PANCREATITIS
ACUTE PANCREATITIS

- Reversible pancreatic parenchymal injury associated with inflammation
- Relatively common
- **CAUSE:** Alcoholism, Gall bladder disease accounts for 80%
- Gall stones are present in about 35 to 60 % of cases and 5% of patients with gall stones develop pancreatitis
- *Male : female ratio – 1:3 for gall bladder disease and 6:1 for alcoholism*

**OTHER CAUSES:**

**Obstruction in pancreatic duct system:**
- periampullary neoplasm, biliary sludge,
- parasites esp. ascaris

**Medication:** Furosemide, azathioprine,
- Estrogen, sulphonamides
- Infection including mumps
ACUTE PANCREATITIS CAUSES

diseases of acute pancreatitis

PAnCREATITiS
P- Post-operative, Peri ampullary diverticulum, Pancreas division
A-Alcohol
C-Connective tissue disorder, cancer pancrease, hyperCalcemia
R-Renal failure
E-ErCP
A-Autoimmune
T-Trauma
I-Infections-mumps, coxsackie, cmv, echo
T-Thrombotic thrombocytopenic purpura, hyperTriglyceridemia

Causes of acute pancreatitis

Other causes:
- Abdominal trauma
- Medications
- Infections
- Tumors
- Genetic/anatomical variants
- High triglyceride levels
- High calcium levels
### Drug Induced Pancreatitis

<table>
<thead>
<tr>
<th>Common</th>
<th>Uncommon</th>
<th>Rare</th>
</tr>
</thead>
<tbody>
<tr>
<td>asparaginase</td>
<td>ACE inhibitors</td>
<td>carbamazepine</td>
</tr>
<tr>
<td>azathioprine</td>
<td>acetaminophen</td>
<td>corticosteroids</td>
</tr>
<tr>
<td>6-mercaptopurine</td>
<td>5-amino ASA</td>
<td>estrogens</td>
</tr>
<tr>
<td>didanosine (DDI)</td>
<td>furosemide</td>
<td>minocycline</td>
</tr>
<tr>
<td>pentamidine</td>
<td>sulfasalazine</td>
<td>nitrofurantoin</td>
</tr>
<tr>
<td>valproate</td>
<td>thiazides</td>
<td>tetracycline</td>
</tr>
</tbody>
</table>
CLINICAL PRESENTATION

- Abdominal pain referred to upper back and sometimes to left shoulder
- Accompanied by anorexia, nausea, vomiting
Acute Abdominal Pain

RUQ

Hepatobiliary
  • Biliary colic
  • Cholecystitis
  • Cholangitis
  • Hepatitis

Gastrointestinal
  • **Pancreatitis**
    • Presentation of gastric, duodenal, or pancreatic pathology

Genitourinary
  • Nephrolithiasis
  • Pyelonephritis

Cardiopulmonary
  • RLL pneumonia
  • MI
  • Pericarditis
  • Pleuritis

LUQ

Pancreatic
  • **Pancreatitis**
    (acute vs. chronic)

Gastrointestinal
  • Gastritis
  • PUD

Splenic pathology
Cardiopulmonary

EPIGASTRIC

Cardiac
  • Aortic dissection/ruptured AAA
  • MI
  • Pericarditis

Gastrointestinal
  • Gastritis, PUD
  • GERD/esophagitis
  • **Pancreatitis**
COMMON PAIN SITES (1)
COMMON PAIN SITES (2)

Organs
- Right hypochondrium
- Gall bladder
- Biliary tract
- Liver
- Periumbilical (central)
- Jejunum/ileum
- Appendix
- Aorta
- RIF
- Appendix
- Caecum/ileum
- Kidney/ureter
- Groin
  - Torsion of testis
  - Check hernial orifices with SBO

Conditions
- Biliary colic
- Cholecystitis
- Ascending cholangitis
- Acute hepatitis
- Small bowel obstruction
- Gastroenteritis
- Appendicitis (early)
- Ruptured AAA
- Mesenteric ischaemia
- Appendicitis
- Crohn disease
- Meckel diverticulitis
- Renal/ureteric colic
- Mesenteric adenitis
- Torsion of testis
- Check hernial orifices with SBO

Organs
- Epigastric
- Oesophagus
- Stomach
- Duodenum
- Gall bladder
- Liver
- Pancreas
- Left hypochondrium and loin
  - Kidney
  - Spleen
- Lower abdomen
  - Large bowel
- LIF
  - Descending colon
  - Sigmoid
- Diverticulitis
  - Ureteric colic
- Suprapubic (hypogastric)
  - Ovaries
  - Fallopian tubes
  - Bladder
- Ruptured ectopic
  - Acute PID
- Ruptured ovarian cyst
  - Torsion of ovary

NB
- Lower abdominal and suprapubic pain overlap
DIFFUSE ABDOMINAL PAIN:

- Peritonitis
- Early appendicitis, perforated appendicitis
- Mesenteric ischemia
- Gastroenteritis/colitis
- Constipation
- Bowel obstruction
- Pancreatitis
- Inflammatory bowel disease
- Irritable bowel syndrome
ACUTE PANCREATITIS SIGNS (1)

- Turner's
- Bruising Flanks
- Cullen's
- Bruising around umbilicus

Acute Pancreatitis
ACUTE PANCREATITIS SIGNS (2)

1. Named after British surgeon George Grey Turner (1877-1951)

2. Named for Thomas Stephen Cullen (1869-1953), Canadian gynecologist who first described the sign in ruptured ectopic pregnancy in 1916

3. Named after George Henry Fox (1846-1937), American dermatologist
LAB. FINDINGS

- increased serum amylase (>3xN, early phase, for 72hrs), then hypoamylasemia <6 month,
- increased serum lipase (8-14 days longer than amylase),
- Trypsin level,
- Pancreatic isoenzyme detection
- glycosuria,
- hypocalcaemia (d/t precipitation of Ca soaps in necrotic fat).
OTHER HYPERAMYLASEMIA CAUSES

- Parotitis
- Sialadenitis
- Anorexia nervosa
- Biliary tract disease
- Peptic ulcer
- Peritonitis

- Intestinal obstruction
- Acute appendicitis
- Diabetes mellitus
- Burns
- Renal insufficiency
<table>
<thead>
<tr>
<th></th>
<th>ULTRASOUND</th>
<th>COMPUTED TOMOGRAHY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organs best visualized</td>
<td>Kidney</td>
<td>Liver and dilated bile ducts</td>
</tr>
<tr>
<td></td>
<td>Gallbladder</td>
<td>Retroperitoneal lymph nodes</td>
</tr>
<tr>
<td></td>
<td>Liver and bile ducts</td>
<td>Gallbladder</td>
</tr>
<tr>
<td></td>
<td>Pancreas</td>
<td>Spleen</td>
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<tr>
<td></td>
<td>Spleen</td>
<td>Pancreas</td>
</tr>
<tr>
<td></td>
<td>Blood vessels</td>
<td>Kidney</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pelvic organs</td>
</tr>
<tr>
<td>Lesions best visualized</td>
<td>Fluid-filled masses/cysts</td>
<td>Tumors/cysts/abscesses</td>
</tr>
<tr>
<td></td>
<td>Gallstones</td>
<td>Mass lesions</td>
</tr>
<tr>
<td></td>
<td>Dilated bile ducts</td>
<td>Fatty liver</td>
</tr>
<tr>
<td></td>
<td>Aortic aneurysms</td>
<td>Hepatic iron overload</td>
</tr>
<tr>
<td></td>
<td>Pancreatic tumor</td>
<td>(hemochromatosis)</td>
</tr>
<tr>
<td></td>
<td>Ascites</td>
<td>Trauma or parenchymal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>hematoma of liver, spleen, and</td>
</tr>
<tr>
<td></td>
<td></td>
<td>kidney</td>
</tr>
<tr>
<td>Advantages</td>
<td>Real-time examination</td>
<td>Less dependent upon a</td>
</tr>
<tr>
<td></td>
<td>Noninvasive</td>
<td>skilled operator</td>
</tr>
<tr>
<td></td>
<td>Guided needle aspiration</td>
<td>Guided needle aspiration</td>
</tr>
<tr>
<td>Disadvantages</td>
<td>Skilled operator necessary</td>
<td>Radiation exposure</td>
</tr>
<tr>
<td></td>
<td>Gas obscures deeper organs</td>
<td>Absence of fat makes examination more difficult</td>
</tr>
</tbody>
</table>
VISUALIZATION OF PANCREAS: CT
PSEUDOCYST
OTHER VISUALIZATION METHODS

- Dynamic spiral CT scanning
  - determine the presence & extent of pancreatic necrosis (loss of enhancement in at least 30% of the pancreatic parenchyma)
- Magnetic resonance cholangiopancreatography (MRCP)
- Endoscopic retrograde cholangiopancreatography (ERCP)
- Endoscopic ultrasonography (EUS)
Surfaces of the liver and related potential spaces. A. This schematic sagittal section through the diaphragm, liver, and right kidney demonstrates the two surfaces of the liver and related peritoneal recesses. B. Sagittal magnetic resonance imaging section demonstrating the relationships featured in A in a living person.
<table>
<thead>
<tr>
<th>Disease</th>
<th>Characteristics</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perforated viscus, especially peptic ulcer</td>
<td>Sudden onset of pain that increases over 30-60 min</td>
<td>Intraperitoneal air present</td>
</tr>
<tr>
<td>Acute cholecystitis and biliary colic</td>
<td>Epigastric or right upper quadrant pain that radiates to right shoulder or shoulder blade</td>
<td>Liver enzymes often elevated; ultrasonography may show thickened gallbladder, pericholecystic fluid</td>
</tr>
<tr>
<td>Intestinal obstruction</td>
<td>Constant colicky pain</td>
<td>Obstructive pattern can be seen on CT scan or abdominal series</td>
</tr>
<tr>
<td>Mesenteric vascular occlusion</td>
<td>Classic triad is postprandial abdominal pain, weight loss, and abdominal bruit</td>
<td>Discrepancy between symptoms (severe pain) and examination (benign abdominal examination)</td>
</tr>
<tr>
<td>Dissecting aortic aneurysm</td>
<td>Sudden onset; pain may radiate to the lower extremities</td>
<td></td>
</tr>
<tr>
<td>Renal colic</td>
<td>Flank pain radiates to the genitals; dysuria may be present</td>
<td>Urinalysis with active sediment</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>Upper abdominal or chest pain</td>
<td>Electrocardiography usually abnormal</td>
</tr>
<tr>
<td>Connective tissue disorders with vasculitis</td>
<td>Acute pancreatitis can be due to vasculitis</td>
<td>Other signs of vasculitis usually present (skin, joint, eye, and kidney involvement)</td>
</tr>
<tr>
<td>Appendicitis</td>
<td>Pain may start in epigastrum or periumbilical then migrate to right lower quadrant</td>
<td>Ultrasonography and and CT aid in diagnosis</td>
</tr>
<tr>
<td>Ectopic pregnancy</td>
<td>Sudden onset of pain; menstrual abnormalities often precede pain</td>
<td>Rapid drop in hematocrit and intraperitoneal pelvic fluid on imaging should raise suspicion</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>Fever, malaise, and other respiratory symptoms (dyspnea, cough, sputum production, chest pain) usually present</td>
<td>Changes on physical examination of the chest and abnormalities on chest X-ray possibly due to ARDS or pleural effusion</td>
</tr>
</tbody>
</table>

*AP = acute pancreatitis; ARDS = acute respiratory distress syndrome; CT = computed tomography; HCT = hematocrit.*
<table>
<thead>
<tr>
<th><strong>AUTOIMMUNE PANCREATITIS CRITERIA</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Criterion H-Histology</strong></td>
</tr>
<tr>
<td>(at least one of the following)</td>
</tr>
<tr>
<td>1. Periductal lymphoplasmacytic infiltrate, obliterative phlebitis, storiform fibrosis</td>
</tr>
<tr>
<td>2. Lymphoplasmacytic infiltrate, storiform fibrosis, abundant IgG4+ cells (≥10 HPF)</td>
</tr>
<tr>
<td><strong>Criterion I-Imaging of pancreas</strong></td>
</tr>
<tr>
<td>1. Typical-diffusely enlarged gland with delayed (rim) enhancement; diffusely irregular, attenuated main pancreatic duct</td>
</tr>
<tr>
<td>2. Others-Focal pancreatic mass/enlargement; focal pancreatic duct stricture; pancreatic atrophy; pancreatic calcification; pancreatitis</td>
</tr>
<tr>
<td><strong>Criterion S-Serology</strong></td>
</tr>
<tr>
<td>Elevated serum IgG4 (normal: 8-140 mg/dL)</td>
</tr>
<tr>
<td><strong>Criterion O-Other organ involvement</strong></td>
</tr>
<tr>
<td>(can be confirmed by biopsy or resolution/improvement with steroid therapy)</td>
</tr>
<tr>
<td>Hilar/intrahepatic biliary strictures; persistent distal biliary stricture; parotid/lacrimal gland involvement; mediastinal lymphadenopathy; retroperitoneal fibrosis</td>
</tr>
<tr>
<td><strong>Criterion R-Response to steroid therapy</strong></td>
</tr>
<tr>
<td>Resolution or marked improvement of pancreatic/extrapancreatic manifestation with steroid therapy</td>
</tr>
<tr>
<td><strong>Diagnostic of autoimmune pancreatitis when any of the following is fulfilled</strong></td>
</tr>
<tr>
<td>1. Criterion H</td>
</tr>
<tr>
<td>2. Criterion I+S</td>
</tr>
<tr>
<td>3. Strong clinical suspicion of autoimmune pancreatitis (idiopathic pancreatic disease+Criterion S and/or O)+Criterion R</td>
</tr>
</tbody>
</table>
ACUTE PANCREATITIS MANAGEMENT

- Key management is resting of pancreas by total restriction of oral intake and supportive therapy by iv fluids and analgesia.
- 5% of severe acute pancreatitis patients die from shock in first week of illness.
- *Complications*: Acute respiratory distress syndrome, acute renal failure.
Chronic pancreatitis (CP)

a chronic (lasting over 6 months) polyetiological progressive inflammatory-dystrophic lesion of the pancreas, which can periodically take signs of acute inflammatory process; flows with formation of focal, segmental or diffuse destructive changes in the parenchyma, ducts and microvasculature; it is characterized by a gradual disorders increase in ductal system, development of parenchyma replacement fibrosis and exo- and endocrine functional insufficiency.
<table>
<thead>
<tr>
<th>Test</th>
<th>Gastrectomy, pernicious anemia</th>
<th>Celiac disease*</th>
<th>Bacterial overgrowth</th>
<th>Ileal resection disease**</th>
<th>Pancreatic insufficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin B12</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low/normal</td>
<td>Low</td>
</tr>
<tr>
<td>Vitamin B12 + intrinsic factor</td>
<td>Normal</td>
<td>Low</td>
<td>Low</td>
<td>Low/normal</td>
<td>Low</td>
</tr>
<tr>
<td>Vitamin B12 + antibiotics</td>
<td>n/a</td>
<td>Low</td>
<td>Normal</td>
<td>Low/normal</td>
<td>Low</td>
</tr>
<tr>
<td>Vitamin B12 + gluten-free diet</td>
<td>n/a</td>
<td>Normal</td>
<td>n/a</td>
<td>Low/normal</td>
<td>Low</td>
</tr>
<tr>
<td>Vitamin B12 + pancreatic enzymes</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>Normal</td>
</tr>
</tbody>
</table>

* The Schilling test may be normal in patients with celiac disease because the terminal ileum is frequently spared. n/a, these stages of the Schilling test are not needed for the disorder. ** Results depend upon the length of resection or the extent of disease. Values will not normalize with >100 cm of resection. Values may normalize after treatment of active Crohn's disease.
Patient with suspected chronic pancreatitis (abdominal pain; jaundice; elevated serum amylase, lipase, or hepatic transaminase levels; weight loss)

Contrast-enhanced CT

- Diagnostic for chronic pancreatitis
  - If contemplating surgery for stone, stricture, or pseudocyst, consider MRCP or EUS to identify ductal anatomy

- Normal imaging tests but high degree of suspicion for chronic pancreatitis
  - Consider EUS with FNAB and pancreatic function tests

- Cystic or mass lesions suspicious for malignancy
  - Consider EUS with FNAB; fluid also can be analyzed for tumor markers, such as carbohydrate antigen 19-9
CHRONIC PANCREATITIS TREATMENT

- **Aim** - Pain control and management of maldigestion

- **Pain**
  - Avoid alcohol
  - Low fat meals
  - Antipain – narcotics tramadol, codeine (addiction)
  - **Surgical pain control**
    - Resection (local - - - - 95%) – causes pancreatic insufficiency
    - Splanchnicectomy, celiac ganglionectomy, nerve block
  - **Endoscopic treatment**
    - Sphincterotomy, dilatation of strictures, caliculi removal, duct stenting
      - Complications – acute pancreatitis, abscess, ductal damage, death
  - **Pancreatic enzymes** - Non enteric coated
    - Pancrelipase → CREON, Ultresa.
THANK YOU...........