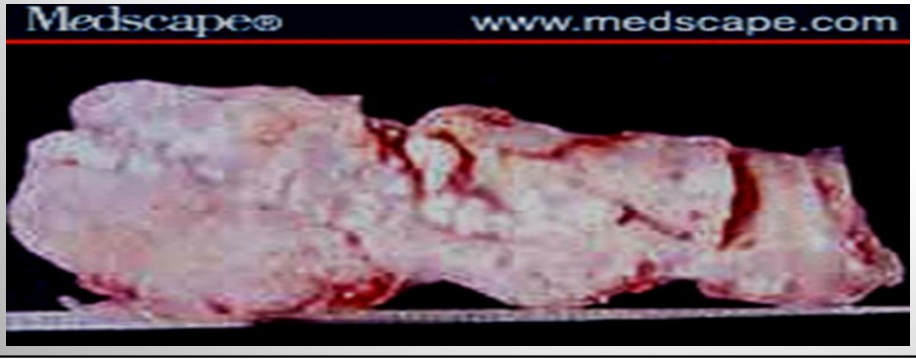
- **Defined as chronic inflammatory condition that causes irreversible damage to pancreatic structure and function.**
- **Incurable**
- **5 To 27 Persons Per 100,000**

① May be recurrent acute pancreatitis.

② More lymphocytes

③ significant calcification

④ Beaded duct



Etiology

- **Alcohol, 70%**
- **Idiopathic (including tropical), 20%**
- **Other, 10%**
  - Hereditary
  - Hyperparathyroidism
  - Hypertriglyceridemia
  - Autoimmune pancreatitis
  - Obstruction
  - Trauma
  - Pancreas divisum

(*)

Pancreas has endocrine and exocrine parts

for the patient:
- to be having malabsorbtion: should loss >85-90% of exocrine gland
- to be diabetic: should loss > 85-90 % of Langrhans

Classification:

↓

Indicate chronicity

1. calcific pancreatitis
2. obstruction pancreatitis
3. inflammatory pancreatitis
4. auto immune pancreatitis
5. asymptomic fibrosis
6. tropical pancreatitis
7. hereditary pancreatitis
8. idiopathic pancreatitis

Signs and Symptoms

- Steady And Boring Pain
- Not Colicky
- Nausea Or Vomiting
- Anorexia Is The Most Common
- Malabsorption And Weight Loss
- Diabetes

Treated by coeliac block

→ ↓ insulin

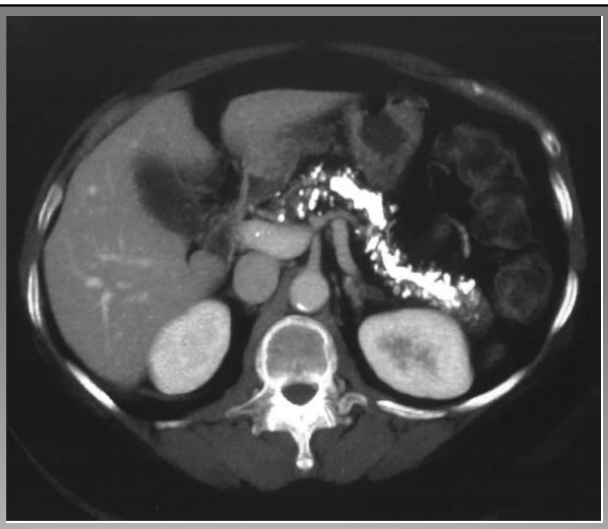
→ ↓ enzyme

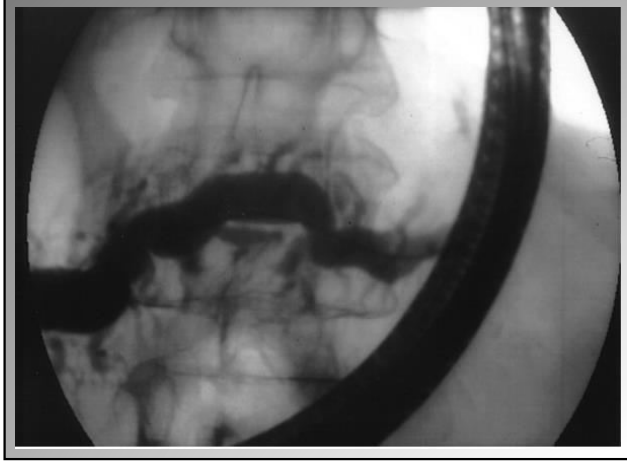
*95% endocrin loss: DM /*90% exocrine loss: Malabsorption

Laboratory Studies

Tests for Chronic Pancreatitis
I. Measurement of pancreatic products in blood
A. Enzymes
B. Pancreatic polypeptide
II. Measurement of pancreatic exocrine secretion
A. Direct measurements
1. Enzymes
2. Bicarbonate
B. Indirect measurement
1. Bentiromide test
2. Schilling test
3. Fecal fat, chymotrypsin, or elastase concentration
4. [^{14}C]-olein absorption
III. Imaging techniques
A. Plain film radiography of abdomen
B. Ultrasonography
C. Computed tomography
D. Endoscopic retrograde cholangiopancreatography
E. Magnetic resonance cholangiopancreatography
F. Endoscopic ultrasonography

Pancreatic calcifications. CT scan showing multiple, calcified, intraductal stones in a patient with hereditary chronic pancreatitis

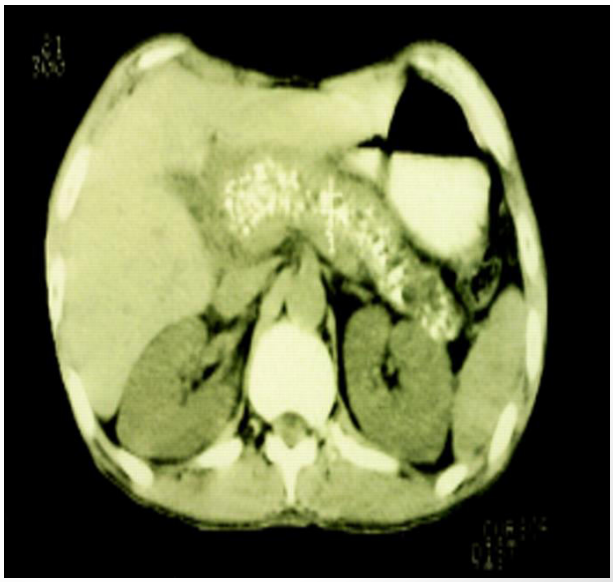




Endoscopic retrograde cholangiopancreatography in chronic pancreatitis. The pancreatic duct and its side branches are irregularly dilated

CT features

- The cardinal CT features of CP are pancreatic atrophy, calcifications, and main pancreatic duct dilation .



Treatment

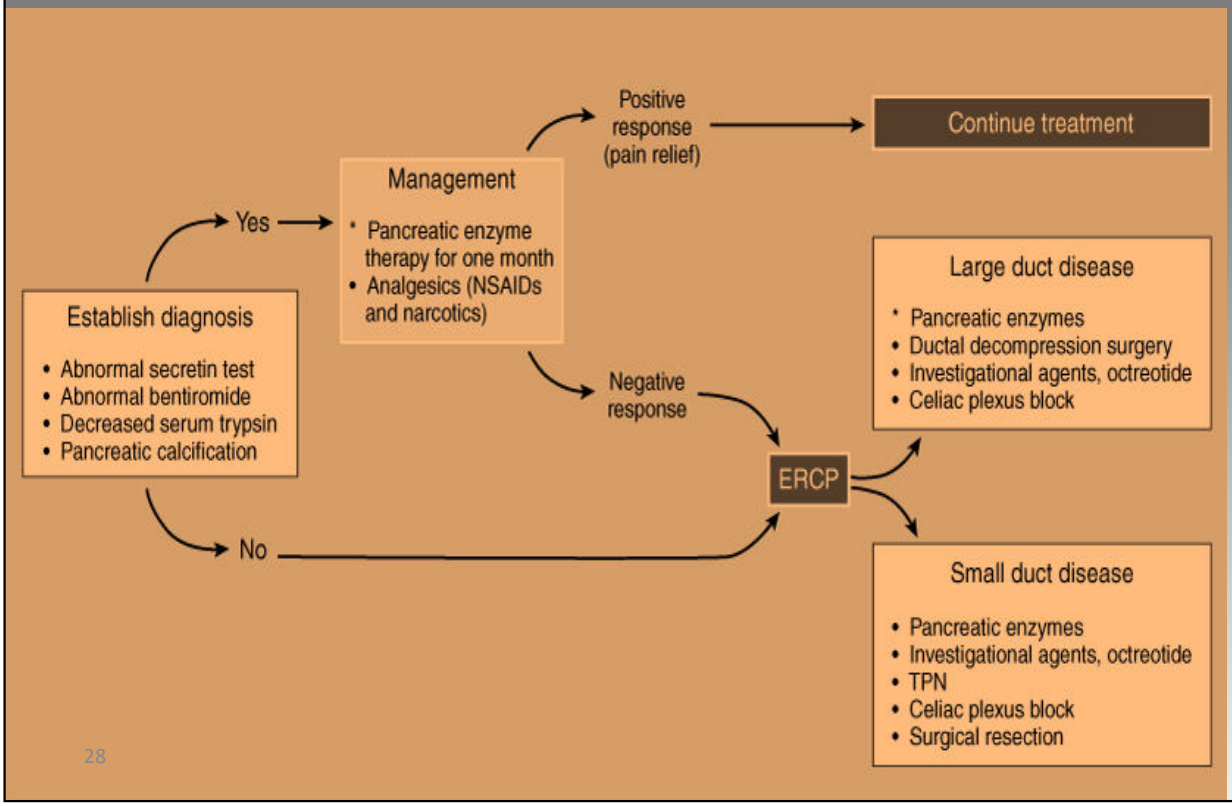
- Analgesia
- Enzyme Therapy
- Antisecretory Therapy
- Neurolytic Therapy
- Endoscopic Management
- Surgical Therapy → Make anastomosis between pancreatic duct and jejunum.

* The best management for chronic 8- - ceoliac block and correct other symptoms.

Complications

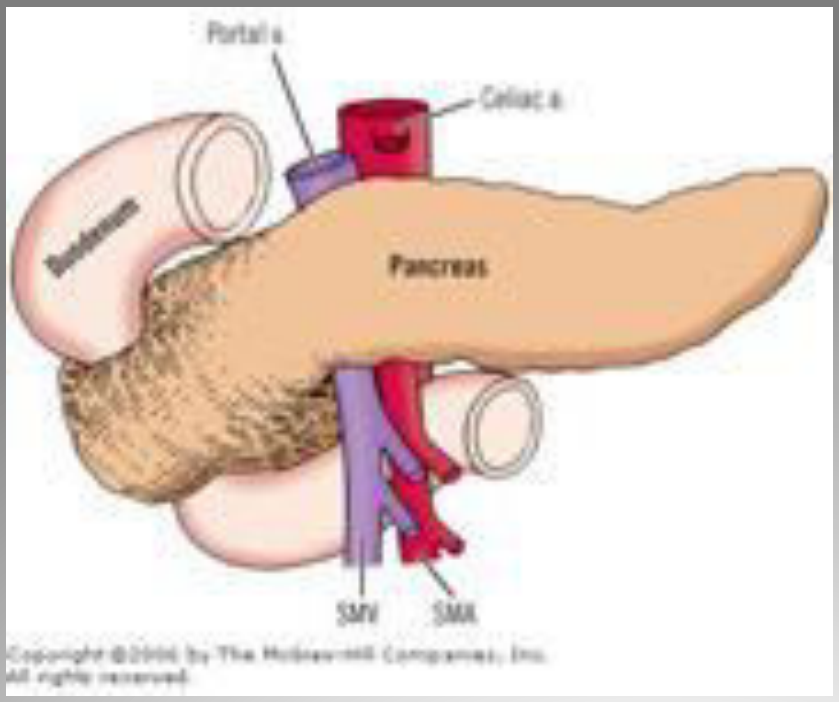
- Pseudocyst
- Pancreatic Ascites
- Pancreatic-Enteric Fistula
- Head-of-Pancreas Mass
- Splenic and Portal Vein Thrombosis

Management



Annular Pancreas

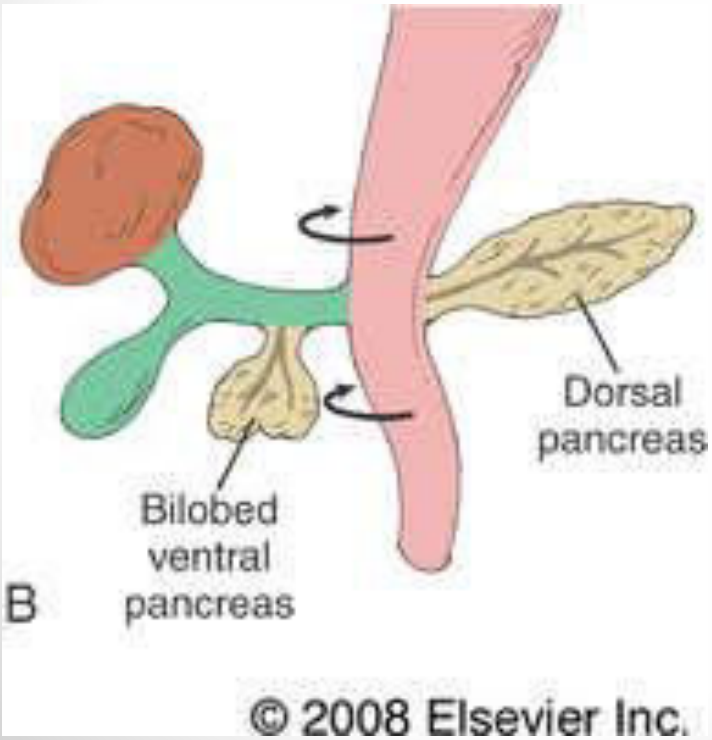
- When the **ventral pancreatic anlage fails to migrate correctly to make contact with the dorsal anlage**, the result may be **a ring of pancreatic tissue encircling the duodenum**.
- Such an annular pancreas may cause **intestinal obstruction** in the neonate or the adult.
- Symptoms of **postprandial fullness**, **epigastric pain**, **nausea**, and **vomiting** may be present for years before the diagnosis is entertained.

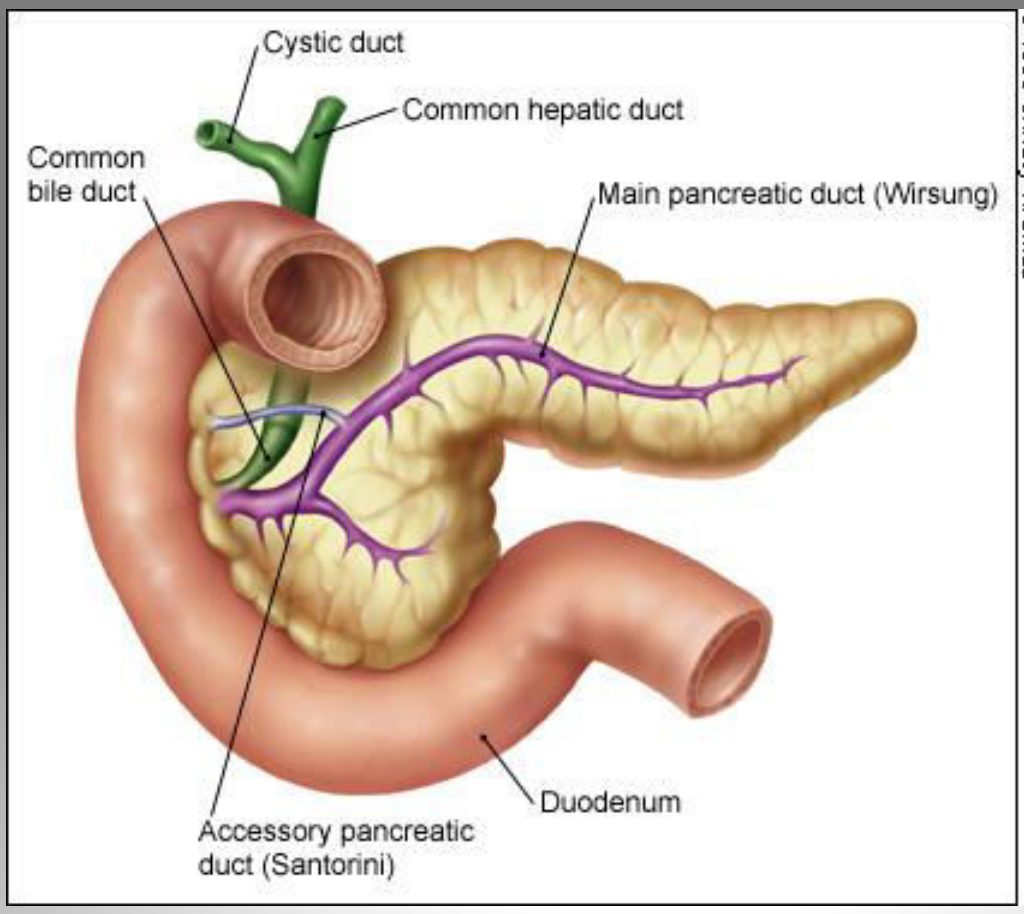


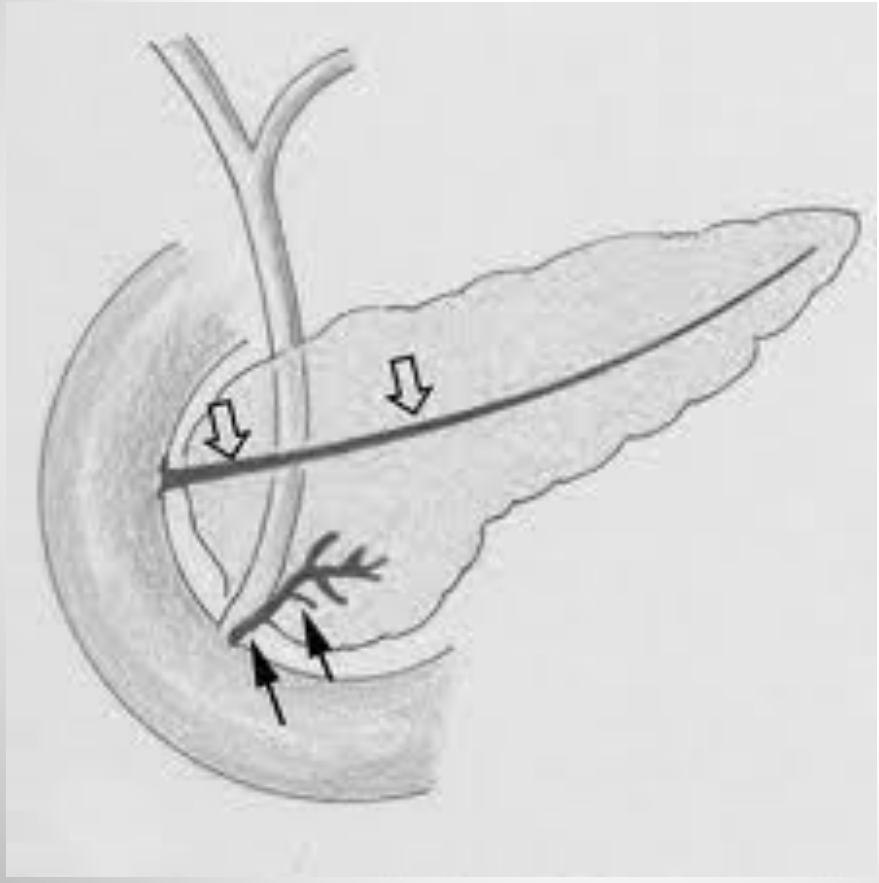
- The radiographic findings are symmetric **dilation of the proximal duodenum** with bulging of the recesses on either side of the annular band, effacement but not destruction of the duodenal mucosa, accentuation of the findings in the **right anterior oblique position**, and lack of change on repeated examinations.
- The differential diagnosis should include duodenal webs, tumors of the pancreas or duodenum, postbulbar peptic ulcer, regional enteritis, and adhesions.
- Patients with annular pancreas have an **increased incidence of pancreatitis and peptic ulcer**.

Pancreas divisum

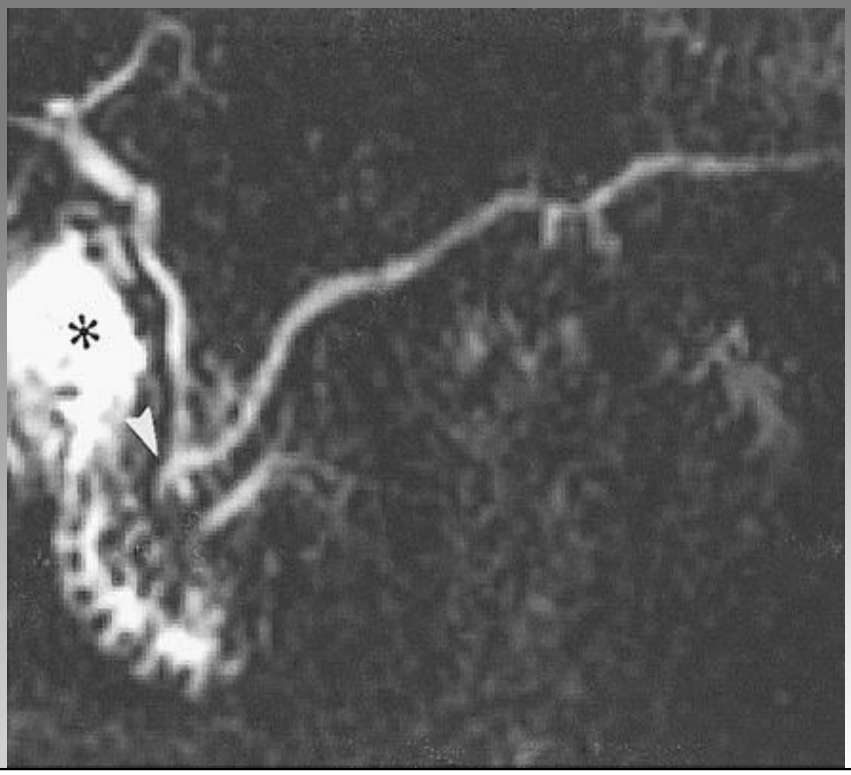
- Occurs when the **embryologic ventral and dorsal pancreatic anlagen fail to fuse**, so that pancreatic drainage is accomplished mainly through the accessory papilla.
- Is the **most common congenital anatomic variant** of the human pancreas.
- **Does not predispose to the development of pancreatitis** in the great majority of patients .
- However, the combination of pancreas divisum and a small accessory orifice could result in dorsal duct obstruction.




Cystic duct
Common hepatic duct
Common bile duct
Main pancreatic duct (Wirsung)
Duodenum
Accessory pancreatic duct (Santorini)
© 1999 Christy Krames



MRCP of pancreas divisum



TUMOURS OF THE PANCREAS

The tumours of the pancreas can be -

A. **Non-Endocrine neoplasms**

B. **Endocrine neoplasms**

which tumor markers are associated with pancreatic cancer?

CA 19-9

- If the tumor has metastesized, then Palliative treatment is used to improve the quality of life.

- If the superior mesenteric artery is involved in tumor → we can't use resetion.

- If the SMV is involved → resection and reanastomosis

---

* periampullary tumor around the ampulla of vater → block the common bile duct

⇓

obstructive Jaundice

(well prognosis)

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---

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⇓

obstructive Jaundice

(well prognosis)

Malignant non-endocrine neoplasms. exocrine

The most common are:-

Ductal adenocarcinoma

Cystadenocarcinoma

preampullary tumor: fluctuant Jaundice

NOTE: Periampullary carcinoma is term used for juxta-pancreatic carcinomas.

They are three forms:-

- **Carcinoma of the ampulla**
- **Carcinoma of the lower CBD**
- **Duodenal carcinoma**

How? (causes fluctuating Jaundice) → growth of tumor → block CBD → ↑Jaundice → Then central necrosis → sloughing → ↓Jaundice → Then new growth

ENDOCRINE NEOPLASMS:

These are less common than non-endocrine tumours and generally benign and sometimes multiple. They includes:

- **Insulinoma**
- **Glucogonomas**

} **common**

- **Others:**
  - **Gastrinomas**
  - **Somatostatatinomas**
  - **Vipomas (Vasoactive Intestinal Polypeptide)**

Associated with: watery diarrhea, hypokalemia achlorhydria (WDHA syndrome)

EVALUATION OF PANCREATIC NEOPLASMS:

- History → Insulinoma ⇒ ↑ insulin, ↓ Glucose, hypoglycemia, improve with sugar uptake.
- Clinical Examination
- Investigations

*During tumor → loss of -ve feedback inhibition, loss of contact inhibition ⇓ Enables non cancerous cells to cease proliferation when they contact with each other.

The specific investigations:-

- Ultrasound Scan
- Angiography
- Laparoscopy
- ERCP
- Histology & cytology
- CT Scan
- MR Imaging

NON-ENDOCRINE NEOPLASMS: (ADENO-CARCINOMA OF PANCREAS)

■ Ductal adeno carcinoma (arising in the exocrine part of pancreas) account for 90% of pancreatic tumour 2/3rd located in the head of pancreas.

Cystadenocarcinoma and endocrine tumour account for most of the remains of malignancy.

■ The exact causative factors responsible are unknown. The peak incidence in the 6th and 7th decade and more in men than women

The predisposing factors are:

- Diet (high protein & high fat)
- Smoking
- Exposure to industrial carcinogens

■ Spread of pancreatic tumours:

A. Local Invasion CBD

B. Lymphatic Portal hepatis

C. Blood Liver / colon

D. Via peritoneal & omental causing ascites

CLINICAL FEATURES:

- The diagnosis of pancreatic cancer varies from the simple and clinically obvious to the most difficult and almost impossible the initial symptoms and signs depend on the site and extent of the pancreatic cancer.

- Modes of presentation:
  - Weight loss
  - Pain
  - Jaundice
  - Steatorrhoea
  - Diabetes Mellitus
  - Acute Pancreatitis
  - Malignant Ascites
  - Gastric Outlet Obstruction

Approach to Investigations:
(Selective Investigations)

- Ultrasound Scan
- C.T. Scan
- MR Imaging Scan
- ERCP
- Histology & Cytology
- Angiography (Coeliac, Superior - Mesenteric)
- Laparoscopy

DELAY IN DIAGNOSIS:

- Over 90% of patient with pancreatic cancer present in the late stage of their disease. At time no chance of cure.
- The factors responsible for late diagnosis

A. Tumour is asymptomatic in the early stage.

B. Patient delay.

C. Physician delay.

D. The patient may not have ready and easy access to competent diagnostic center .

MANAGEMENT OF PANCREATIC CANCER:

A. Surgical Treatment

B. Non Surgical Treatment

SURGICAL TREATMENT:

- Pancreatic Cancer is essentially incurable since metastasis occurs at such early stage. Any treatment must be regarded as palliative.

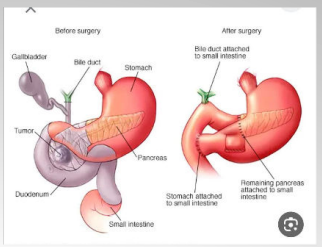
■ Surgical Options:

• For curative surgical treatment of cancer in the head of pancreas the optims are available:

A. Whipple operation (Pancreatico-duodenectomy)

B. Pylorus Preserving Pancreaticoduodenectomy

C. Total Pancreatectomy



• Palliative Surgical Treatment (Surgical Bypass)

• For tail of the pancreas (Distal pancreatectomy)

• Body of the pancreas (Distal + removal of the body of pancreas) the

■ **Pre-operative preparation of the patient for major surgery:**

1. **All jaundiced patients must be kept in good state of nutrition and hydration.**
2. **Blood clotting deficiencies must be corrected.**
3. **Cardio pulmonary functioning carefully assessed.**
4. **Drainage procedure consider in certain cases.**

NON-SURGICAL TREATMENT:

The following options available:

(Pallative procedure for non operable cases)

- **Percutaneous coeliac ganglion blockade.**

(For pain)

- **Stent to compress bile duct.**

.

- **Combination of chemotherapy and radiotherapy may become alterative in the future.**

h

FUNCTIONING ENDOCRINE TUMOURS OF THE PANCREAS:

These are much less common than adeno carcinoma.

The beta cell tumours secrete (Insulin) and called INSULINOMAS.

Another functioning tumour secrete(Gastrin) called GASTRINOMA which come from G cells

- Other tumours are:

a. Vipoma (Werner-Morrison syndrome, Pancreatic cholera)

b. Somastatinoma

c. Glucagonoma

d. HP (Human Pancreatic Polypeptide tumours)

- Slow growing and therefore carry much better prognosis.

INSULINOMA:

- The commonest islet cell tumour and arise from the beta cell and situated anywhere on the surface or within the substance of the pancreas.

- Most tumours are benign adenomas but 15% are low grade carcinomas and secrete (insulin).

CLINICAL FEATURES:

Whipple described a triad of features which typify the (insulinomas):

1. Fasting produces fainting.

2. During these "attacks" there is hypoglycaemia.

3. The attacks may be relieved by ingestion of glucose.

INVESTIGATIONS:

1. Measurement of blood sugar in an attack.
2. Overnight fasting serum glucose and insulin level (before & after overnight). Insulin level are estimated by radio-immunoassay.
3. Pre-operative localization of the tumour very important identification at operation can be difficult.

[Combination CT Scan and selective angiography]

TREATMENT:

1. If the tumour localized surgical resection is the TR of choice also this apply to metastases.
2. If the tumours not localized during surgery (Intra operative USS can be done to localize the tumour) than resected.
3. Sub total distal resection for multiple tumours is appropriate.

4.With negative exploration it is appropriate to perform pancreatectomy distal to the superior mesenteric vessels.

5.The Hypoglycemic attacks may be relieved by diazoxide or streptazotocin.

GASTRINOMA: (Zollinger-Ellison Syndrome)

The tumour arising from the islets cell of langhans in the pancreas and in the duodenal wall.

The majority (60%) of these tumours are malignant. They may be associated with (MEN 1)which are Parathyroid Hyperplasia, and Pituitary Adenoma. Gastrinoma give rise to ZE Syndrome which consist of triad (hypersecretion of gastric acid, severe peptic ulceration and the presence of non-beta cell tumour of the pancreas or duodenum).

CLINICAL FEATURES:

- The disease present as peptic ulcer disease 90%.They have typical pain more over in severe and less response to medical treatment.

- Co-existing diarrhoea.

- All complications of peptic ulcer disease are present in (ZE-Syndrome) as acute haemorrhage, perforation and recurrent ulceration.

THE DIAGNOSIS OF ZE-SYNDROME:

- Severe peptic ulcer disease doesn't respond to treatment.

- Multiple peptic ulcers or ulcers in unusual distal duodenum or locations such as the jejunum.

- Peptic ulcer disease associated with diarrhoea.

- Recurrent peptic ulcer disease following in acid reducing operation (surgery).
- Peptic ulcer is associated with MEN- 1 Syndrome.
- Marked elevation of serum gastrin.

TREATMENT:

- Medical therapy for control of the acid hypersecretion in patient with ZE-Syndrome considered the Omprazole antisecretory drug of choice for all gastrinoma patients.

- **Surgical Treatment:**

Tumour excision.

Total gastrectomy.

Patient with metastases should have medical therapy if fail total gastrectomy.

Gastrinoma patient with MEN 1 Syndrome and hyperparathyroidism should documented have parathyroid surgery performed prior to removal of gastrinoma.

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*** Which factor is most important in deciding whether a pancreatic adenocarcinoma is resectable?**

a. tumour size

b. tumour invasion of the portal vein

c. metastatic disease

d. enlarged peripancreatic lymph nodes

e. serum CA19-9 levels

*** Which of the following is the appropriate investigation in a patient presenting with a recent episode of right upper quadrant pain and a normal physical examination?**

a. abdominal CT scan

b. ERCP

c. plain X-ray of the abdomen

d. upper abdominal ultrasound

*** The most specific symptom associated with pancreatic adenocarcinoma is:**

a. weight loss

b. painless jaundice

c. epigastric pain

d. right upper quadrant pain, jaundice and fever

e. back pain relieved by leaning forwards

*** Chronic pancreatitis most often presents with:**

a. weight loss

b. steatorrhoea

c. diabetes mellitus

d. fractures

e. recurrent epigastric pain

*** The usual early complications of acute pancreatitis is:**

a. Hyperglycemia

b. Hypovolemia Shock

C. ARDS

d. Hypocalcemia

e. Renal failure

*** Regarding anatomy of the pancreas, select the wrong statement Select one:**

a. The transverse colon is related to its anterior surface

b. The junction of the superior mesenteric with the splenic vein lies behind the head

c. The Aorta lies posterior to the body.

d. The tail is related to the left colic flexure

e. Located in retroperitonium except its tail.

*** The most common indication for surgery in chronic pancreatitis is:**

Select one:

a. jaundice

b. pain

c. pseudocyst

d. gastric outlet obstruction

e. anorexia

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