Pancreatitis

- Acute pancreatitis:
  - Reversible

- Chronic pancreatitis:
  - Persistent
  - Progressive
  - Residual damage
Acute pancreatitis

- Pancreatic inflammation
- Autodigestion
Etiology (1)
- Gallstone (50-70%)
- Alcoholism (25%)
- Iatrogenic (ERCP, operation)
- Trauma (blunt, penetrating)
- Drugs (thiazides, steroids, azathioprine)
- Metabolic (hypercalcemia, hyperlipidemia, hypothermia)
- Infections (mumps, coxsackie B, mycoplasma)

Etiology (2)
- Vascular (ischaemia, vasculitis)
- Congenital (pancreas divisum)
- Hereditary
- Pancreatic duct obstruction (tumor)
- Toxin (scorpion bite)
- Malnutrition
- Idiopathic
Pathology

- Interstitial oedematous pancreatitis
- Necrotizing haemorrhagic pancreatitis
Epidemiology

- Can occur at any age
- Rare in children and very young adult (infection, trauma, drugs, hereditary, parasites)
- Alcohol-related pancreatitis: young adult
- Biliary tract disease: middle age and elderly

Clinical features

- Pain (>90%), develops quickly, reaching maximum within minutes, 50% radiate to back
- Nausea
- Vomiting
- Retching
- Hiccoughs
Physical signs

- Signs minimal relative to symptom
- Fever
- Tachycardia
- Epigastric tenderness
- Abdominal distension
- Paralytic ileus
- Shock
- Grey-Turner’s sign (loin)
- Cullen’s sign (periumbilical)
Diagnosis

- Serum amylase 4x normal
- Urine amylase (elevation persists several days after normalization of serum amylase)
- Amylase/creatinine clearance 4x normal
- Isoamylase
- Lipase

Hyperamylasemia

- Sialadenitis
- PPU
- Biliary disease
- Intestinal obstruction
- Mesenteric infarct
- Ruptured ectopic pregnancy
- Ruptured abdominal aortic aneurysm
Blood tests

- Leucocytosis
- Hyperglycaemia
- Hypocalcemia
- Hyperlipidemia

Plain XR

- Sentinel jejunal loops
- Colonic cut-off
- Duodenal ileus
- Generalised ileus
- Retroperitoneal fluid accumulation: obliteration of psoas outline
- Pleural effusion
- Basal atelectasis
Investigations

- USG
- CT
- EUS
- MRCP
- ERCP

Course of disease

- Wide variation in severity
- Mild self limiting disease to rapidly progressing fatal disease
- Overall mortality 10-15%
- Severe group: up to 40%
- Death: early: multiple organ failure
  after 1st week: septic complication
- How to identify the severe group?
Scoring systems

- Ranson’s score
- Imrie score
- APACHE II (acute physiology and chronic health evaluation)

On admission
- Age > 55 years
- WBC > 16x10^3/ mm^3
- FBS > 11.2 mmol/l
- LDH > 350 IU/l
- SGOT > 250 SFU/dl
Ranson’s score

Within 48 hours
- Hct decrease >10 %
- Blood urea increase >1.8mmol/l
- Ca <2mmol/l
- Sa O₂ <8KPa
- BE < -4mEq/L
- Fluid sequestration > 6 litre

Ranson’s score

<table>
<thead>
<tr>
<th>Score</th>
<th>Mortality</th>
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<tbody>
<tr>
<td>&lt;3</td>
<td>0.9%</td>
</tr>
<tr>
<td>3-4</td>
<td>18%</td>
</tr>
<tr>
<td>5-6</td>
<td>50%</td>
</tr>
<tr>
<td>&gt;6</td>
<td>90%</td>
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USG

- Non-invasive
- Readily available
- Can be done at bedside
- Can reveal gallstone and dilated biliary system
- Disadvantage: poor visualisation of pancreas, cannot diagnosis pancreatic necrosis, limited by gas in distended bowel

CT findings

- Pancreas
  - Parenchymal enlargement (diffuse or focal)
  - Parenchymal edema
  - Necrosis
- Peripancreatic change
  - Blurring of fat planes
  - Thickening of fascial planes
  - Presence of fluid collection
- Nonspecific
  - Bowel distension, pleural effusion, mesenteric edema
## CT grading of severity

<table>
<thead>
<tr>
<th>Grade</th>
<th>CT appearance</th>
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<tbody>
<tr>
<td>A</td>
<td>normal</td>
</tr>
<tr>
<td>B</td>
<td>gland enlargement, small intrapancreatic fluid collection</td>
</tr>
<tr>
<td>C</td>
<td>&lt;30% necrosis</td>
</tr>
<tr>
<td>D</td>
<td>30-50% necrosis</td>
</tr>
<tr>
<td>E</td>
<td>&gt;50 % necrosis</td>
</tr>
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Early ERCP

- Indicated in severe pancreatitis associated with biliary sepsis or obstruction
  - Done within 24 hours
  - Endoscopic sphincterotomy +/- stone extraction
  - Decrease morbidity and mortality
  - Procedure related complications
Surgical intervention

- Diagnosis in doubt
- Failed medical treatment
- Biliary pancreatitis
- Management of complications
  - Pseudocyst
  - Abscess
  - Haemorrhage

Biliary pancreatitis

Need remove gallbladder and possible stones in CBD after attack over
- Pancreatitis resolves if pain subsides and serum amylase returns to normal
- Premature feeding can lead to recurrent attack
- ERCP
- Laparoscopic cholecystectomy within same admission, or endoscopic sphincterotomy if high risk for surgery
Management of mild pancreatitis

- NPO +/- NG tube
- IV fluid
- Analgesic
- No need for antibiotic
- No need for CT scan
- Search for underlying cause
- Treat the underlying cause to prevent recurrent attack

Management of severe pancreatitis

- Involve either a local or systemic complication
- Fluid resuscitation
- Oxygen therapy
- Intensive care support
- Monitoring: urine output, central venous pressure, pulmonary artery wedge pressure, cardiac output, systemic vascular resistance
- Nutrition
Systemic complications

- Resp failure, ARDS: mechanical ventilation, PEEP
- Heart failure: inotropes
- Renal failure: haemodialysis
- GI failure: proton pump inhibitors
- Coagulopathy: FFP, platelet concentrate
- Neurological (irritability, confusion)
- Metabolic (hypocalcemia, hyperglycemia)

Antibiotic

- Infective complication usually occurs after 1st week
- Translocation of enteric organisms
- E Coli, Klebsiella, Enterococcus, Staphylococcus, Pseudomonas
- Prophylactic antibiotics beneficial in severe cases, must be broad spectrum like 3rd generation cephalosporin or imipenum
- Early enteral feeding and gut decontamination may be beneficial
Other drugs
- Somatostatin analogues: controversial
- Anticholinergic agents, protease inhibitors, glucagon: not useful

Nutrition
- Indicated in patients not expected to eat for 1 week or more
- Enteral feeding (nasogastric, nasojejunal or jejunostomy tubes placed after operation) is safe and beneficial, can be given in early stage
- Total parental nutrition in cases of paralytic ileus and duodenal obstruction
Local complications

- **Acute fluid collection**
  - Early in the course of disease, located in or near the pancreas, wall encompassing the collection is ill defined

- **Pseudocyst**
  - Collection of pancreatic juice enclosed in a wall of fibrous or granulation tissue that arises following an attack of acute pancreatitis
  - Formation of a pseudocyst requires 4 weeks or more from onset of acute pancreatitis

Local complications

- **Pancreatic necrosis**
  - A diffuse or focal area of nonviable parenchyma which is typically associated with peripancreatic fat necrosis

- **Pancreatic abscess**
  - Collection of pus, in proximity to pancreas containing little, or no pancreatic necrosis

- **Pancreatic effusion**
- **Pancreatic ascites**
  - Chronic generalised peritoneal enzyme-rich effusion usually associated with pancreatic duct disruption
Diagnosis of necrosis

- Contrast CT scan: necrotic areas do not enhance

Diagnosis of infected necrosis
- Clinically increase abd pain, fever, leucocytosis and/or organ failure
- Air bubbles in necrotic area
- CT or USG guided FNA for smear and culture
Surgery for necrosis

- Non-operative treatment for sterile necrosis
- Infected necrosis needs surgical intervention
- Operation: necrosectomy (devitalized pancreatic parenchyma and retroperitoneal fat)+/- drainage, lavage, relaparotomy, zip closure, laparostomy
- Minimal invasive: endoscopic/percutaneous
- Pancreatic resection: high morbidity & mortality
Pseudocyst

- Drainage indicated if persists for 4-6 weeks and size >6cm or symptomatic
- Complications: rupture, haemorrhage, infection, obstruction
- Internal drainage is preferable to external drainage
- External drainage for infected or ruptured cysts or acute cysts with thin, friable walls
Pseudocyst

Internal drainage depends on location
- Retrogastric cyst: posterior cystogastrostomy
- Cyst around head of pancreas: cystoduodenostomy
- Cyst bulge to transverse mesocolon: Roux-en-Y cystojejunostomy
- Cyst in tail or body of pancreas: distal pancreatectomy + splenectomy

Approach: open, laparoscopic, endoscopic
Chronic pancreatitis

- Uncertain pathogenesis
- Unpredictable clinical course
- Unclear treatment
- Spectrum of clinical features from silent disease to unexplained abdominal pain which eludes all diagnostic aids
Etiology

- Alcoholic
- Trauma
- Obstruction (stricture, stone, tumor, pseudocyst)
- Hyperparathyroidism
- Hereditary (A.D.)
- Tropical pancreatitis
- Cystic fibrosis
- Idiopathic
- Hyperlipidemia
- Toxic substances

Pathogenesis

- Hypersecretion of protein, plug formation, Ca CO3 precipitation
- Chronic inflammation
- Increased parenchymatous and ductal pressure
- Compartment syndrome
- Neural alteration/neuritis
Clinical picture

- 3 leading symptoms
  - Pain (painless in 5-20%)
  - Exocrine insufficiency
  - Endocrine insufficiency
- Weight loss
- General debility
- Occasional acute attacks
- Physical sign: tenderness

Morphology

- Pancreas: atrophic or enlarged
- Chronic change: fibrosis, inflammation, loss of exocrine tissue
- Acute change: edema, acute inflammation, necrosis
- Pancreatic duct: dilatation, obstruction or shorthening (chain-of-lakes)
- Acute pancreatitis does not lead to chronic pancreatitis unless complications occur such as duct stricture, pseudocyst
Investigation

- Blood tests
- XR: pancreatic calcifications (up to 70%)
- USG
- CT
- EUS
- ERCP
- MRCP
- Pancreatic function tests
Complications

- Pseudocyst
- Abscess
- Stenosis of CBD, duodenum, colon
- Pseudoaneurysm (splenic, GD, PD)
- Fistula
- Pleural effusion
- Ascites
- Splenic vein thrombosis
- Pancreatic ductal adenocarcinoma (20x ↑)
Treatment (1)

- Eliminate etiology
- Pain relief
- DM control
- Enzyme supplement
- Intervention radiology: cyst, abscess, collection

Treatment (2)

- Endoscopic treatment (temporising role)
  - Biliary stent, pancreatic stent, remove stone
- Surgical treatment
  1. Drainage: Longitudinal pancreatojejunostomy (Puestow procedure)
  2. Resection: Whipple, PPPD, duodenum-preserving pancreatic head resection (Beger operation), pylorus preserving partial duodenopancreatectomy, distal pancreatectomy
  3. Combination: Pancreatic head resection + longitudinal PJ (Frey procedure)