Pancreatitis

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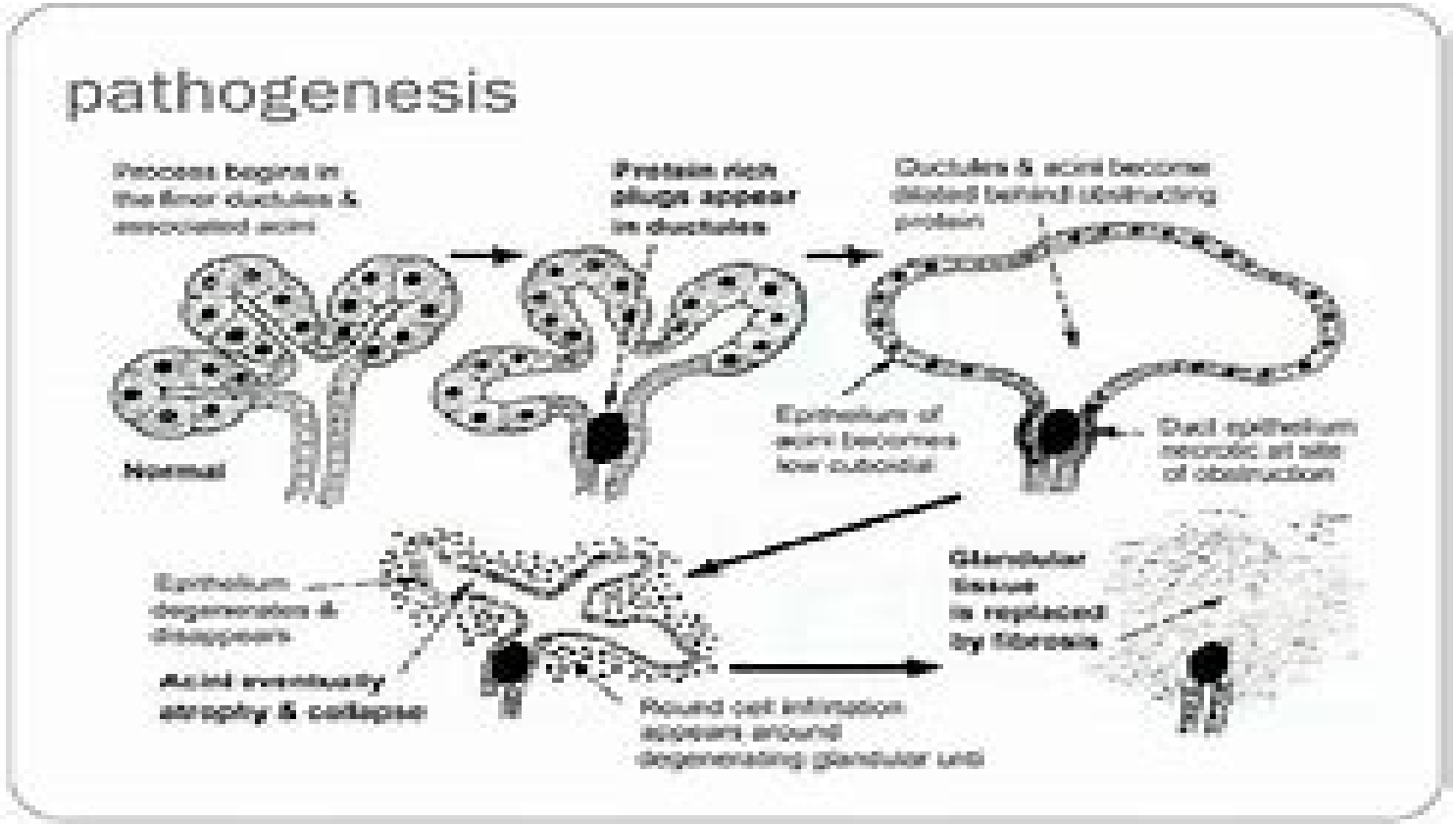
Acute Pancreatitis

- Clinically = A sudden onset of abdominal pain + ↑Digestive enzymes in the blood or urine.
- Mechanism =Premature activation of trypsinogen.
- (Trypsinogen Activation Peptide or TAP is one of the earliest markers)



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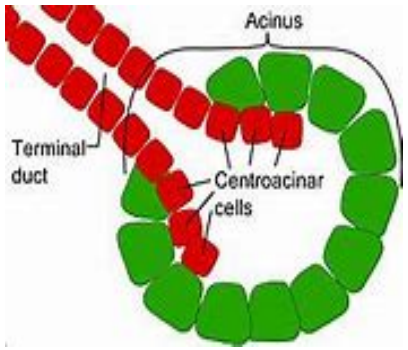

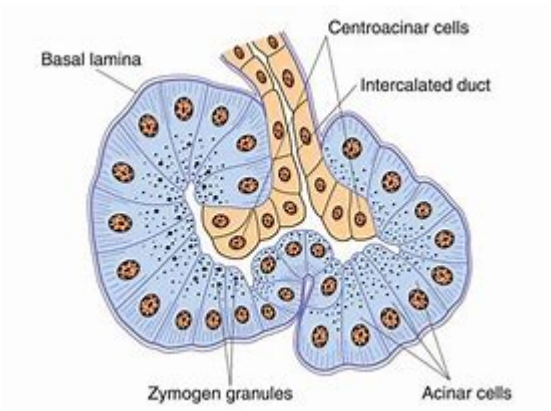

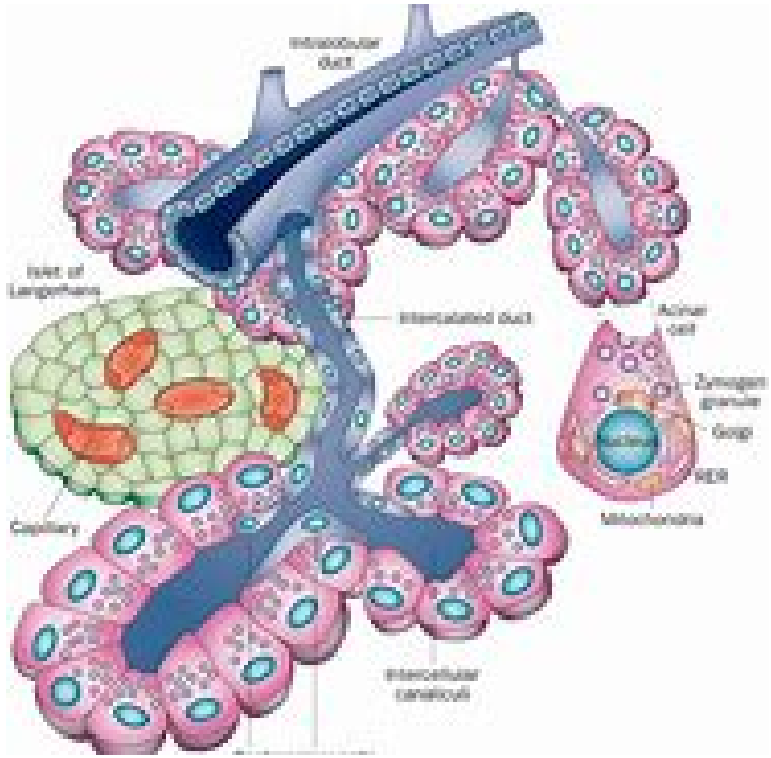

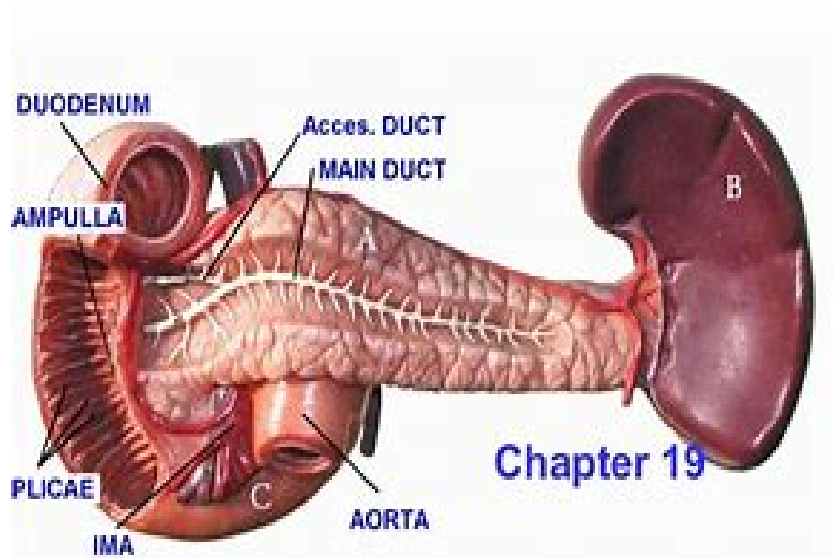

- *ERCP associated pancreatitis* can be attenuated by pretreatment with trypsin inhibitors (gabexate)
- Mutations that enhance trypsinogen activation , diminish trypsin inactivation , or limit trypsin clearance from the ducts are associated with acute pancreatitis.
- Secondly a vigorous immune response contributes to the severity of the pathological condition

Etiology Of Acute Pancreatitis In adults:

- Gallstones
- Alcohol abuse
- Hypercalcemia
- Hypertriglyceridema
- Medications
- Blunt trauma

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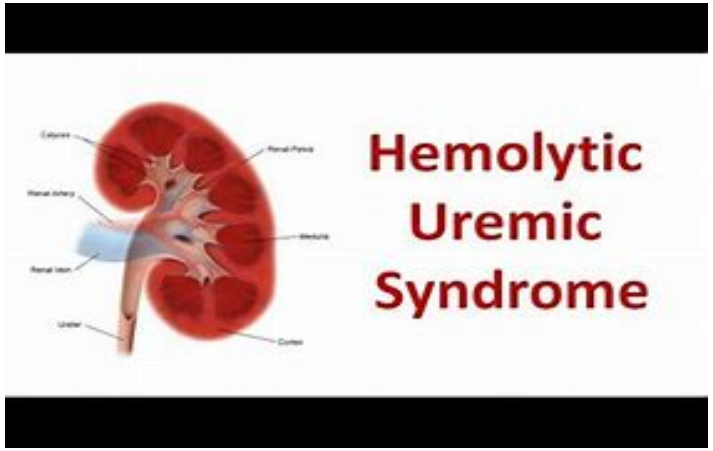
In Children:

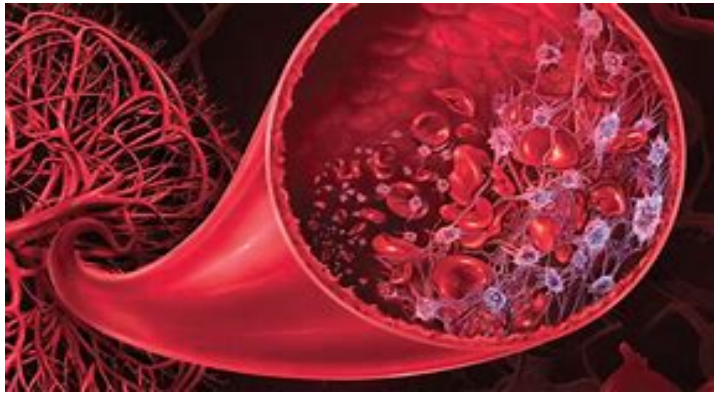
- ***Severe systemic illnesses*** **(20% of reported cases)**

*** Death due to acute pancreatitis in children alone are now uncommon(<2%)**

*** HUS = The most common of all systemic disease causing acute pancreatitis**

*** A.P after organ transplantation is also common.**





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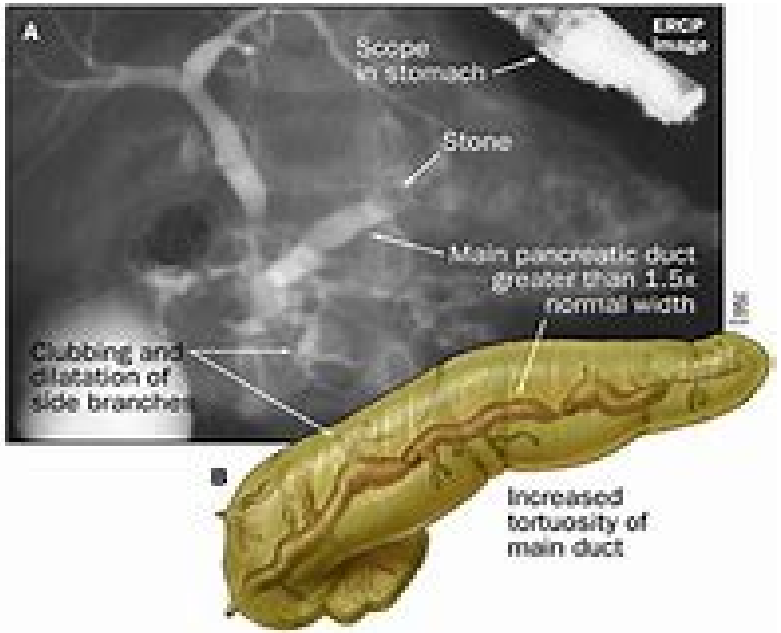
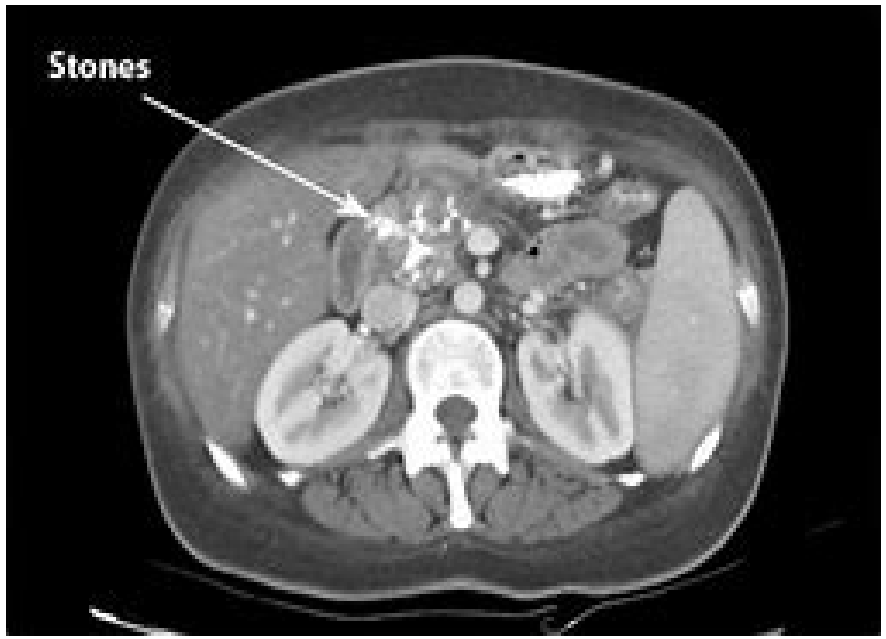
- **Gallstones/Sludge** = An important cause of A.P in children = In 10-30% = Therapeutic ERCP





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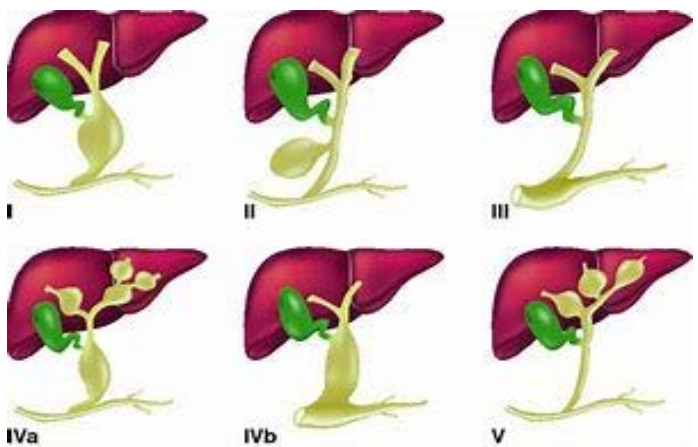
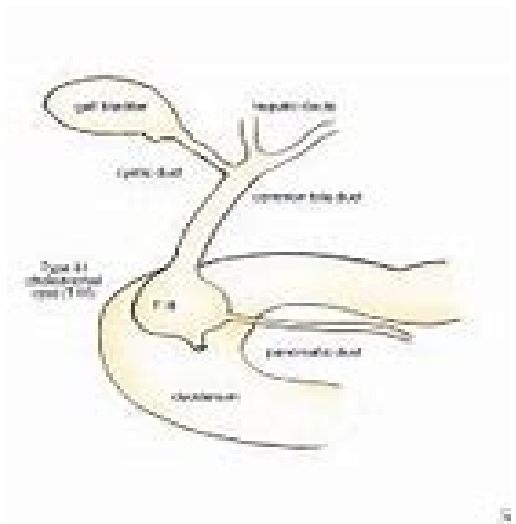
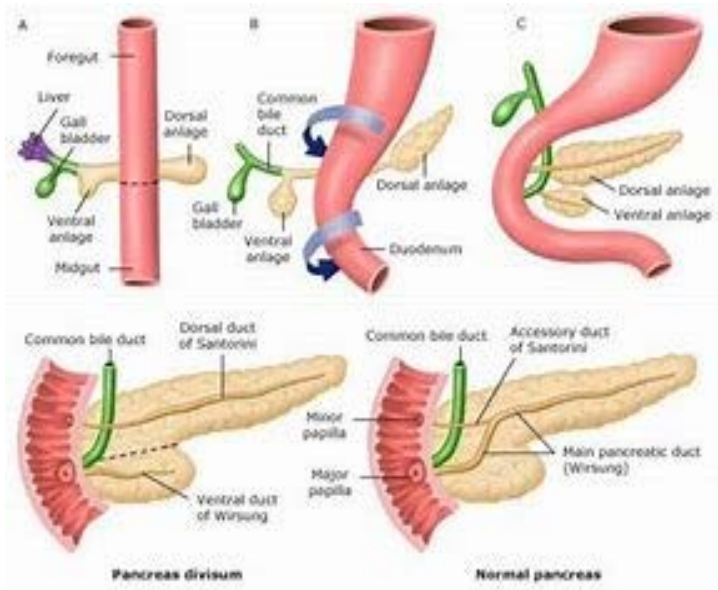
Structural abnormalities = The most commone : Pancreas divisum.

choledochal cysts, choledochoceles, partial pancreas divisum.







- **Infectious** acute pancreatitis (primarily viral) includes:
- ***Mumps,Entrovirus,EBV,HAV,CMV,Rubella,Coxsackie virus, Varicella,Rubeola,measles and influenza virus.***
- ***HIV*** = Frequently develop A.P usually from a secondary infection (CMV,MAI,PCC,Cryptosporidium parvum,)/from medications.
- Bacterial infections
- Helminth infections(Ascaris lumbricoides) = Can be severe, complicated, and difficult to treat.

Medications

- The strongest evidence in adults:
- Azathioprine
- 6MP
- Thiazide diuretics
- Sulfonamides
- Furosemide
- Estrogens
- Tetracycline
- Suggestive evidence for:
- L-asparginase

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- Iatrogenic hypocalcemia
- Chlorthalidone
- CS
- Ethacrynic acid
- Phenformin
- Procainamide

- 25% 0f ped.cases were associated with the use of medications.
- Of this patients , 65% had no other etiology.
-
- Mezalamine , CTX in the most recent series
- Anticonvulsant valproate = The most common medication reported in this series
- The medication age was 8.9 years(range 1-18years)
- Min dose: 4.5 mg/kg/d(range 20-85)

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- Trauma , blunt/accidental/child abuse (common cause = 20% of cases)
- The major concern = pancreatic duct transection
- Post-ERCP pancreatitis
- Familial pancreatitis includes hereditary
- Atypical CF with compound heterozygous CFTR mild-variable mutations or CFTR mutations plus modifying factors , such as SPINK1 mutations , are the most common cause of familial pancreatitis in our experience.
- There is no association between α1-antitrypsin mutations and acute pancreatitis

Evaluation of a child with Acute Pancreatitis should be include:

- Ca – TG – R/O of other metabolic disorders – DKA and inborn errors of metabolism.

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Acute Recurrent Pancreatitis (ARP)

- Is seen in 10% of children after a 1st episode of acute pancreatitis
- 25% of cases are idiopathic.
- Congenital structural anomalies of the biliary tree , pancreas and intestinal tract
- Genetic mutations
- A careful evaluation aimed at identifying reversible causes should be undertaken
- In addition to avoiding another attack of acute pancreatitis one should consider the prevention of chronic pancreatitis through eliminating known risk factors.
- Theorically the progression to chronic pancreatitis may be slowed by the use of antioxydants
- (By reducing the frequency and severity of recurrent symptoms in hereditary pancreatitis) but this approach is currently unproven.

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Diagnosis of Acute Pancreatitis

- Sudden onset of typical abdominal pain + Elevation of amylase or lipase to at least 3 times the ULN
- But both enzymes can be normal when there is radiographic and clinical evidence of pancreatitis.
- Also both enzymes can be elevated by other conditions unrelated to pancreatitis.
- The level of elevation is also not diagnostic , although the higher the level is above the URL the more likely there is to be pancreatic inflammation
- Other pancreatic products: PL A2 , Trypsin , TAP , Elastase are elevated in pancreatitis.
- Elevation of AST and ALT. ↑[AST- ALT] + [amylase or lipase] may be more predictive of pancreatitis than ↑amylase or lipase alone.
- Paine is usually epigastric , RUQ or LUQ with radiation through to the back.

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- But back pain can occur alon or may localize to other areas of the abdomen.
- Nausea/Vomiting
- Fever
- Tachycardia
- Hypotention

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- Jaundice
- Guarding , rebound , ↓bowel sounds
- Feeding intolerance
- Children < 3yr : Atypical symtoms = irritability , abdominal distention and fever
- Ascites or abdominal mass
- Epigastric tenderneass (but nonspecific and unreliable)

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Pancreatic Edema > Necrosis > Hemorrhage

Mild Acute Pancreatitis	Severe Acute Pancreatitits
1. **Severe abdominal pain** in epigastric area /RUQ 2. **Vomiting** 3. **Fevere** 4. Abdominal **distention** 5. Abdominal **tenderness** 6. +/- Abdominal mass 7. +/- **Dehydration** Prognosis: **Good** (If no complication) Lab data: 1. High **Lipase**(***choice and more specific***) 2. High **Amylase**	Patient is **ill**/**toxic**/with severe abdominal pain/nausea/vomiting/**high grade fevere**/**jaundice**/**ascites**/pleural **eff**.(in ***left*** side)/**shock**/**gray Turner** and **Cullen** sign/**necrotic** pancreas(a hemorrhagic inflammatory mass Prognosis: **bad** Lab data: High : Hct-WBC-BS-Urine Glu-GGT-PT/INR-Bil **Low : Ca** ❖ ***CT is recommended for determination of severity***

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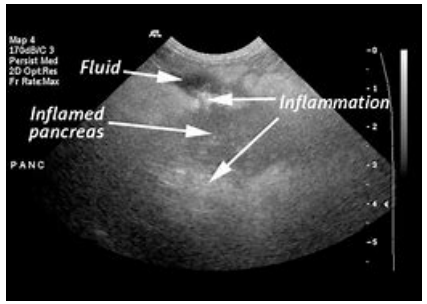

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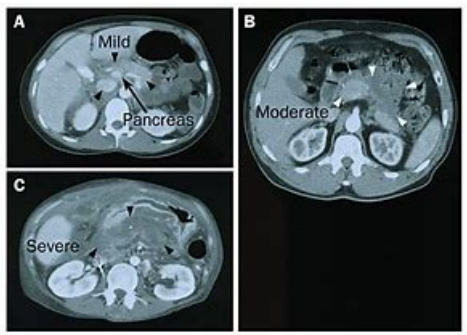
CT scan



Medical Management of Acute Pancreatitis

- Analgesia
- IV fluids
- Pancreatic rest
- Monitoring for complications
- Volume expansion early the course of acute pancreatitis is important for :
- *Cardiovascular stability
- *Preventing development of pancreatic necrosis

Full attention to fluid balances because:

1.Patients kept without food

2.Third spacing

3.Fluid loss from NGT used to decompress the stomach(as a Tx for vomiting)

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- **Meperidine** 1-2 mg/kg IM or IV for pain control

- **Entral/Total parentral nutrition** are offen unnecessary in mild cases but should be instituted early if a severe or prolonged course is anticipated.

- **Antibiotics** are usually unnecessary except for the most severe cases especially if significant necrosis is present.

Severity of Acute Pancreatitis

- Acute pancreatitis can be life-threatening
- The *early causes* of death:
- 1.cardiovascular collapse = vascular leakage syndrome with 3rd spacing of fluid + vomiting + making the patient NPO.
- Tx: Fluid resuscitation guided , by following CVP.

- 2.respiratory failure = ARDS like (leakage of fluid into alveolar spaces + inflammation)

- Late life-threatening complications :
- are related to infected pancreatic necrosis and multiple organ failure (pancreatic necrosis is uncommon in children : 0.3%)
- How we can help limit these late complications ?
- 1.Judicious use of antibiotics
- 2.Attention to nutrition

Complications of Acute Pancreatitis

- **Local :**
- Edema
- Inflammation
- Fat necrosis
- Phlegmon
- Pancreatic necrosis
- 1.Steril
- 2.Infected
- Abscess
- Hemorrhage
- Fluid collections
- Psuedocysts
- Duct rupture and strictures
- Extention to nearby organs

- **Systemic :**
- Shock
- Pulmonary edema
- Pleural effusion
- Acute renal failure
- Coagulopathy
- Hemoconcentration
- Bacteremia/sepsis
- Distant fat necrosis
- Vascular leak syndrome
- Multiorgan system failure
- Hypermetabolic state
- Hyperglycemia

Pathophysiology of pancreatitis

- Distruction/obstraction of ducts > Change trypsinogen into trypsin > activation of other proenzymes > Autolysis + Pancreastasis

- Edema > Necrosis (localased or diffused) > Rupture of vessles > Hemorrhage > Inflammatory response in peritoneum

Diagnostic criteria

2 of 3 :

1)Abdominal pain

2)Amylase or Lipase >= 3[ULN]

3)Imaging findings

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Cullen / Gray Turner