

PANCREATITIS

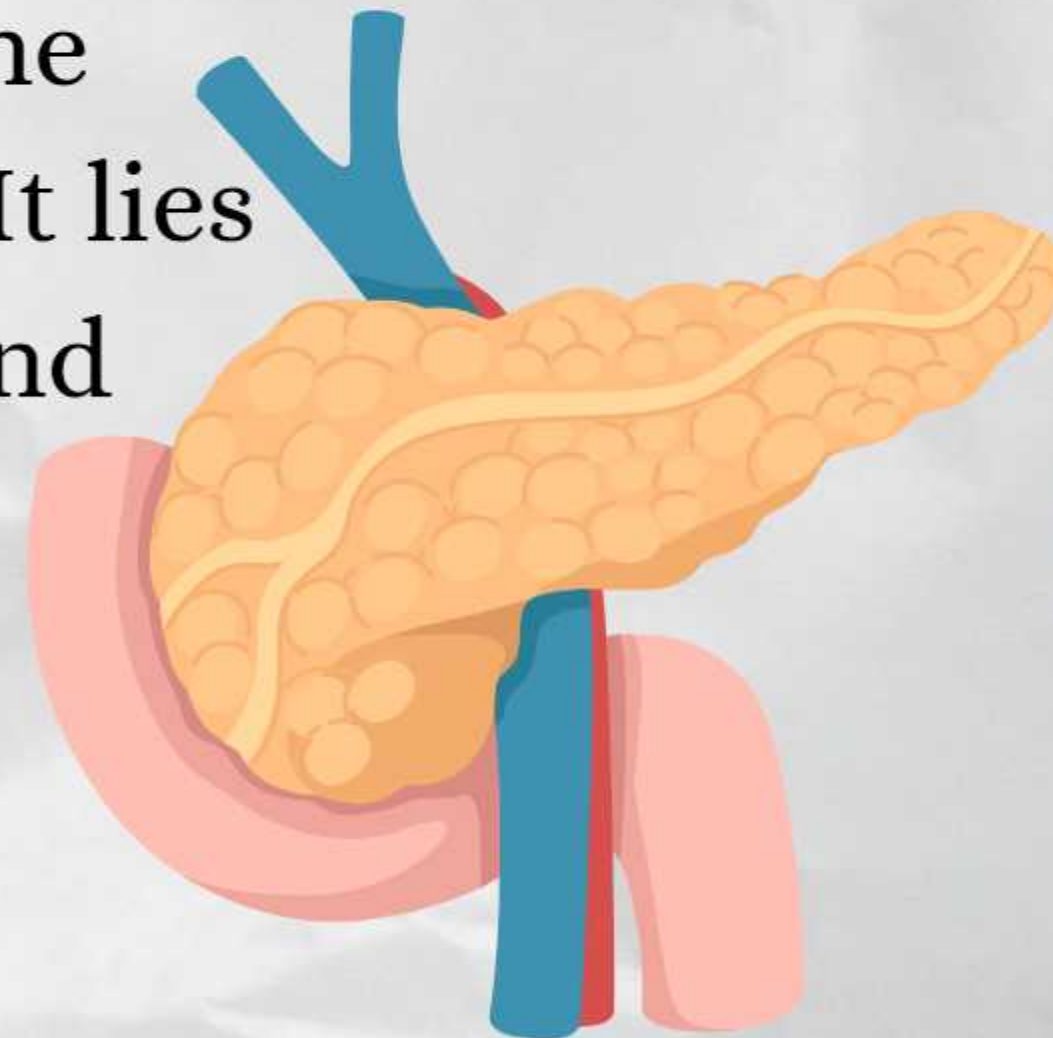


CONTENT LAYOUT

- **INTRODUCTION**
- **DEFINITION**
- **EPIDEMIOLOGY AND ETIOLOGY**
- **PATHOGENESIS**
- **SIGN & SYMPTOMS**
- **INVESTIGATIONS**
- **MANAGEMENT**
- **COMPLICATIONS**

Intro ; Quick revision

- The pancreas is an extended, accessory digestive gland that is found **retroperitoneally**, crossing the bodies of the L1 and L2 vertebrae on the posterior abdominal wall and it weighs about 90 grams with 12-15 cm long.
- lies transversely in the **upper abdomen** between the duodenum on the right and the spleen on the left, It lies behind the stomach and lesser sac and wraps around superior mesenteric artery and vein.
- It is divided into the head, neck, body, and tail.
- It is supplied by the pancreatic branches of the **splenic artery**.



Intro ; Quick revision

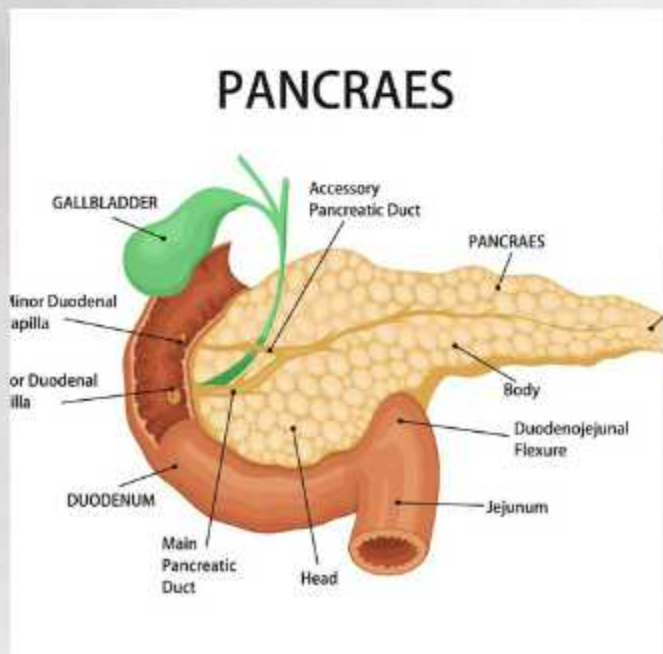
- The pancreas produces an **exocrine** secretion (pancreatic juice from the acinar cells) which then enters the duodenum through the main and accessory pancreatic ducts and **endocrine** secretions (glucagon and insulin from the pancreatic islets of Langerhans) that enter the blood.

Endocrine

Alpha cells – Glucagon
Beta cells – insulin
Gamma cells – polypeptides
Delta cells – somatostatin

Exocrine

Alpha amylase – starch digestion
Lipase – fat digestion
Proteases – protein digestion



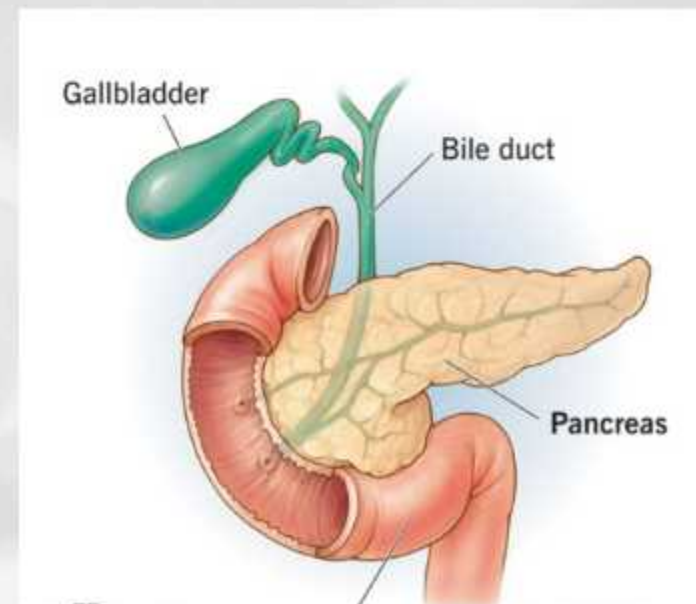
Definition; acute pancreatitis

- Acute pancreatitis is a serious condition where the pancreas becomes inflamed over a short period of time, due to premature activation of pancreatic enzymes and autodigestion of peripancreatic tissues.
- Most people with acute pancreatitis improve within a week and experience no further problems, but severe cases can have serious complications and can even be fatal.
- An acute condition presenting with abdominal pain, a three fold or greater rise in the serum levels of the pancreatic enzymes amylase or lipase, and/ or characteristic findings of pancreatic inflammation on contrast- enhanced CT



Epidemiology and etiology

The two major causes of acute pancreatitis are biliary calculi, which occur in 50–70% of patients, and alcohol abuse, which accounts for 25% of cases



CAUSES OF ACUTE PANCREATITIS

- I**DIOPATHIC
- G**ALLSTONES
- E**THANOL
- T**RAUMA (PENETRATING)
- S**TEROIDS
- M**UMPS
- A**UTOIMMUNE
- S**CORPION STING
- H**YPERLIPIDEMIA/**H**YPERCALCEMIA
- E**NDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY (ERCP)
- D**RUGS



Definition; Chronic pancreatitis

- Progressive inflammatory disease of the pancreas that affects both functions of the pancreas. For example, when the exocrine function is affected, patients present with pancreatic insufficiency, steatorrhea, and weight loss.
- **Pancreatic insufficiency** results when greater than 90% of the organ is damaged. The incidence depends on the severity of the disease and can be as high as 85% in severe chronic pancreatitis. On the other hand, impairment of the endocrine function of the pancreas eventually results in pancreatogenic diabetes (Type 3c diabetes)

Epidemiology and etiology

- Causes of chronic pancreatitis include **alcohol abuse**, ductal obstruction (malignancy, stones, trauma), genetics (cystic fibrosis, hereditary pancreatitis), chemotherapy, and autoimmune diseases such as systemic lupus erythematosus (SLE) or autoimmune pancreatitis.
- The alcohol (most common cause) increases the secretion of proteins from acinar cells, causing the fluid to become viscous, leading to ductal obstruction, acinar fibrosis, and atrophy. Fortunately, less than 10% of alcoholics develop chronic pancreatitis, so it suggests that other mechanisms play a role in the pathology.

Table 1. Causes of Chronic Pancreatitis

Common	Frequency (%)
Alcoholic	65–80
Idiopathic	15–30
Uncommon	
Autoimmune	3–5
Obstructive	3–5
Rare	
Hereditary	<1
Hypertriglyceridemia	<1
Hyperparathyroidism	<1

Data extracted from Witt H et al,¹ Etemad B et al,² and DiMagno MJ et al.³

Epidemiology and etiology

- Compared to other illnesses, chronic pancreatitis is **hard** to identify. In cases where the disease is secondary to alcohol, it can go largely undiagnosed since chronic pancreatitis is progressive. The diagnosis can take a long time to be discovered.
- chronic pancreatitis due to alcohol is more common in **males**, whereas that due to hyperlipidemia is more common in females.
- The median age at diagnosis is **45**.



The background of the slide features a close-up, grayscale image of crumpled paper, creating a textured, three-dimensional effect. A thick, solid blue arc curves across the top of the image, starting from the left edge and extending towards the right. Centered on the crumpled paper is the word "Pathogenesis" in a bold, blue, sans-serif font.

Pathogenesis

ACUTE PANCREATITIS :

- Inflammation of the pancreas due to Premature activation of pancreatic enzyme within the pancreas, leading to a process of autodigestion.
- Anything that injures the acinar cell and impairs the secretion of zymogen granules or damages the duct epithelium and thus delays enzymatic secretion, can trigger acute pancreatitis.
- Once cellular injury has been initiated, the inflammatory process can lead to pancreatic edema, hemorrhage and, eventually, necrosis
- Inflammatory mediators and cytokines provoke local and systematic effects

- As inflammatory mediators are released into the circulation, systemic complications can arise , such as :

- 1. Increased permeability → hypovolemia and hypotension**
- 2. Acute respiratory distress syndrome and pleural effusion**
- 3. Renal failure / kidney injury**
- 4. Disseminated intravascular coagulation (DIC)**
- 5. Hemorrhage**

- Acute pancreatitis may be categorized as mild (interstitial edematous pancreatitis) or severe (necrotizing pancreatitis).
- The former is characterized by interstitial edema of the gland and minimal organ dysfunction.
- The majority of patients will have a mild attack of pancreatitis, the mortality from which is around 1%.
- Severe acute pancreatitis is seen in 5–10% of patients, and is characterized by pancreatic necrosis, a severe systemic inflammatory response and often multi-organ failure
- In those who have a severe attack of pancreatitis, the mortality varies from 20 to 50%

EARLY PHASE :

- It is characterized by a systemic inflammatory response syndrome (SIRS) which – if severe – can lead to transient or persistent organ failure (deemed persistent if it lasts for over 48 hours).
- About one-third of deaths occur in the early phase of the attack, from multiple organ failure
- It usually lasts a week

LATE PHASE :

- Typically, in those who suffer a severe attack and can run from weeks to months.
- It is characterized by persistent systemic signs of inflammation, and/or local complications, particularly fluid collections and peripancreatic sepsis.
- Deaths occurring after the first week of onset are often due to septic complications.

CHRONIC PANCREATITIS :

- Chronic pancreatitis is a progressive inflammatory disease in which there is irreversible destruction of pancreatic tissue
- It's characterized by diffuse Scaring and To pancreatic duct and tissue and commonly leads to endocrine and exocrine insufficiency

Causes

1. Alcohol abuse is the most common cause(70%)
2. Obstruction
3. Metabolic (hypercalcemia, hypertriglyceridemia)
4. Hereditary pancreatitis (cystic fibrosis)
5. Congenital



CLINICAL PRESENTATION

ACUTE PANCREATITIS :

- Pain is the cardinal symptom
- It develops quickly reaching a maximal intensity within minutes and then persists for days or even weeks
- The pain is severe , constant and poorly responsive to analgesia
- The pain is felt first at the epigastrium and may be localised to one of the upper quadrants
- 50% of patients report pain radiating to the back
- Many patients gain relief by sitting or leaning forwards

ACUTE PANCREATITIS :

- The suddenness of onset may simulate a perforated peptic ulcer
- Radiation to the chest can simulate myocardial infarction, pneumonia or pleuritic pain
- In fact, acute pancreatitis can mimic most causes of the acute abdomen and should not be discounted in differential diagnosis

ACUTE PANCREATITIS :

- Nausea, repeated vomiting and retching are the most common symptoms to be associated with acute pancreatitis
- Hiccups are a troublesome association with the pain



ACUTE PANCREATITIS :

Physical examination :

- The general appearance may vary between that of a patient who is well or, at the other extreme, one who is severely ill with profound shock, toxicity and confusion.
- Vital signs usually show tachycardia , hypotension and tachypnea .
- The body temperature is often normal or even subnormal, but frequently rises as inflammation develops .
- Mild jaundice can be caused by biliary obstruction in gallstone pancreatitis .

ACUTE PANCREATITIS :

Physical examination :

- Bleeding into the fascial planes can produce ecchymosis of the flanks (Grey Turner's sign) or umbilicus (Cullen's sign) .
- Subcutaneous fat necrosis may produce small, red, tender nodules on the skin of the legs .



ACUTE PANCREATITIS :

Physical examination :

- Abdominal examination may reveal distension due to ileus or, more rarely, ascites with shifting dullness .
- A mass can develop in the epigastrium due to inflammation .
- Muscle guarding in the upper abdomen is usually present . Rigidity rarely occur .
- A pleural effusion is present in 10–20 per cent of patients .
- Pulmonary edema and pneumonitis are often described give rise to the differential diagnosis of pneumonia , myocardial infarction or heart failure .

CHRONIC PANCREATITIS :

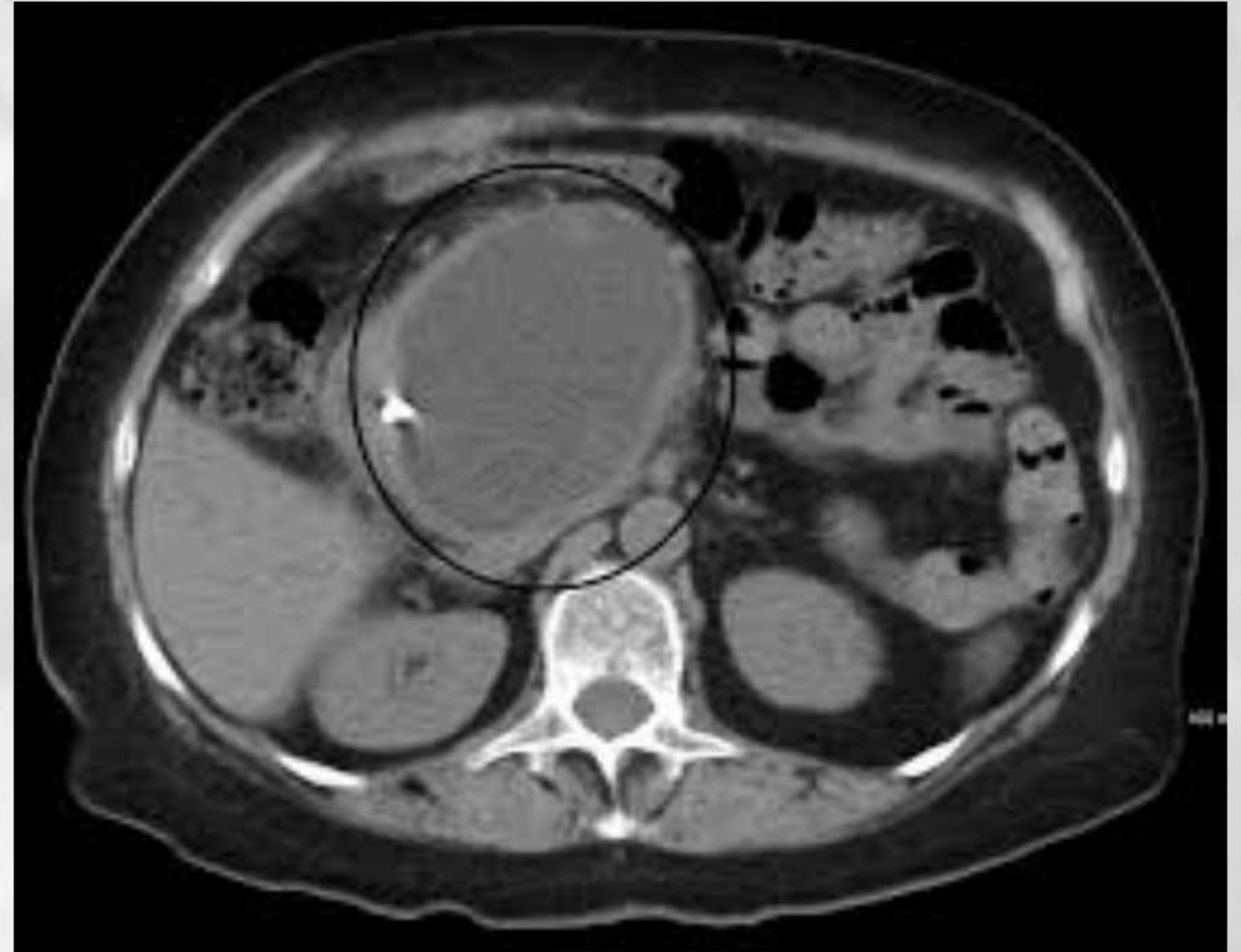
- Pain is the most important symptom in the majority of patients
- The site of pain depends to some extent on the main focus of the disease
- If the disease mainly involves the head of the pancreas, then epigastric and right subcostal pain is commonly described
- On the other hand , if the pain is limited to the body and tail of the pancreas, left subcostal and back pain are described
- Some patients describe the pain as more of a diffuse , dull abdominal pain
- Radiation to the shoulder, usually the left shoulder, occurs .
- Early in the course of the disease, the pain may be episodic, lasting for days to weeks and then vanishing for several months before returning again

CHRONIC PANCREATITIS :

- Weight loss is common, because the patient usually loses the appetite
- Nausea and vomiting usually accompany the attacks
- Attacks of acute pancreatitis may occur, superimposed on the pattern of chronic pain.
- Loss of exocrine function leads to steatorrhoea in more than 30 per cent of patients with chronic pancreatitis.
- Loss of endocrine function and the development of diabetes is not uncommon
- Many patients become addicted to the narcotics prescribed for pain

Pancreatic Pseudocyst :

- pocket of fluid that develops outside of your pancreas after it's been injured, usually by pancreatitis.
- A severe case of pancreatitis can cause the pancreatic duct to leak. When pancreatic juices leak, the digestive enzymes can irritate the surrounding tissues. A protective capsule forms around the leak, made of fibrous, scar-like tissue. This is a pseudocyst.





INVESTIGATIONS

ACUTE PANCREATITIS :

- Typically, the diagnosis is made on the basis of the clinical presentation and an elevated serum amylase level
- A serum amylase level three to four times above normal is indicative of the disease .
- However , normal serum amylase level does not exclude acute pancreatitis, particularly if the patient has presented a few days after the onset
- Serum lipase level provides a slightly more sensitive and specific test than amylase

ACUTE PANCREATITIS :

- A CBC should be performed to check for anemia and leukocytosis
- Usually serum calcium levels drop in severe pancreatitis as it become bound to fatty acids
- Liver function test is also useful to evaluate for gallbladder pathology
- Blood sugar is measured to evaluate the endocrine function of the pancreas
- Arterial blood gas study might be done to evaluate for any respiratory distress

ACUTE PANCREATITIS :

IMAGING

- Plain erect abdominal X-ray is not diagnostic but it is useful in the differential diagnosis
- Calcified gallstones or pancreatic calcifications can be discovered on X-ray
- Chest X-rays can show any Pleural effusions or ARDS



ACUTE PANCREATITIS :

IMAGING

- Ultrasonography is not diagnostic although it can detect any pancreatic swelling
- It should be performed within 24 hours of presentation to exclude gallstones , acute cholecystitis or dilated common bile duct

ACUTE PANCREATITIS :

IMAGING

- CT is not necessary for all patients, particularly those deemed to have a mild attack on prognostic criteria
- However, a CT with IV contrast is indicated in the following situations:
 1. If there is diagnostic uncertainty
 2. Organ failure , sepsis and a deteriorating patient
 3. Suspected localised complication (fluid,pseudocyst,pseudoaneurysm)
 4. in patients with severe acute pancreatitis, to distinguish interstitial from necrotising pancreatitis

ACUTE PANCREATITIS :

IMAGING

- Cross-sectional MRI can yield similar information to that obtained by CT
- EUS and MRCP can help in detecting stones in the common bile duct and directly assessing the pancreatic parenchyma, but are not widely available
- ERCP allows the identification and removal of stones in the common bile duct in gallstone pancreatitis
- In patients with severe acute gallstone pancreatitis and signs of ongoing biliary obstruction and cholangitis, an urgent ERCP should be sought

CHRONIC PANCREATITIS :

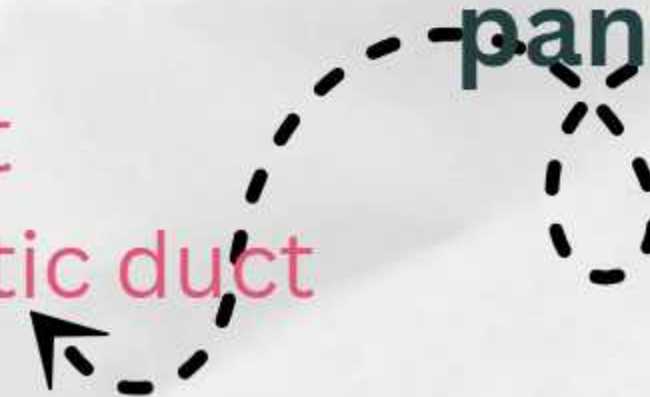
- Only in the early stages of the disease will there be a rise in serum amylase
- Tests of pancreatic function only confirm the presence of pancreatic insufficiency or that more than 70% of the gland has been destroyed.
- Pancreatic calcifications may be seen on abdominal x-ray
- CT or MRI scan will show the outline of the gland, the main area of damage and the possibilities for surgical correction
- An MRCP will identify the presence of biliary obstruction and the state of the pancreatic duct
- The use of intravenous secretin during the study may demonstrate a pancreatic duct stricture that is not apparent on a standard MRCP

CHRONIC PANCREATITIS :

- ERCP is the most accurate way of elucidating the anatomy of the duct and, in conjunction with the whole organ morphology, can help to determine the type of operation required, if operative intervention is indicated
- EUS can also be very useful , findings characteristic of chronic pancreatitis include :

1. The presence of stones
2. The presence of cysts
3. Lobularity
4. Irregular main pancreatic duct
5. Dilation of the main pancreatic duct
6. Hyperechoic margins of the main pancreatic duct

Four or more of these features is highly suggestive of chronic pancreatitis.

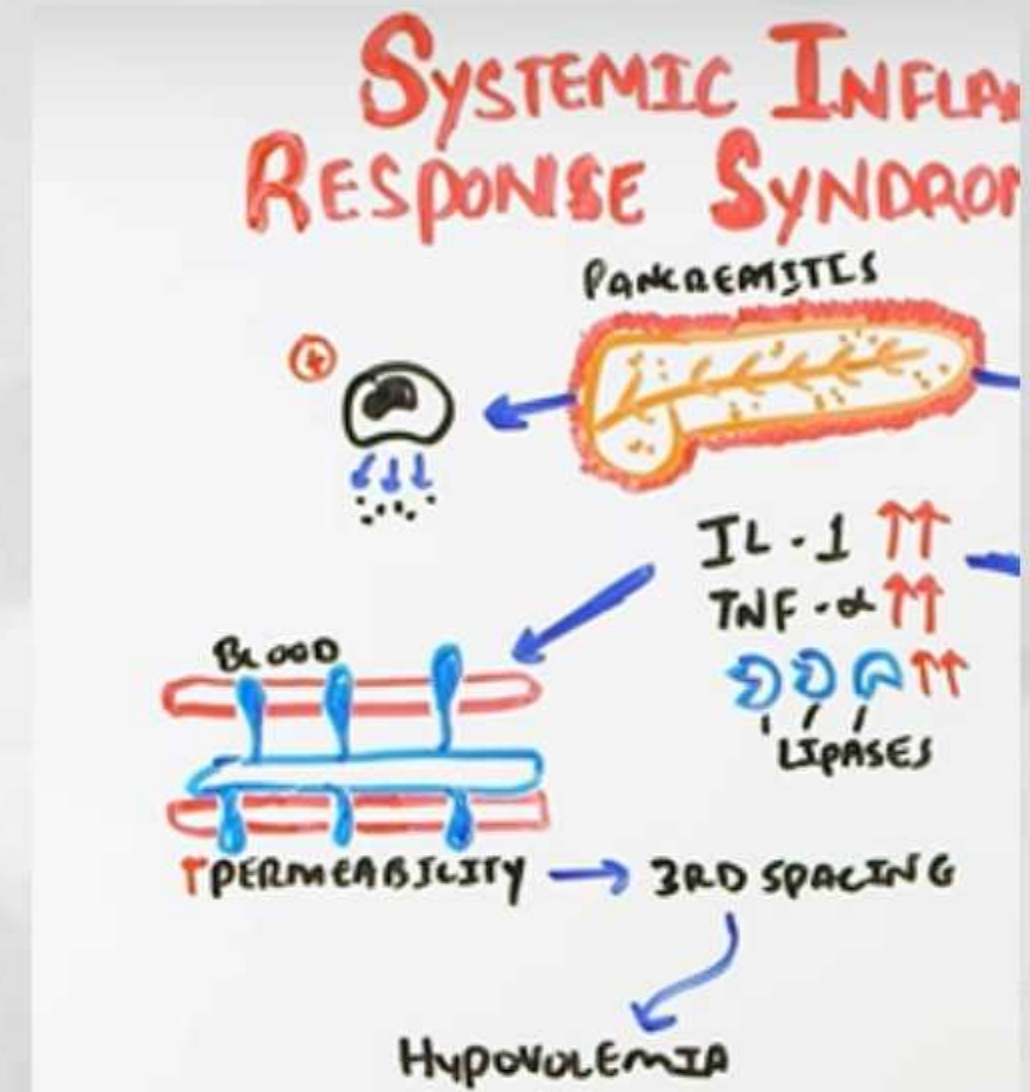


The background of the slide features a close-up, grayscale image of crumpled paper, creating a textured, three-dimensional effect. A thick, solid blue arc curves across the top of the frame, starting from the left edge and extending towards the right. Centered horizontally in the middle of the slide is the word "COMPLICATIONS" in a bold, blue, sans-serif font.

COMPLICATIONS

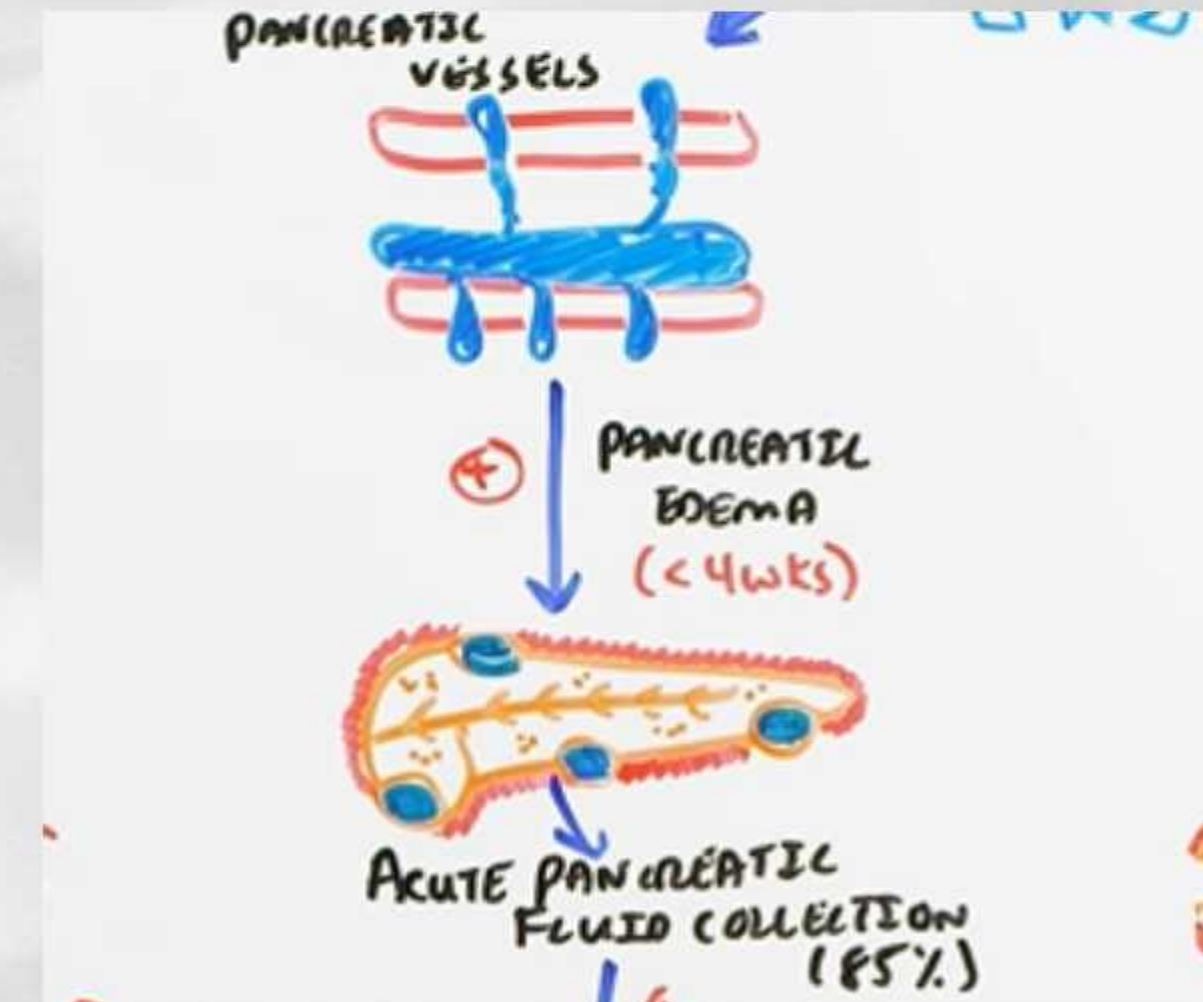
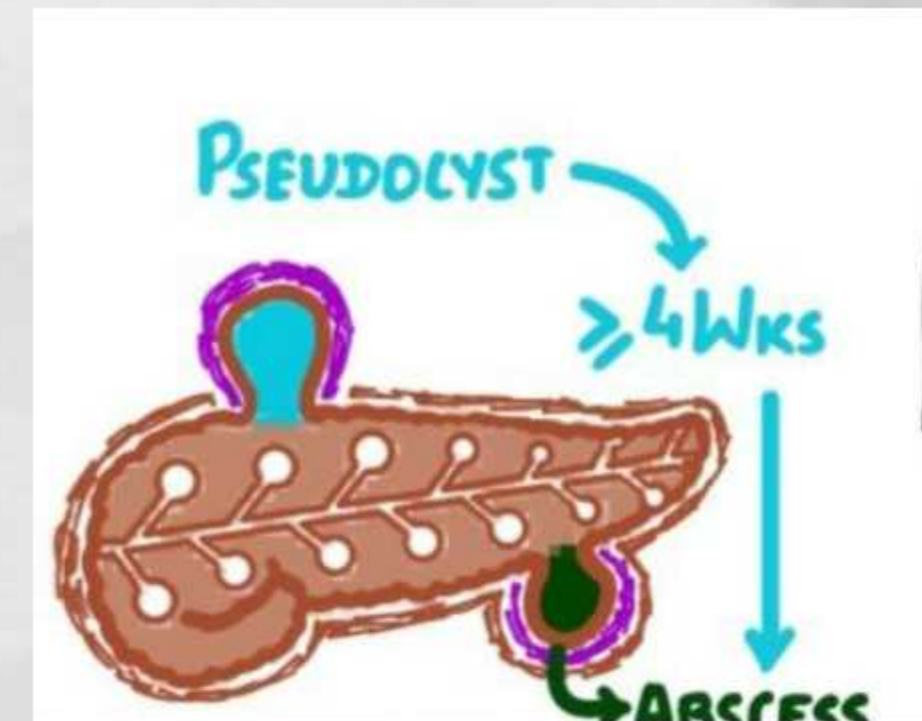
1. Systemic inflammatory response syndrome (SIRS)

- Neutrophils can also stimulate macrophage to release IL1, IL-6 and TNF- α that act on blood vessels to undergo a vasodilatory response and increase permeability (leaky) $\rightarrow$ fluids can leak into the interstitial space $\rightarrow$ hypovolemia $\rightarrow$ shock



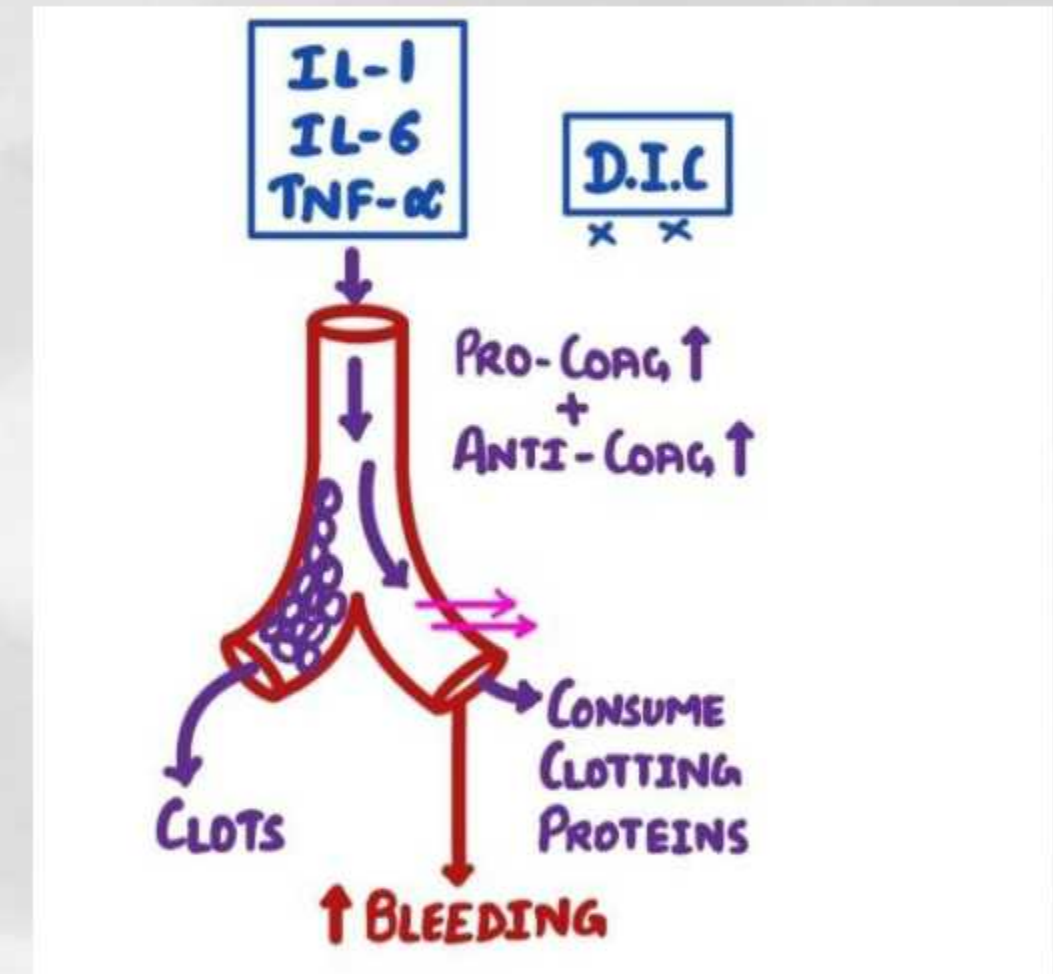
2. Pancreatic edema

- IL-1, IL-6 and TNF will increase the permeability in the pancreatic vessels, that will cause a leakage into the pancreatic tissues
- if edema continues, pancreatic pseudocyst will appear
- This pseudocyst may get inflamed, or ruptured and leading to peritonitis



3. Disseminated intravascular coagulation (DIC)

- IL-1, IL-6, and TNF Act on the coagulation enzymes = $\uparrow$ procoagulant and $\downarrow$ anti-coagulant protein activity
- That will increase the consumption of platelets and the coagulation factor $\rightarrow$ increase bleeding
- PT/INR will be prolonged



4. Alveolar edema and plural effusion

5. Acute kidney injury due to low perfusion

6. Ascites



MANAGEMENT

- 1. Intravenous fluid administration**
- 2. Brief period of fasting (nil by mouth)**
- 3. Antibiotics are not indicated?!**
- 4. Analgesia**
- 5. Antiemetic**
- 6. Supplement oxygen**
- 7. Remove the stone (ERCP or cholecystectomy)**
- 8. Treat the addiction**

9. Correct malabsorption (pancreatic enzymes replacement)

10. Endoscopic drainage of pseudocyst

11. Insulin

CAN WE USE ANTIBIOTICS TO TREAT PANCREATITIS ?

- **Prophylactic antibiotic isn't recommended**
- **Antibiotic in pancreatitis only if there is infected pancreatic necrosis or other documented infection (UTI, chest infection, cholangitis, acute cholecystitis.etc)**

THANK YOU

DONE BY : ABD ALRAHMAN AL-HARBI , JEHAD HAMDAN
, SHADI ABU TA'A , NOUR ALJBOUR , JOOD ABDALGHANI

GROUP A2