Surgical diseases of the Pancreas

Dr. J. I. van Beljon
Anatomy of the Pancreas
Physiology of the Pancreas

- **Exocrine pancreas**
  - Trypsin
  - Chymotrypsin
  - Elastase
  - Carboxypeptidase A
  - Carboxypeptidase B
  - Colipase
  - Pancreatic lipase
  - Cholesterol ester hydrolase
  - Pancreatic α amylase
  - Ribonuclease
  - Deoxyribonuclease
  - Phospholipase A²

- **Endocrine Pancreas**
  - Insulin
**Acute Pancreatitis**

- Def. Acute inflammation, usually with rapid onset of pain and tenderness, often accompanied by vomiting, and systemic inflammatory responses. Regional tissues and remote organ systems are sometimes involved. Elevated pancreatic enzymes in blood or urine usually occur, but not invariably.
# Etiology of A.P.

<table>
<thead>
<tr>
<th>Metabolic</th>
<th>Mechanical</th>
<th>Vascular</th>
<th>Infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>Cholelithiasis</td>
<td>Post-operative</td>
<td>Mumps</td>
</tr>
<tr>
<td>Hyperlipoproteinemia</td>
<td>Postoperative</td>
<td>Periarteritis nodosa</td>
<td>Coxsakie B</td>
</tr>
<tr>
<td>Hypercalcemia</td>
<td>Pancreas divisum</td>
<td>Atheroembolism</td>
<td>Cytomegalovirus</td>
</tr>
<tr>
<td>Drugs</td>
<td>Post-traumatic</td>
<td></td>
<td>Cryptococcus</td>
</tr>
<tr>
<td>Genetic Scorpion venom</td>
<td>Pancreatic duct obstruction</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pancreatic duct bleeding</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Duodenal obstruction</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Clinical Picture

- Clinical Picture
  - History
  - Symptoms
  - Signs
History

- Risk factors
- Previous attacks?
Symptoms

- **Pain**: upper abdominal, constant, radiates to the back (50%), often starts after alcohol binge or heavy meal, increases in intensity rapidly. Dominant symptom in 85%-100%.

- **Nausea**

- **Vomiting**: not copious, gastric and duodenal contents
Signs

- Restlessness
- Rapid pulse
- Rapid respiratory rate
- Arterial hypotension
- Abdomen moderately distended, epigastric fullness.
- Grey-turner sign
- Cullen sign
- Fox sign
Special investigations

- Confirm diagnosis
  - S-amilase (remember diff.)
  - U-amilase
  - S-lipase
- CRP
- ABG
- FBC
- S-Calsium
CXR
  - Sympathetic pleural effusion
  - Atelectasis
  - A.R.D.S.

AXR
  - Sentinel loop
  - Colon cutoff sign
  - Duodenal ileus
  - Calcifications
  - Obscured psoas lines

79% will have radiological signs !!!
HOW DO WE DETERMINE PROGNOSIS? (TREATMENT)

- 80% Will recover without any complications
- 20% Will develop severe cardio-pulmonary complications or septic complications
- Prognostic assessment:
  - Ranson
  - Imrie
  - APACHE 2
  - CRP
- Classify into mild or severe acute pancreatitis (Atlanta classification 1992)
TREATMENT OF ACUTE PANCREATITIS

- NON-OPERATIVE
  - To limit severity of pancreatic inflammation
    - Inhibition of pancreatic secretion
      - Nasogastric suction
      - Pharmacologic
      - Hypothermia
      - Pancreatic irradiation
    - Inhibition of pancreatic enzymes
      - Corticosteroids
      - Prostaglandins
  - To interrupt the pathogenesis of complications
    - Antibiotics
    - Antacids
    - Heparin
    - Low molecular weight dextran
    - Vasopressin
    - Peritoneal lavage
TREATMENT OF ACUTE PANCREATITIS

- To support the patient and treat complications
  - Restoration and maintenance of intravascular volume
  - Electrolite replacement
  - Respiratory support
  - Nutritional support
  - Analgesia
  - Heparin
TREATMENT OF ACUTE PANCREATITIS

- Operative treatment
- Diagnostic laparotomy
- To limit the severity of the pancreatic inflammation
  - Biliary procedures
- To interrupt the pathogenesis of complications
  - Pancreatic drainage
  - Pancreatic resection
  - Pancreatic debridement
- Peritoneal lavage
- To support the patient and treat complications
  - Drainage of pancreatic infection
  - Feeding jejunostomy
- To prevent recurrent pancreatitis
Summary of treatment

- All patients
  - Nasogastric suction
  - NPO
  - Monitor and maintenance of intravascular volume
  - Respiratory monitoring and support
  - Antibiotics (selective)
  - Early laparotomy only for diagnosis
  - Estimate prognosis by early signs

- Patients with severe pancreatitis
  - Peritoneal lavage
  - Nutritional support
  - Suspect and treat pancreatic sepsis
  - Heparin if hypercoagulable
Complications of acute pancreatitis

- Systemic complications:
  - Fluid imbalance
  - Electrolite imbalance
  - Cardiac impairment
  - Renal impairment
  - Respiratory impairment
  - Liver failure

- Local complications:
  - Ileus
  - Duodenal obstruction
  - Biliary obstruction
  - Pseudocyst formation
  - Infected necrosis
  - Colon necrosis
Pancreatic pseudocyst

- Def. Pseudocysts are localized collections of pancreatic juice occurring as a result of pancreatic inflammation, trauma or duct obstruction. They are distinguished from other types of pancreatic cysts by their lack of an epithelial lining.

- Presenting symptoms:
  - Epigastric pain
  - Nausea
  - Vomiting
  - Weight loss
  - Epigastric mass
  - Fever
  - Jaundice
Pancreatic pseudocyst

- Investigations:
  - Elevated s-amylase (50%)
  - Ultrasound
  - CT
  - ? E.R.C.P.

- Natural history:
  - Most will resolve spontaneously

- Treatment:
  - Only if symptomatic

- Treatment options:
  - Drainage
    - External
    - Internal
    - Endoscopic
    - Surgically
DEF. Chronic pancreatitis is an inflammatory disease of the pancreas characterized by destruction of its exocrine and endocrine tissue and by their replacement with fibrous scar.

It is the difference in the ability to recover that is the basis for the classification of pancreatitis into acute and chronic forms.
ETIOLOGY OF CHRONIC PANCREATITIS

- Alcohol
- Ductal obstruction
  - Congenital or acquired strictures of the pancreatic duct
  - Pancreas divisum
  - Ductal obstruction due to tumors
  - Inflammation of the ampulla of Vater
- Protein malnutrition
- Cystic fibrosis
- Hypercemic states
- Hereditary pancreatitis
- Idiopathic pancreatitis
Abdominal pain (95%)
Exocrine dysfunction (steatorrhea & creatorrhea)
Endocrine dysfunction (DM)
Weight loss (75%)
Few clinical findings
SPECIAL INVESTIGATIONS

- Blood tests
- Radiology (mainstay of the diagnosis)
- AXR
  - Pancreatic calcifications (30-50%)
- CT
  - Dilated pancreatic duct
  - Calcification of pancreas
- Pseudocysts
- E.R.C.P.
  - “Chain of lakes” appearance
  - Distal bile duct stenosis
EXTRAPANCREATIC INVOLVEMENT

- Common bile duct obstruction (10%)
- Duodenal obstruction (1%)
- Colonic obstruction
TREATMENT OF CHRONIC PANCREATITIS

MEDICAL
- Pancreatic insufficiency
- Diabetes mellitus
- Pain

SURGICAL
- Resections
- Drainage procedures
PANCREAS TUMORS

- Benign v/s malignant
- Exocrine v/s Endocrine (Pancreatic islet cell tumors)
ENDOCRINE TUMORS

- Alpha cell: Glucagon, Glucagonoma
- Beta cell: Insulin, Insulinoma
- Delta cell: Somatostatin, Somatostatinoma
- Delta-2-cells: VIP, WDHA (VIPoma)
- G-cells: Gastrin, ZES (Gastrinoma)
EXOCRINE TUMORS

- Adenocarcinomas
- Most common pancreas tumor
- Etiology unknown
- Risk factors
  - Sigaret smoking
  - High intake animal fat and meat
  - Chronic pancreatitis
  - Several hereditary disorders
    - Hereditary pancreatitis
    - Von Hippel-Lindau syndrome
    - Lynch-syndrome
    - Ataxiatelangiectasia
Symptoms:
- Early non-specific
- Anorexia
- Weight loss
- Abdominal discomfort
- Nausea
- Specific symptoms
- Jaundice
- Pruritus
- Moderate pain
- DM
- Unexplained attack of pancreatitis
CLINICAL PRESENTATION

Physical findings
- Jaundice
- Enlarged liver
- Palpable gallbladder (Courvoisier’s law)
- Palpable mass (Big pancreas tumor)
- Ascites
- Virchow-Troisier node
- Blumer shelf
- Sister Josephs node
- Wasting
LABORATORY DATA

- LFT (raised ALP, Bili.)
- CA 19-9
- CA 494
- Ultrasound
- CT scan
- MRI
- Cholangiography
  - E.R.C.P.
  - P.T.C.
  - M.R.C.P.
TREATMENT

- Palliation
- Jaundice (pruritis)
- Pain
- Duodenal obstruction
- Curative
- Resection of the tumor (Whipple procedure / Pancreaticoduodenectomy)