

Pancreatic Problems

Notes are in blue

Important things said by Dr. Faisal Al-saif are in red

429 Surgery Team

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Main Objectives:

1. Acute Pancreatitis focus on it, it is the commonest & its management is critical
 2. Chronic Pancreatitis not a medical ER
 3. Pancreatic Tumors not a medical ER
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1- Acute Pancreatitis (definition is very important)

- A non-bacterial inflammatory disease caused by activation and autodigestion of the pancreas by its own enzymes

* Usually the pancreatic enzymes are not in the active form until they reach the duodenum

* what causes the activation of the enzymes?

Mainly, something that increases the pressure in the pancreatic duct

Etiology 1&2 are the most IMP. (In acute pancreatitis, the most common cause is Gallstones. The second most common cause is alcohol abuse)

1. Gall stones

- a. usually small gall stones when they pass from the gall bladder through the cystic duct they stop at the ampulla of vatar causing blockage of the bile duct and pancreatic duct which increases the pressure >>> push enzymes back inside the pancreas & activate them causing the acute pancreatitis process.
- b. Most of these gall stones will pass, it is transient – how do we find out that? We examine the stool and find small stones in their feces.

2. Alcohol by 2 theories

- a. why do they keep drinking although they have pancreatitis, because alcohol relieves their pain
 - i. direct toxic effect of alcohol ("alcohol is cytotoxic", triggers the inflammatory process)
 - ii. Transient ischemia, when drinking alcohol it causes cutaneous vasodilation, blood shifts from viscera to SC tissue causing transient

ischemia in visceral organs, pancreas is very sensitive to ischemia, the 1st organ we lose they call it "elorgan eldalooo3"

3. Hypercalcemia

- a. pepsinogen is converted to pepsin by calcium!
- b. Chemotrypsinogen is converted to chemotrypsin by the calcium as well,
 - i. So Ca helps activating the pancreatic enzymes. it also helps other organs in their function, such as the liver. In cases of Hypercalcemia, Ca causes more conversion, same happens in peptic ulcer also.
 - ii. Ca + fat = soapification, happens if inflammation is very severe, Ca in the serum will be decreased because it's being used in the process of soapification (we can actually see soap if we open up the patient) –
 - 1. So don't be fooled if the serum Ca level is normal in the acute attack!! Maybe it was high but because it is consumed in the soapification it went down back to normal.

4. Hyperlipidemia

- a. hypertriglycerides, levels of TG go up with any inflammation, so TG level goes up in the acute... Although when you find high levels of TG, don't assume that it caused the pancreatitis, maybe it went up b/c of the pancreatitis, unless it is very high 20-40 for ex., and the normal is 4, associated with high Ca – they have to have dialysis for TG. So when the inflammation settles down, repeat the test and check the levels again to know which has caused the other.

He literally said the others are not important

5- Familial

6- Drug induced:

remember these 5 commonly used drugs:

diuretics (thiazides and lasix), hormonal replacement therapy, oral contraceptive pills, and steroids. Don't forget them!

7- Obstruction:

tumor – in 1% of pt having acute pancreatitis is b/c of pancreatic adenocarcinoma

8- Viral infections:

like coxiella virus and mumps

9- Iatrogenic after ERCP usually triggers, contrast to the pancreatic duct >> high pressure >>> activation ... so try not to cannulate the pancreatic duct only the bile duct

10- Trauma

11- Scorpion bite

12- Idiopathic

History

- Acute Epigastric pain radiating to the back, pancreas is retroperitoneal organ typically patients present holding their epigastrium and leaning forward so the pancreas drops forward away from the nerves and that decreases the pain sensation
- Nausea and vomiting body defense mechanism to tell u not to eat or drink, avoiding pancreas stimulation exacerbating pancreatitis, not necessary to be an obstruction
- Previous attacks an etiology that caused previous attack and was not treated they might present 2nd and 3rd time, for ex. gall stone, alcoholic (so ask the pt. about these 2), or Hypercalcemia or hyperlipidemia and it wasn't treated ...
- Underlying disease
Mainly gall stone and alcohol so treat the underlying cause to prevent recurrence

Examination

- BP ↑ PR and Temperature
- Dehydration
- Shock
- Epigastric tenderness
- Pleural effusion (occurs basally on the left lung)
- Grey Turner's u have to "turn" the pt. to see it, so it's "turner's" & Cullen's signs



THE MOST IMPORTANT thing in Acute Pancreatitis is IV FLUID REPLACEMENT:

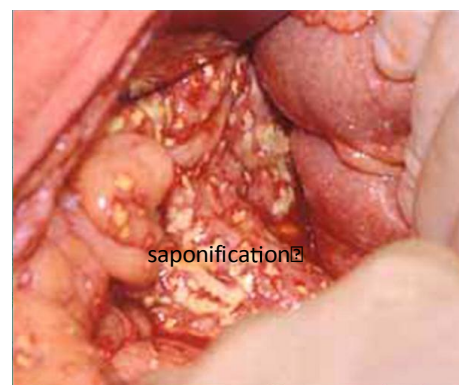
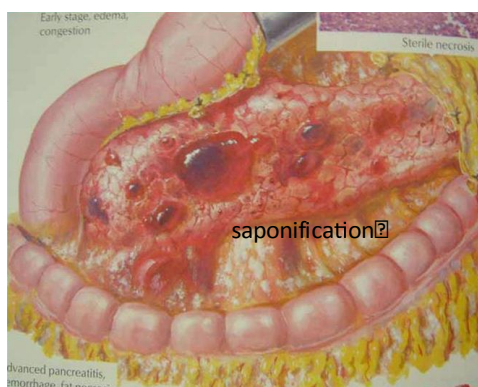
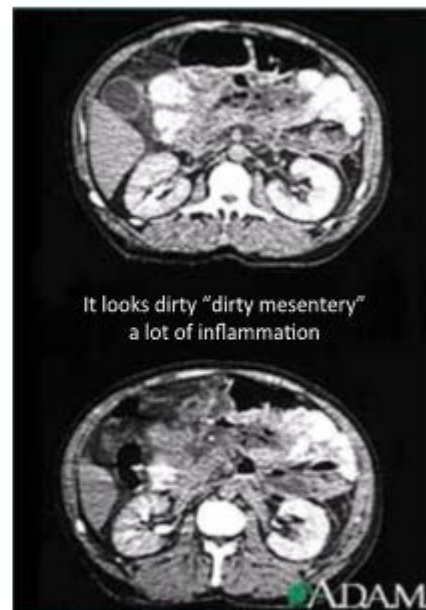
- Any inflammation that happens causes edema, pancreas is a very big organ in a very big cavity, and so do you think the edema would be small, large, or huge? It is HUGE, patient can lose 3-4 L from edema just around the pancreas, so they can present with hypotension and tachycardia, high temperature, dehydration and shock.
- So how do you save their lives?? IV fluids!!! the most important thing is to give your pt in the ER 3-4 L of IV fluid NS/Ringer's, don't wait, otherwise u will increase their mortality and make them sicker, b/c they will get epigastric tenderness obviously that is like an acute abdomen but it doesn't need surgery.
- So in the ER when you have a patient with acute abdomen rule out 1st pancreatitis before taking him to the OR, operating on pancreatitis is veeeery bad, they don't need surgery.
- The tail of the pancreas is close to the Left hemi diaphragm, so the edema around it will accumulate in the chest they will get pleural effusion as a part of the reaction to inflammation, it is called sympathetic effusion.
- When the inflammation is very severe around the pancreas, enzymes will start ingesting the pancreas, and eat up the arteries which results in bleeding which is called hemorrhagic pancreatitis!!!
 - The bleeding is retroperitoneal, and it will go around, so u will see Grey Turner's (bl. around the flank) & Cullen's signs (bl. around the umbilicus)
- ACUTE PANCREATITIS IS THE ONLY ACUTE ABDOMEN EMERGENCY THAT DOESN'T NEED SURGERY! MCQ!

Lab

- ↑WBC leukocytosis due to **inflammation** not infection!
- ↑Lipase **more specific** to the pancreas than amylase
- ↑Amylase **more sensitive, shorter ½ life** – goes up quickly & down quickly, secreted from everywhere in the GI from mouth to anus, ovaries and fallopian tubes (high in any GI problem & ectopic pregnancy). If you catch the patient very early, you'll find that the lipase is normal and amylase is elevated more than 1000, nothing else would cause it to be high like that.
- Ca & lipids mentioned earlier in the notes, so we have to measure them twice

Radiology

- AXR → sentinel loop
 - 1 or 2 small bowel loops dilated around the pancreas *generalized peritonitis causes ileus (painful obstruction) of the whole small bowel, localized peritonitis causes localized ileus "sentinel loop" rarely seen
- CT → Phlegmon very good examination to diagnose acute pancreatitis



The fat around the pancreas is infected only by the lipases from the degenerating pancreas resulting in necrosis. This, in combination with calcium, leads to the formation of soaps saponification.

Ranson's Criteria MCQ!!! Always comes in the exam

Doesn't help in the management, but gives you an idea about the prognosis (pt A will do better than pt. B)

1. On admission:

- Age > 55 : the older the pt, the worse the prognosis
- WBC > 16,000 : more inflammation
- Glucose > 11 : pancreas is diseased and cannot secrete insulin
- AST >250 & LDH >350: they are enzymes that tell u the inflammation is higher

*if the pt scores more it means his prognosis is worse!

2. During 34-48 hrs :

- Hematocrit ↓ >10% : means there's hemorrhage! "Hemorrhagic pancreatitis"
- Urea ↑ > 8mg/dl : means pt. is dehydrated >> what saves pt. life is IV fluids
- Fluid sequestration > 6 L : how much fluid is in the abdomen, it depends on how much u need to give the pt. fluids to make him stable, so If u have to give the pt 6L of IV fluids that means he lost 6 L of fluid
- PO2 < 60 : the pt is having difficulty breathing b/c of fluids and inflammation,
- Base deficit > 4: if there's acidosis, acidosis means hypotension
- Ca < 8 mg/dl remember saponification, so the more Ca drops, the worse the inflammation

* ↓HCT, ↑Urea, Fluid sequestration, base deficit are all related to hypovolemia, how to Rx?? >>>> give pt. IV fluids!!!

Management

1- Rest the patient (Analgesia) they have very bad pain

2- Rest the bowel (NG) put a nasogastric tube for the pt. if they are vomiting

3- Rest the pancreas (NPO + **IVF**) – NPO: Nil per Os (nothing by mouth)

* do they need Abx (antibiotics)??! Nooo! But a lot of ppl think they need and give them b/c pt has fever and leukocytosis, and that's wrong... Giving Abx in acute pancreatitis is like a white guy in a basketball team :p looks nice but it doesn't do u any good !!! so Noooo Abx please, just give them IV fluids for God's sake !! ☺

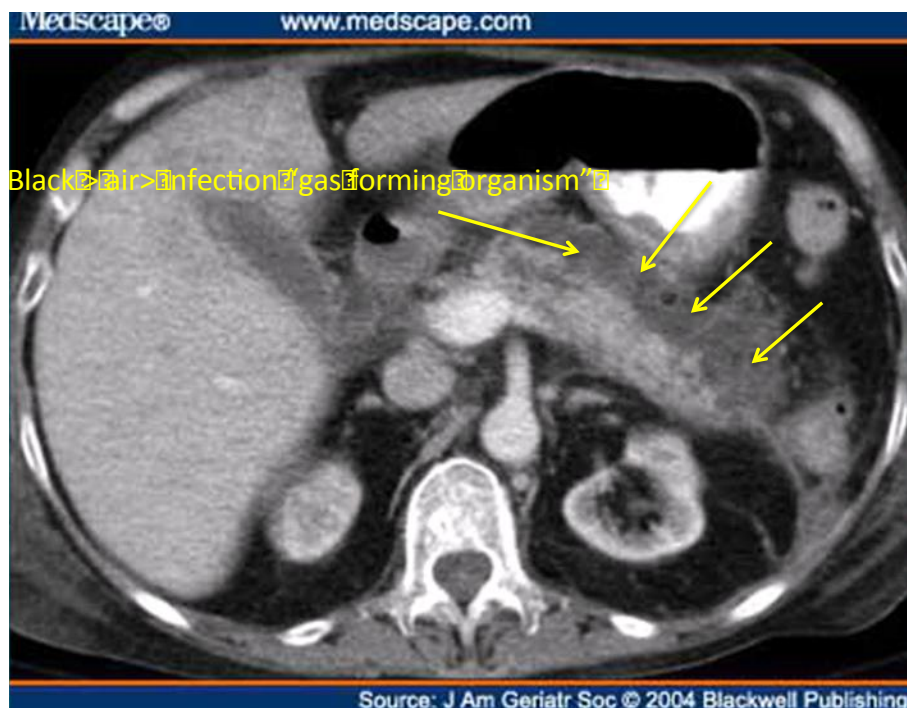
* 90% will be fine with conservative management.

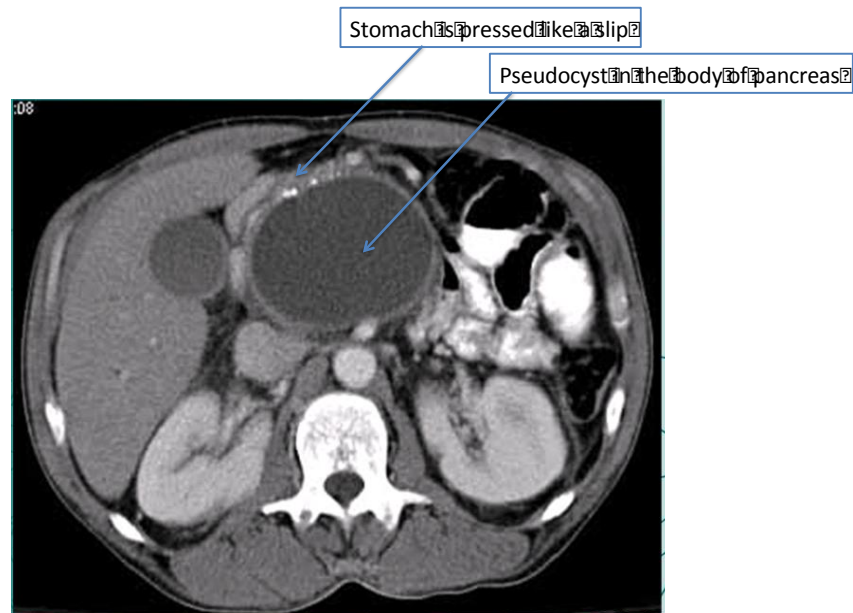
Complications happen in a series, they are the only indications for Abx.:

1. Necrosis > 30% ,if inflammation is very bad, part of the pancreas dies
2. Infected necrosis it will be infected with GIT organisms (NF)
3. Abscess
4. Pseudocyst

* If any of the upper complications occur, give antibiotics with Rx .. if pt. didn't improve, they might need surgery now and it's the worst surgery u would ever see "necrosectomy" open the abdomen it is very messy, & remove all the necrotic tissues, u might need to do it more than once

* to be insulin independent, u only need 10% of your pancreas





Pseudocyst: inflammation >> break in the pancreatic duct >> enzymes leakage to the lesser sac killing some tissue and form a capsule of fibrous tissue around it "pseudocyst" (it has necrotic tissue but no epithelium, unlike the true cyst that has epithelium around it)

History:

- Failure of pancreatitis to recover or recurrence of symptoms
- Abdominal pain
- Pressure symptoms:
pressure on: stomach causing N/V,,, or pressure on bile duct causing obstructive jaundice
- Epigastric mass
- ↑ Lipase or WBC
- Obstructive jaundice
- CT scan is very diagnostic

Complications

- 1- Infection and form abscess
- 2- Rupture: forming pancreatic ascites abdomen will be full of pancreatic enzymes
- 3- Bleeding: erode into vessels especially gastroduodenal artery will cause very bad bleeding

Treatment

- A) Observe for 6-12 weeks
(50% of pseudocysts will disappear by that time), then repeat CT
- B) Drainage indicated in :
 - 1. Infection (external)
 - 2. Symptomatic (internal)
 - 3. >5 cm (internal)

*so if pseudocyst is <5 cm or asymptomatic, do we drain it? Nooo

*drainage needs a big opening in the abdomen, if u aspirate only it will reoccur

2. Chronic Pancreatitis

- **Progressive inflammatory** disease of the pancreas causing **fibrosis** and loss of endocrine and exocrine function. - Loss of parynchema & function -
- **Commonest cause is alcohol** – why? they drink more to relieve the pain, it's hard for alcoholics to quit drinking

Symptoms

- 1- Abdominal pain
- 2- Malabsorbtion
- 3- Diabetes

Diagnosis

- Lipase/Amylase usually normal b/c no acute inflammation
- ↑ Glucose **they are diabetic**
- AXR calcification **they form stones with obstruction**
- CT Calcification, atrophy, dilated ducts

Complications

1- Biliary obstruction

b/c of fibrosis of the head of pancreas – bile duct passes through the head of pancreas -

2- Pseudocyst due to multiple strictures that might rupture

3- Carcinoma repeated inflammation is a predisposing factor of CA (cancer)

4- Splenic vein thrombosis b/c it lies on the top pancreas and it can get thrombosed on inflammation

Treatment

- Pancreatic enzymes for malabsorption it's 1 pill with each meal problem solved

- Insulin for diabetes

- Analgesia the biggest problem is pain analgesics can cause celiac plexus block

- Celiac block u inject analgesics into the celiac plexus to kill the nerves to inhibit the pain

- Surgical drainage open the pancreatic duct across the whole pancreas, there are multiple strictures, so u bring a piece of the bowel and connect them together so the pancreas will empty into the bowel pancreaticojejunostomy (connect the pancreas to the bowel immediately, doesn't need the pancreatic duct anymore) that would relieve the pain

- Pancreatectomy done if none of the previous Rx worked... it is a very big operation especially in chronic pancreatitis pt too much inflammation engulfing the surrounding vessels, it is bad but sometimes we have to do it ... pancreas is important for insulin and also glucagon, so a patient who had pancreatectomy will have hypoglycemia very easily "brittle diabetes" b/c there's no compensation b/w the insulin supplements they take if they don't eat well, they don't have glucagon to elevate the blood sugar, so they could die from hypoglycemia , so try to avoid removing the pancreas as much as we can

3. Pancreatic adenocarcinoma

- 3rd leading cause of cancer death in men 35-- 55 *it's a theory*
- *****↑ with cigarette smoking*****, fatty food, remoteremote gastrectomy and in blacks
- Other factors, Chronic pancreatitis, polyposispolypsis syndromes, family history and cholecystectomy. - 70% in the head

** they are lucky if they get jaundice when tumor is in the head of pancreas if tumor is in the body or tail not causing jaundice, they usually present late with metastasis*

History

- Weight loss like any CA they'll have loss of appetite
- Jaundice
- Deep seated pain
- Back pain *tumor invaded the retroperitoneal and that's a bad sign usually >>> tumor cannot be removed!*
- Gastric outlet obstruction *if tumor is big compressing the deudenum*

Examination

- Jaundice
- **Fever** *there's a big difference in obstructive jaundice with/without fever, if there's fever >>> Cholangitis, it's an ER !!!*

The rest are not important

- Hepatomegaly
- Palpable gallbladder - Succession splash

Lab

- Obstructive jaundice
- ↑ WBC : *leukocytosis if they have Cholangitis*
- CA 19-9 : *a tumor marker, if >100 it means there's cancer*
- US - CT ... - ERCP : *double duct sign: double dilated sign (pancreatic and bile duct) indicating presence of tumor, better seen on CT*

Management: just know it is surgical

- assess resectability (rule out local invasion and distant metastasis)
- Whipple's resection
- Palliative biliary and gastric drainage
- Poor long term survival

IV added nothing on: Cancer
IV added something on: pseudocyst
and chronic pancreatitis
IV added loads of things on: acute
pancreatitis

MCQs!!

1) The most specific blood test in diagnosing acute pancreatitis is:

- a) Serum amylase
- b) Urinary amylase
- c) Serum lipase
- e) CA 19-9
- f) CEA

2) The most important step in the management of acute pancreatitis is :

- a) IV fluids
- b) Antibiotics
- c) NG tube
- e) ERCP
- f) Pain medications

3) Ranson's criteria include the following except:

- a) WBC
- b) Age
- c) Serum glucose
- e) LDH
- f) Serum Lipase

4) The following are causes of acute pancreatitis except:

- a) Alcohol
- b) Gall stones
- c) Trauma
- d) Viral infections
- e) Hypocalcemia

5) The most important factor in pancreatic adenocarcinoma is :

- a) Alcohol
- b) Smoking
- c) Chronic pancreatitis
- e) Diabetes
- f) Gastrectomy

6) Pancreatic Pseudocyst might be complicated with all of the following except:

- a) Malignant transformation
- b) Rupture
- c) Bleeding
- d) Jaundice
- e) Infection

7) Symptoms of chronic pancreatitis include all of the following except:

- a) Diabetes
- b) Constipation
- c) Diarrhea
- d) Abdominal pain

8) Which of the following is most helpful in diagnosing pancreatic adenocarcinoma:

- a) CA 125
- b) Serum amylase
- c) Serum lipase
- e) CEA
- f) CA 19-9

9) Pain in chronic pancreatitis could be improved with, except:

- a) Antibiotics
- b) Narcotics
- c) Celiac block
- e) Surgical drainage
- f) Pancreatectomy

10) Pancreatic adenocarcinoma can present with, except:

- a) Hematemesis
- b) Jaundice
- c) Abdominal pain
- d) Abdominal mass
- e) Weight loss