

Imaging in acute pancreatitis

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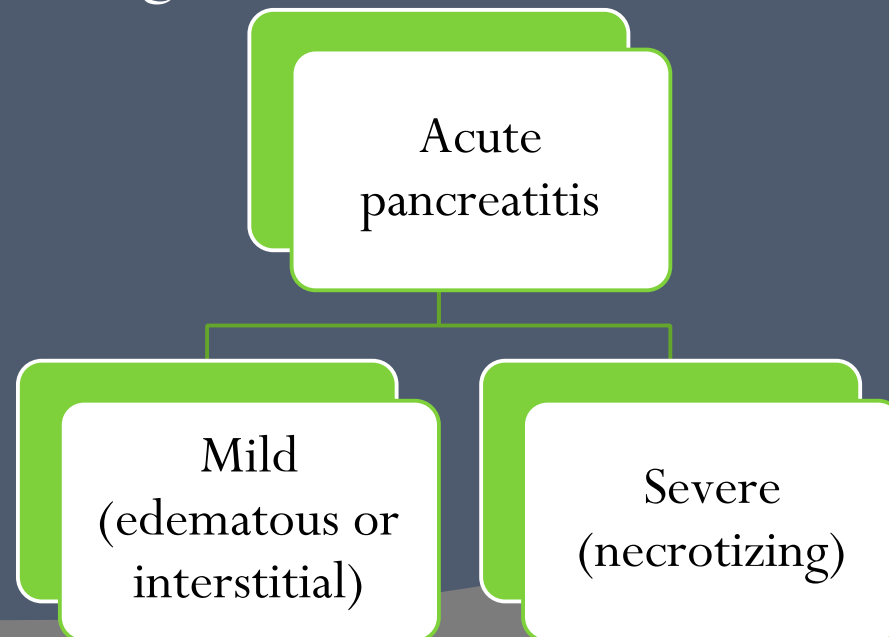
2ND YR PG RADIODIAGNOSIS

INTRODUCTION

- ① Imaging plays a major role in the management of acute pancreatitis.
- ① The main role of a radiologist is to grade the severity of the disease and identify any complications if present.
- ① Image guided interventional procedures are nowadays being preferred.

CLASSIFICATION OF ACUTE PANCREATITIS

- According to the International Symposium On Acute Pancreatitis, held in 1992.
- Based on presence of Multi-organ failure and appearance of gland on CECT.



COMPLICATIONS

- ① FLUID COLLECTIONS
- ① INFECTION OF THE NECROSIS
- ① PSEUDOCYST
- ① ABSCESS
- ① VASCULAR
- ① G.I. INVOLVEMENT
- ① SYSTEMIC COMPLICATIONS

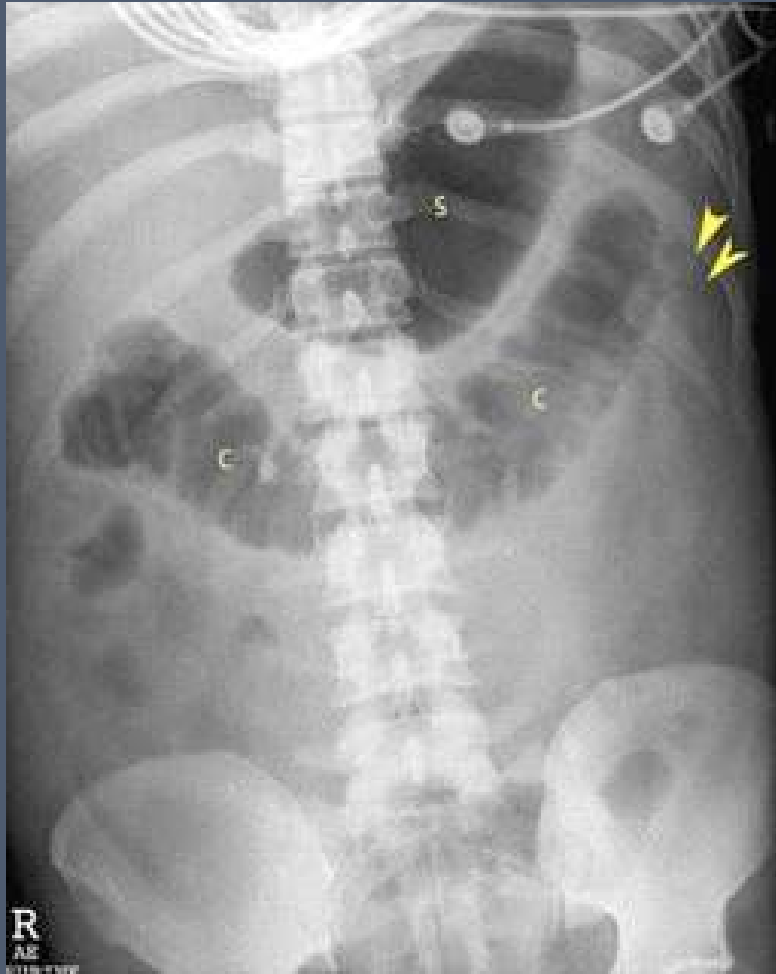
METHODS OF INVESTIGATION

- ◎ **CONVENTIONAL RADIOGRAPH**
- ◎ **BARIUM STUDIES**
- ◎ **ULTRASONOGRAPHY**
- ◎ **CT (PLAIN & CONTRAST)**
- ◎ **MRI**
- ◎ **MRCP**
- ◎ **EUS**
- ◎ **INTERVENTIONAL PROCEDURES**

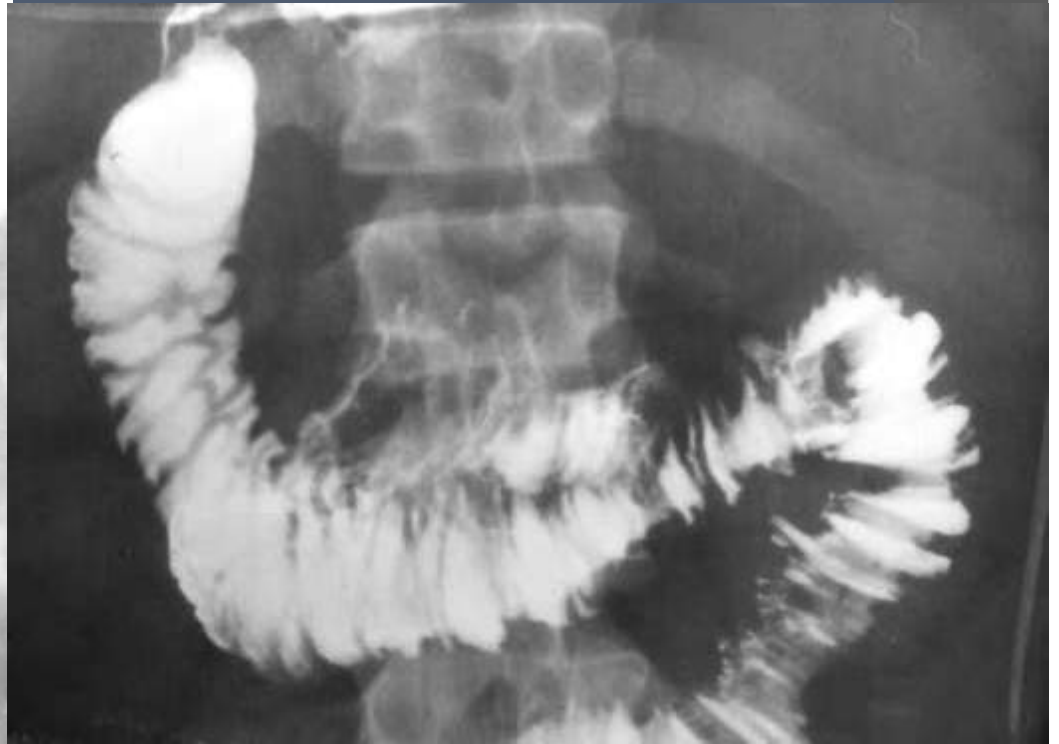
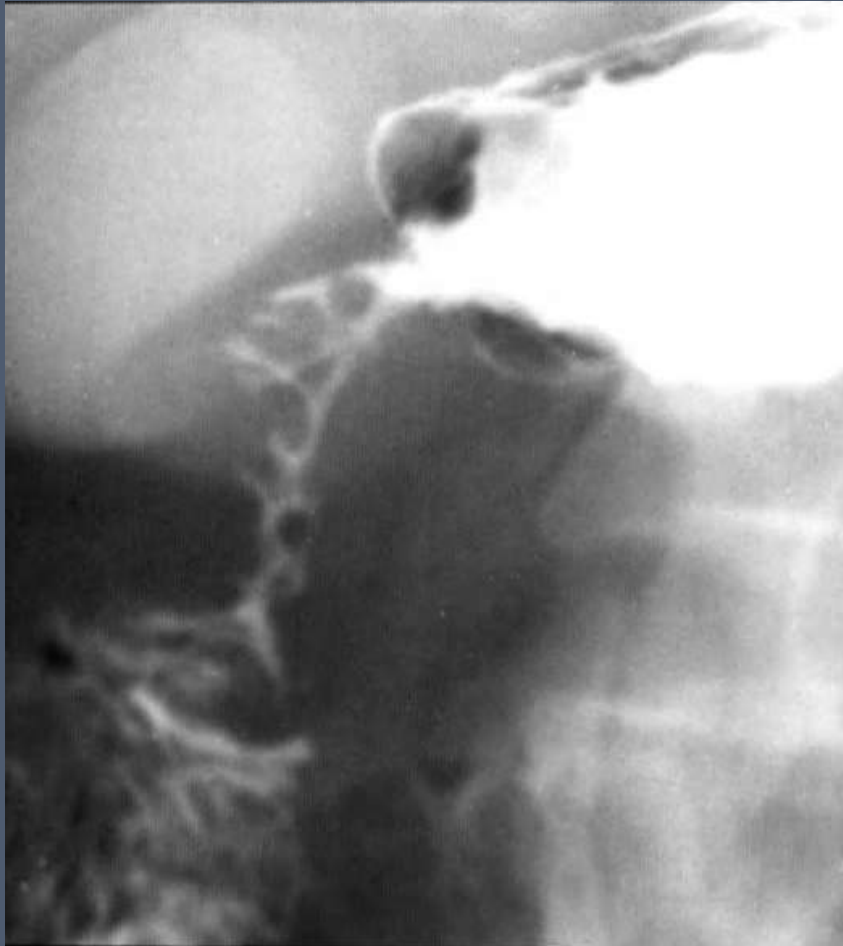
CONVENTIONAL RADIOGRAPHY

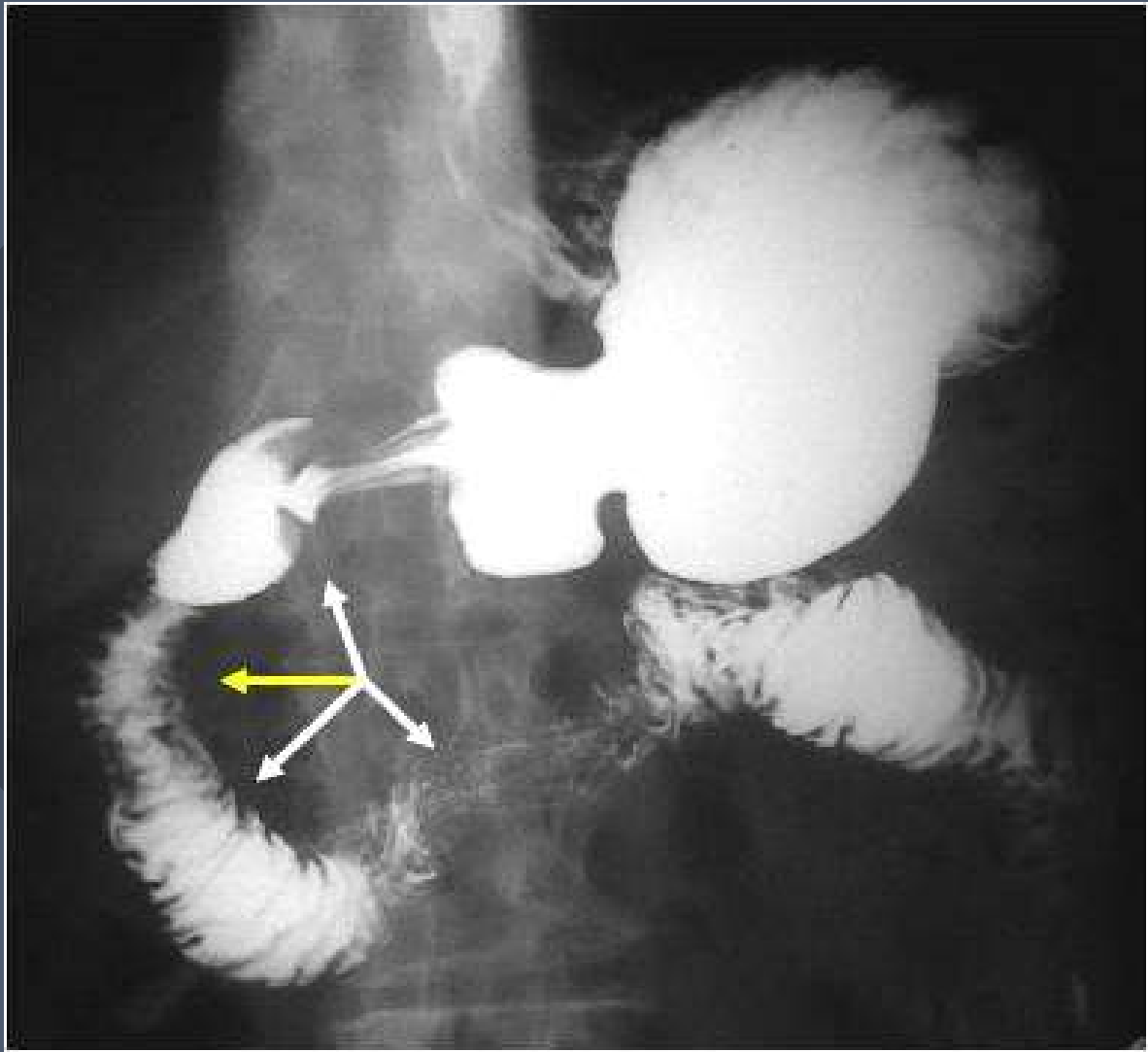
- Conventional radiograph of the chest and abdomen are often abnormal during an episode of acute pancreatitis , but rarely yield a specific diagnosis
- Findings are
 - a) gas filled duodenal cap & loop
 - b) sentinel loop sign
 - c) small bowel ileus
 - d) colon cut-off sign
 - e) gas/ calcification within pancreas
 - f) pleural effusions & bibasal atelectasis.





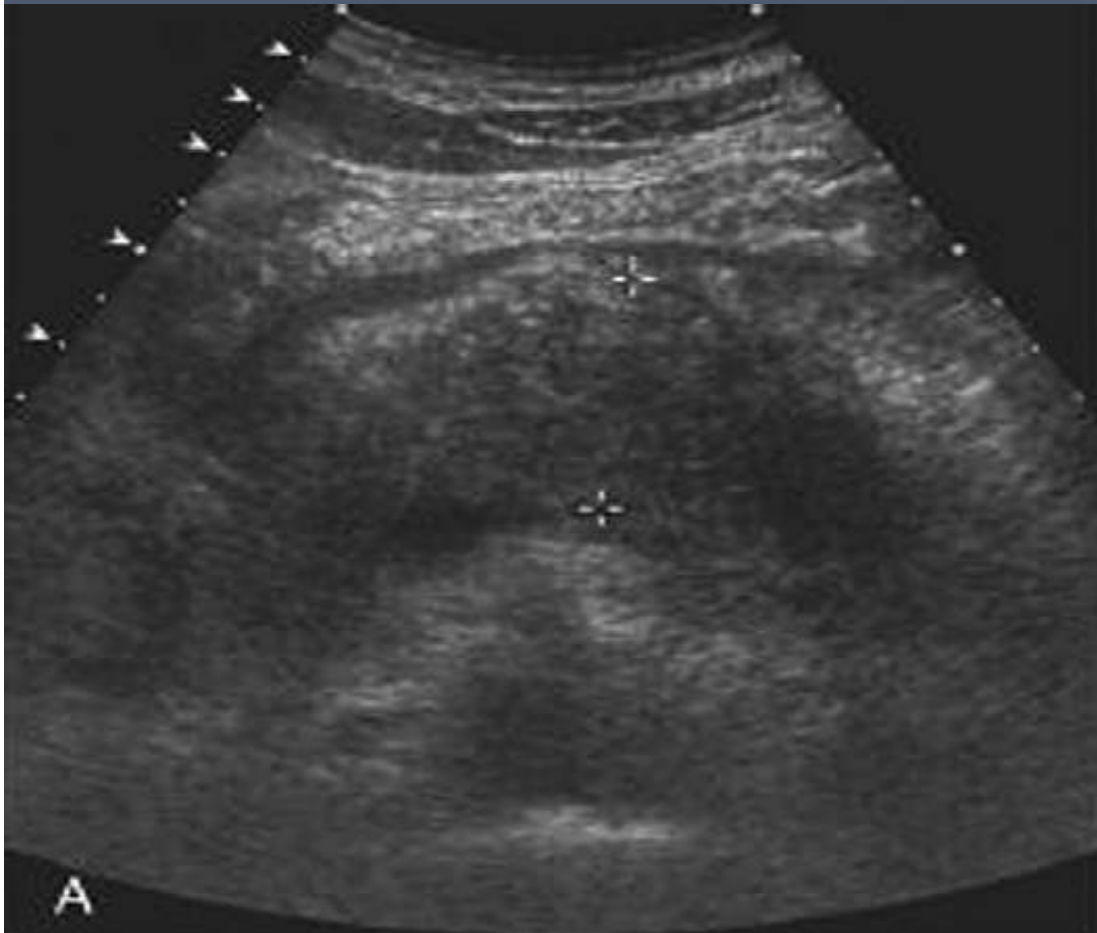
BARIUM STUDIES



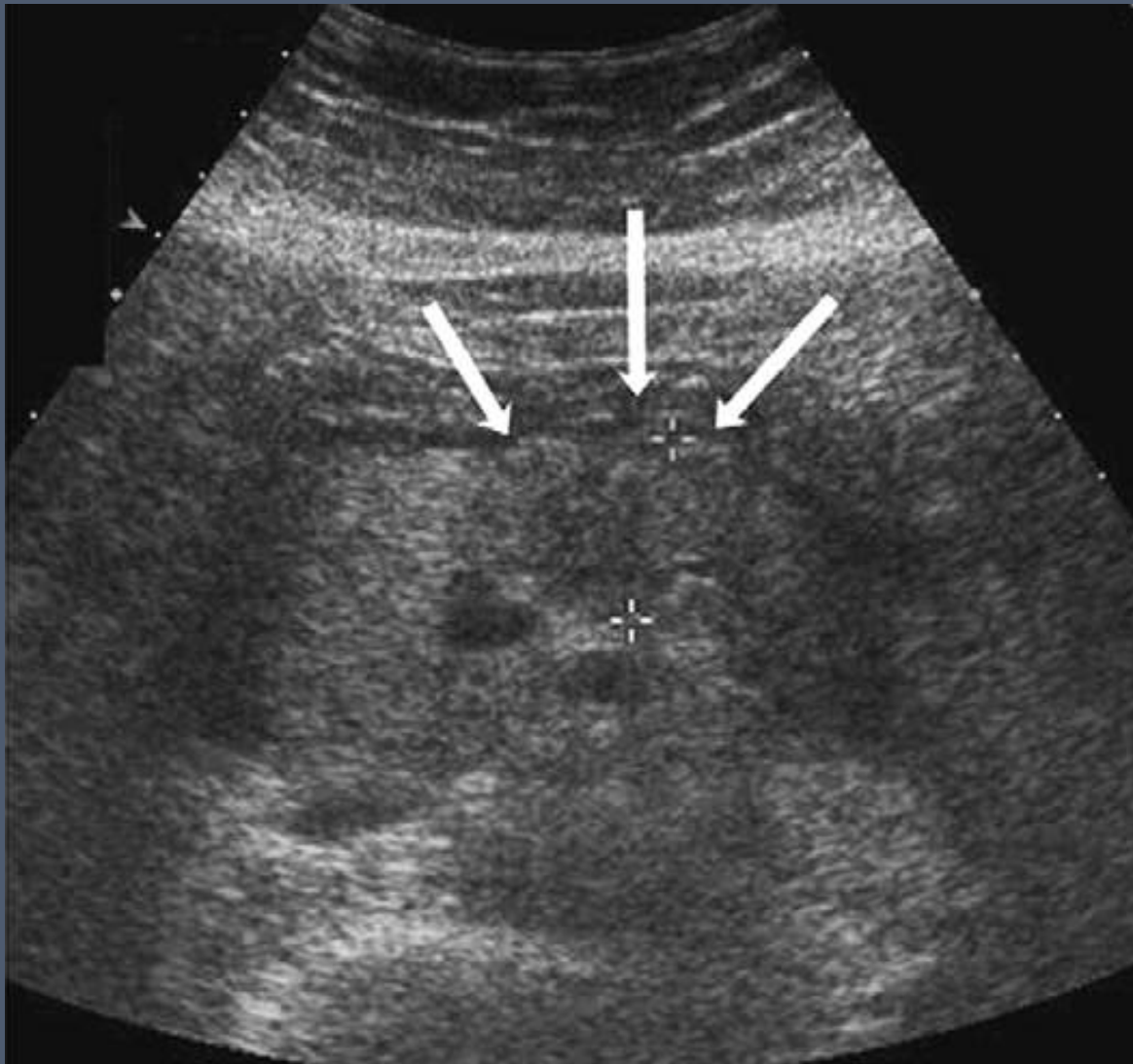


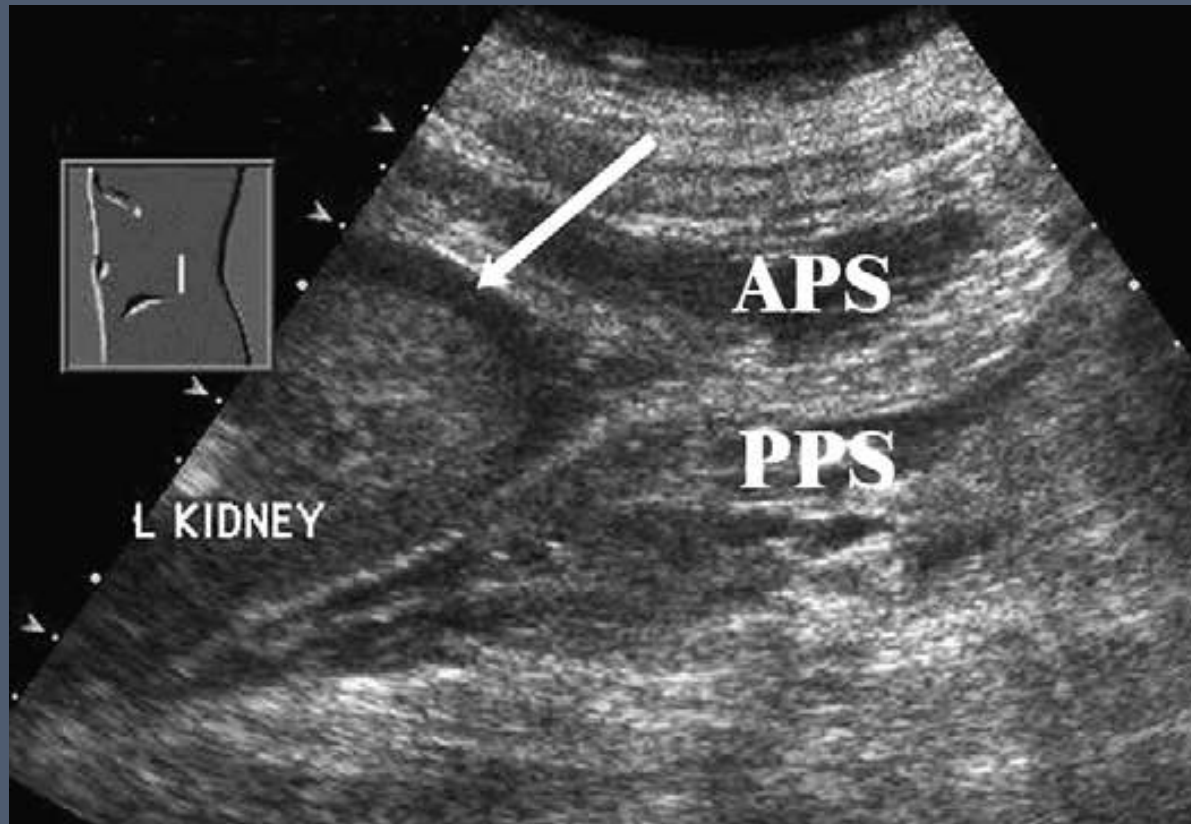
ULTRASONOGRAPHY

- ① US to detect an underlying treatable cause such as cholelithiasis.
- ① In mild acute pancreatitis(70–80%), the US appearances may be entirely normal but common findings include generalized (or less commonly, focal) enlargement of the gland with reduced reflectivity.
- ① Margins may be difficult to define and peripancreatic fluid may be visualized.
- ① In patients with high alcohol intake hepatic steatosis may be seen.
- ① Doppler imaging to rule out or identify vascular complications.

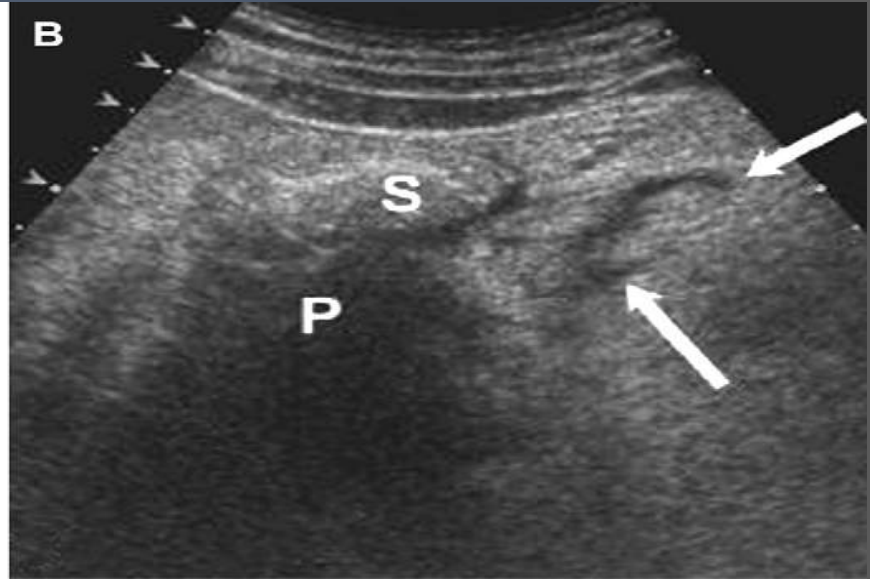
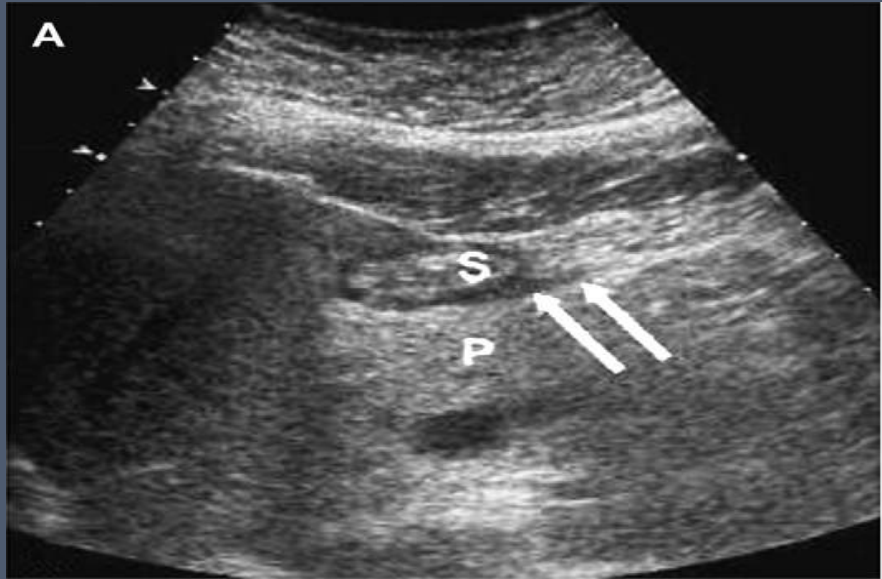


The criterion used for enlargement of the pancreas is ≥ 23 mm AP dimension at the level of the SMA. This measurement is three standard deviations above the mean.

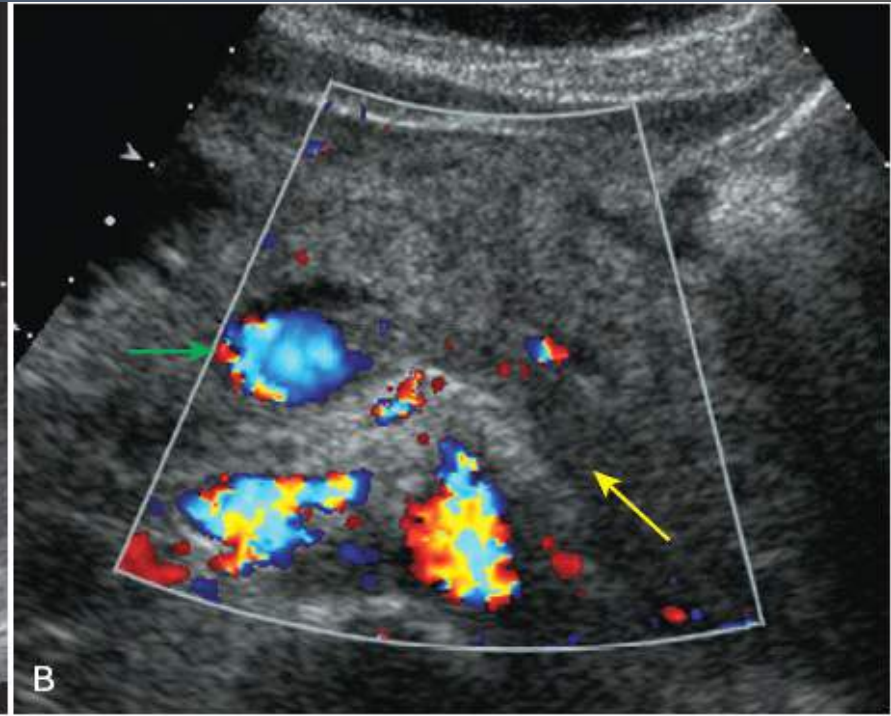
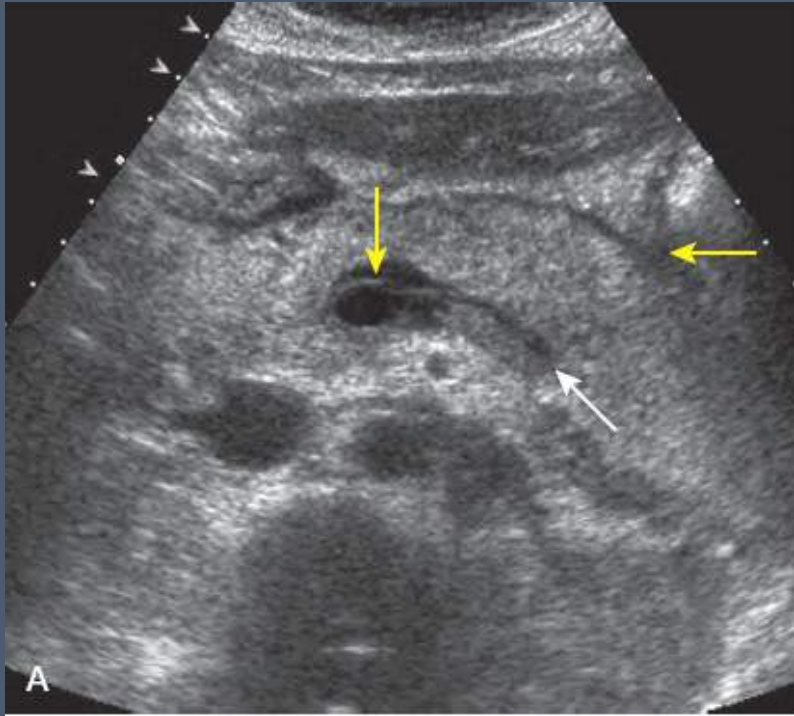




Multiple anatomic areas of inflammation are common in acute pancreatitis. 3 retroperitoneal spaces are affected in this patient: (APS), PS (arrow) and (PPS)

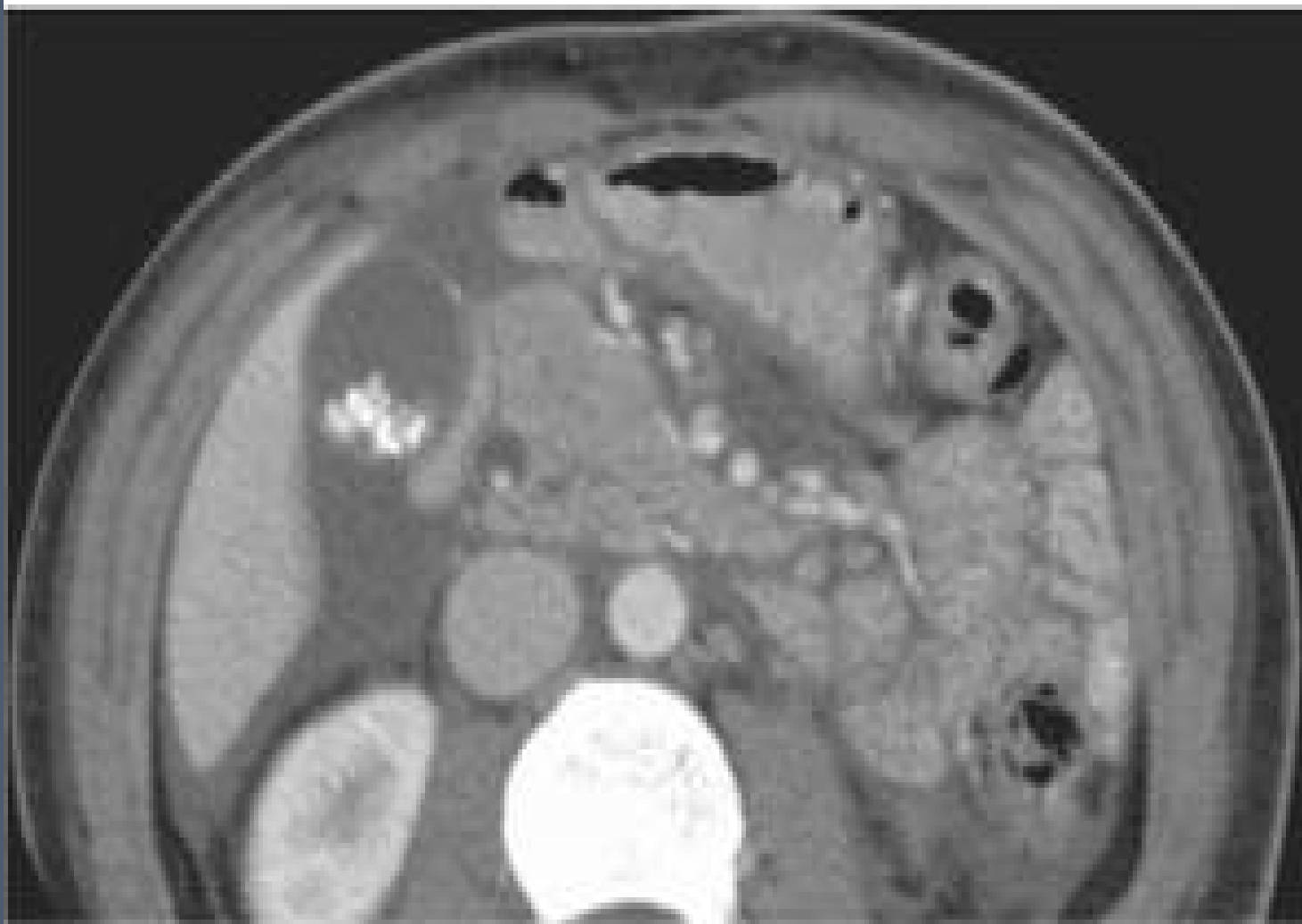






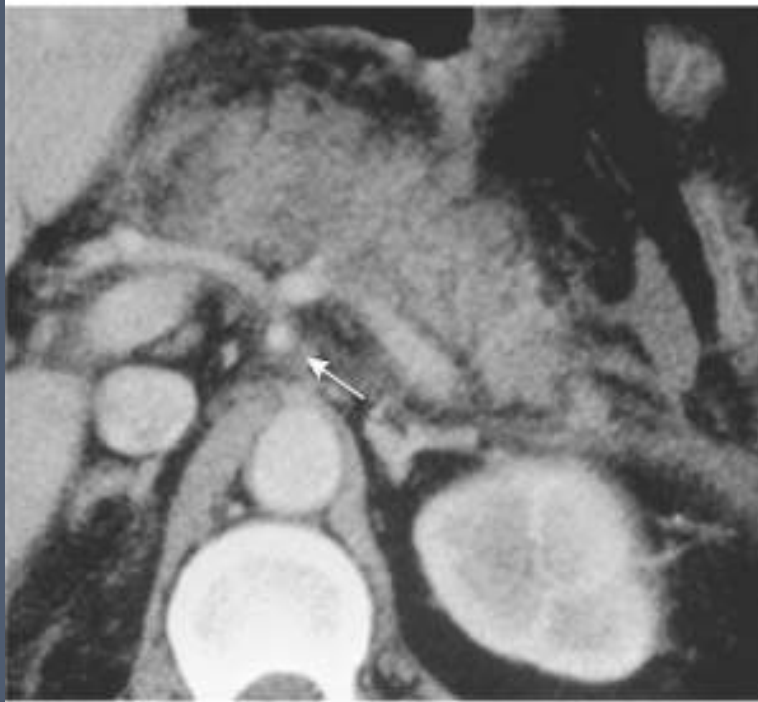
COMPUTED TOMOGRAPHY

- ◎ CECT is the most reliable imaging modality for the staging but requires meticulous technique.
- ◎ Thin sections during maximum pancreatic enhancement should be obtained.
- ◎ Helical technique : administration of oral neutral contrast (water) with an IV iodinated contrast agent volume of 100–150 ml injected at 3 ml s^{-1} with a 30 and 70s data acquisition delay to visualize the pancreas in both the arterial and portal venous phases of enhancement.

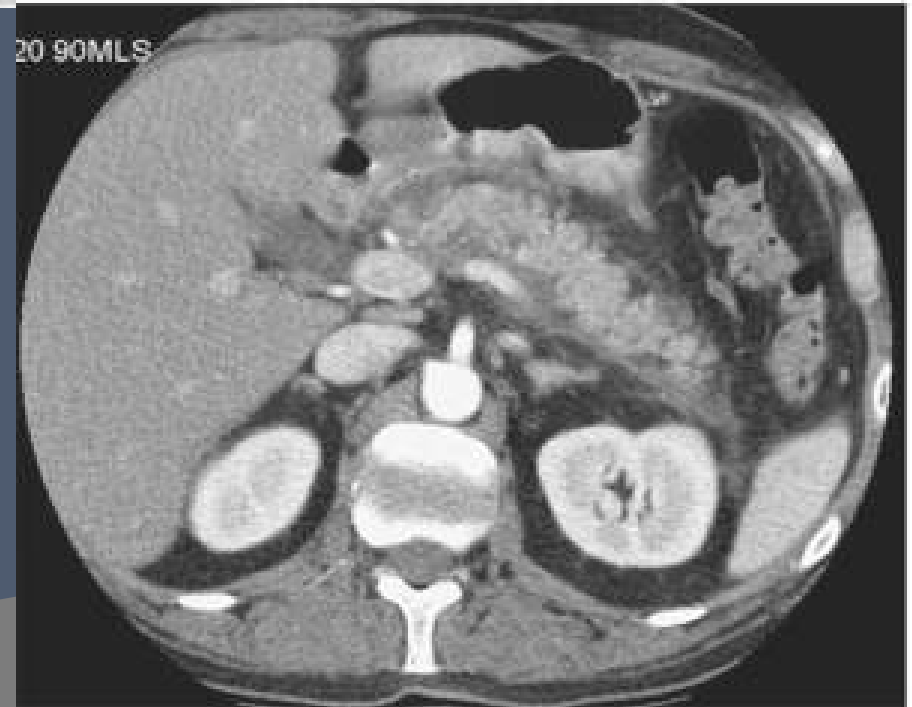


MILD ACUTE PANCREATITIS

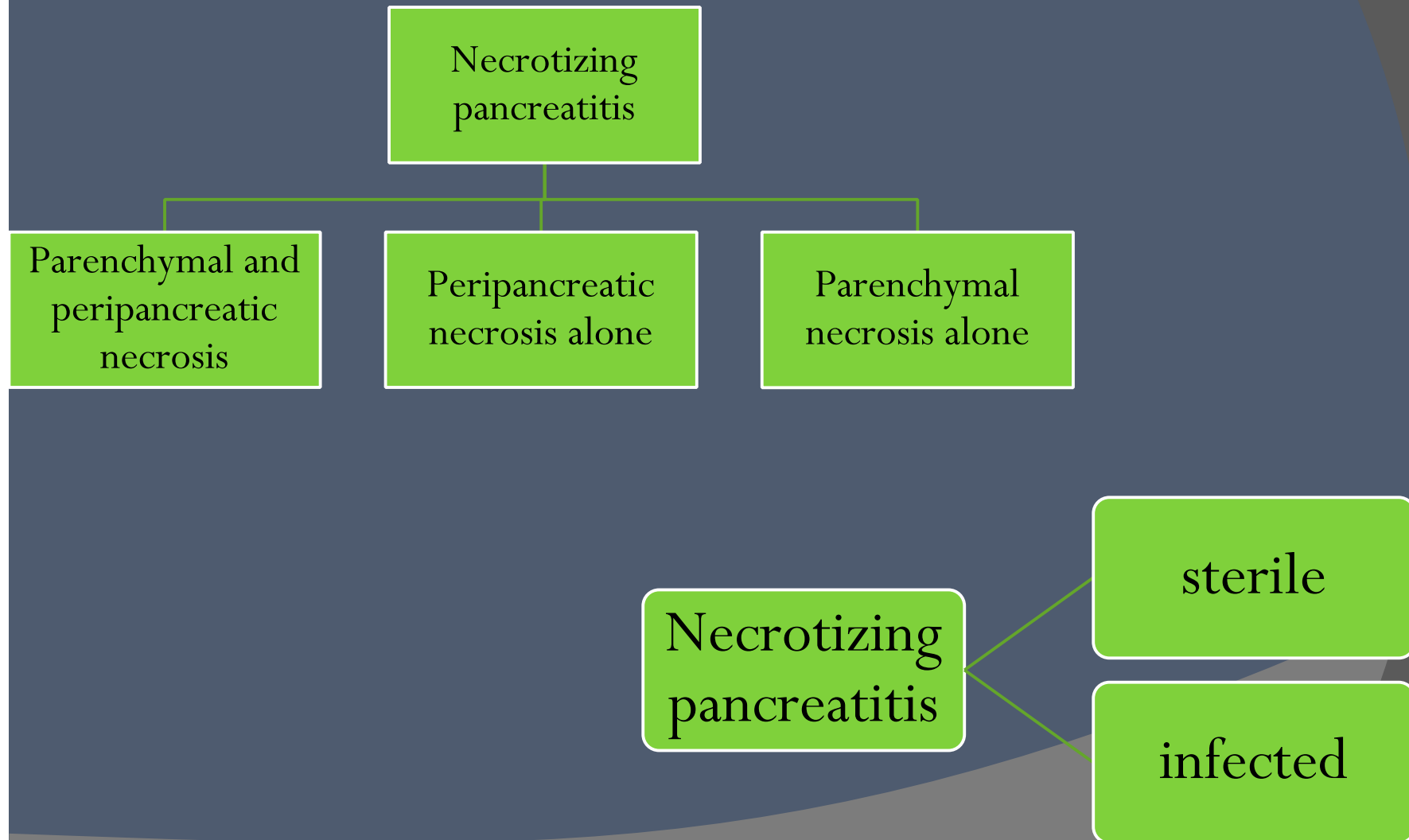
- ⦿ If the inflammation is very mild the gland may appear normal.
- ⦿ More commonly → an enlarged gland with patchy high attenuation in the peripancreatic fat is noted.
- ⦿ Cuffs of fluid may be seen around adjacent vessels.
- ⦿ Thickening of fascial planes may be noted.
- ⦿ The gland shows uniform enhancement.



MILD ACUTE
PANCREATITIS



SEVERE ACUTE PANCREATITIS



GLAND NECROSIS

- ⦿ Hallmark of severe acute pancreatitis.
- ⦿ Necrotic tissue is seen as areas of non-enhancement within the pancreatic parenchyma
- ⦿ Gets Infected in 20–70% and is responsible for an estimated 80% of deaths.
- ⦿ The presence of gas bubbles within an area of necrotic tissue is highly suggestive of infection but can also be caused by a fistula to the GIT.
- ⦿ Confirmation requires FNA
- ⦿ If confirmed surgical intervention is indicated

EXTRAPANCREATIC
COMPLICATIONS

SCORE

NIL

0

PRESENT

2

TOTAL

SEVERITY

0-2

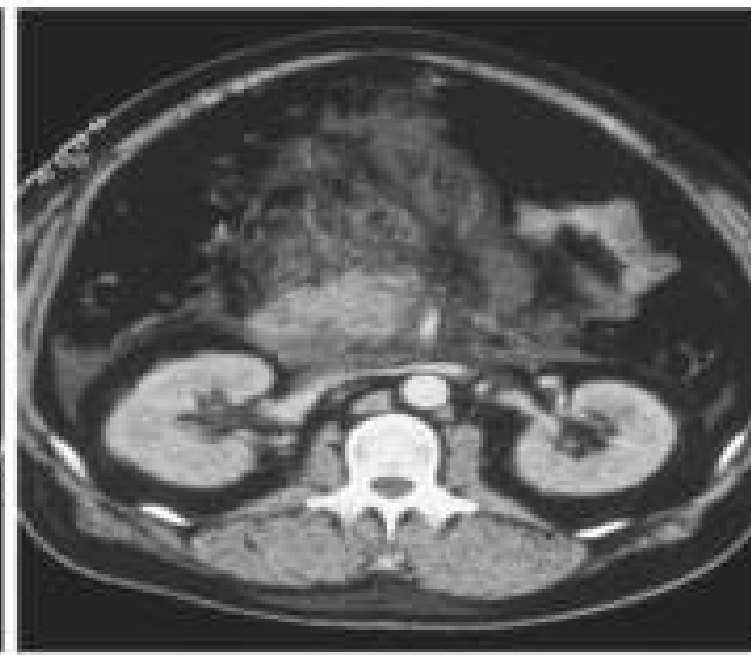
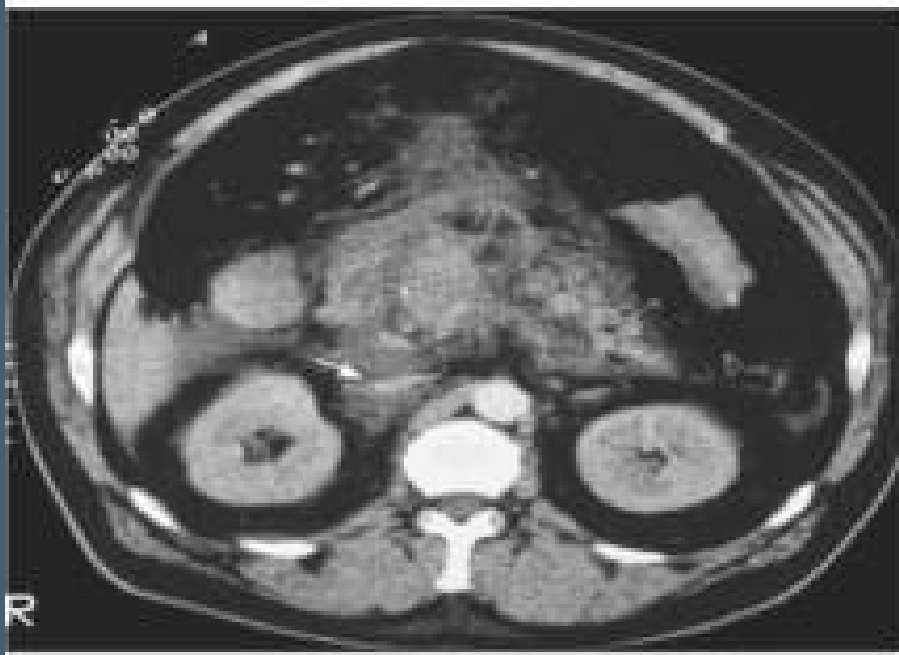
MILD

3-7

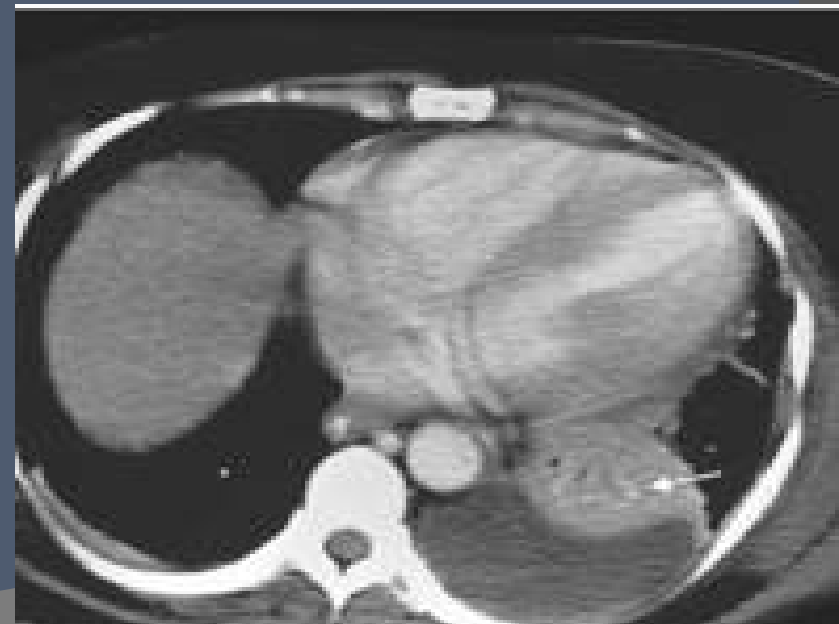
MODERATE

8-10

SEVERE



**MODERATELY
SEVERE ACUTE
PANCREATITIS.**



FLUID COLLECTIONS AND PSEUDOCYSTS

- ① Fluid collections arise within or adjacent to the pancreas in approximately 40%
- ① In more than half resolve spontaneously without clinical sequelae.
- ① Appear as ascitic collections within the peritoneal or retroperitoneal spaces.
- ① In other cases they persist and over several weeks develop into pseudocysts, which classically have a fibrous capsule.

FLUID COLLECTIONS



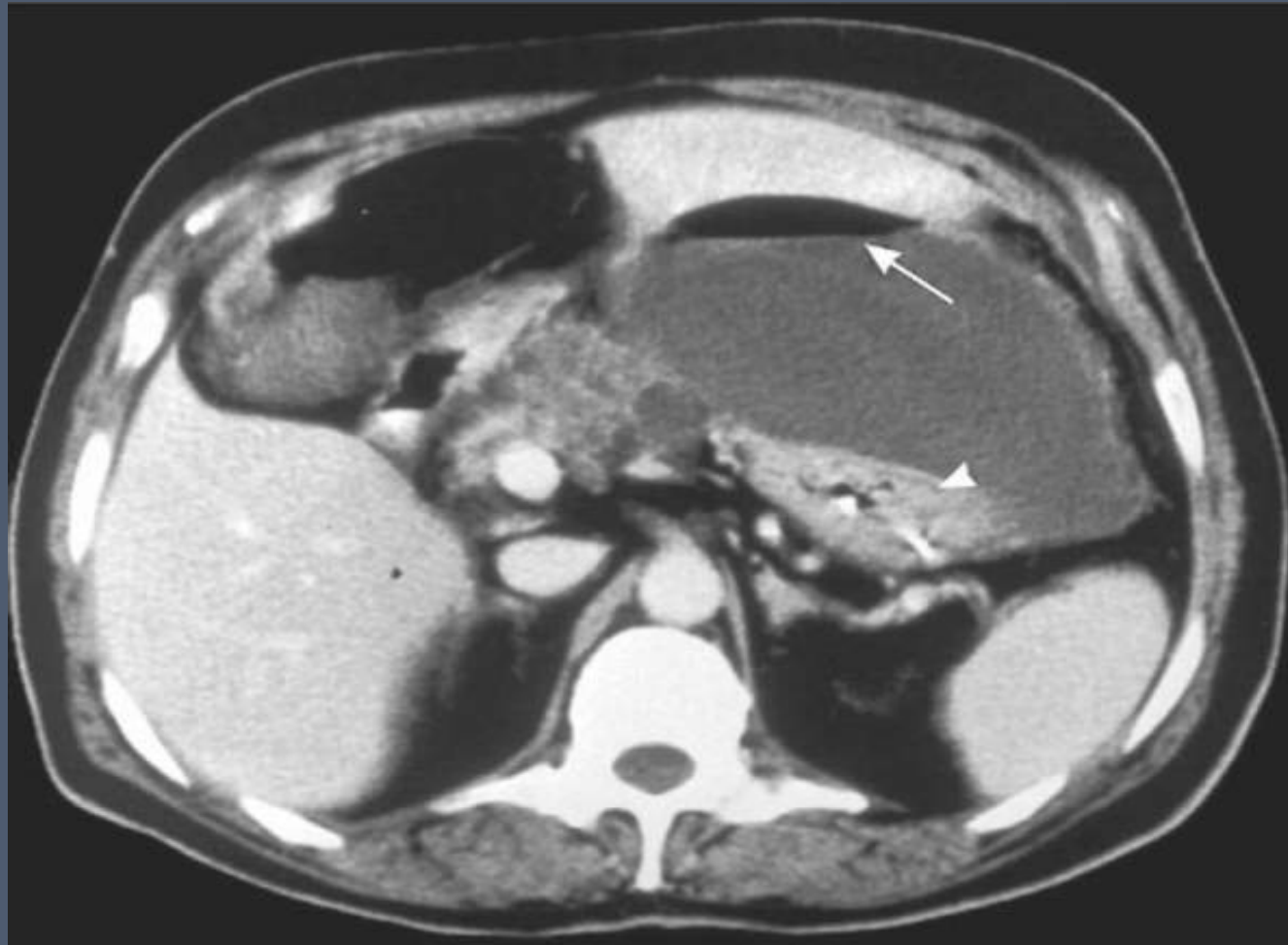
PANCREATIC PSEUDOCYST

- Irrespective of the wall of the collection, pseudocyst is defined as **any fluid collection persisting for more than 4 weeks**
- **More than 50% of pseudocysts resolve spontaneously.**
- **Pseudocyst appears as a well defined fluid attenuation lesion on CT, and if sterile no enhancement of the wall is noted.**
- **Complications include rupture, infection , haemorrhage, pain, biliary or pancreatic duct obstruction , or gastrointestinal tract involvement**
- **Effective treatment may be provided by percutaneous catheter drainage following full pre-drainage evaluation**

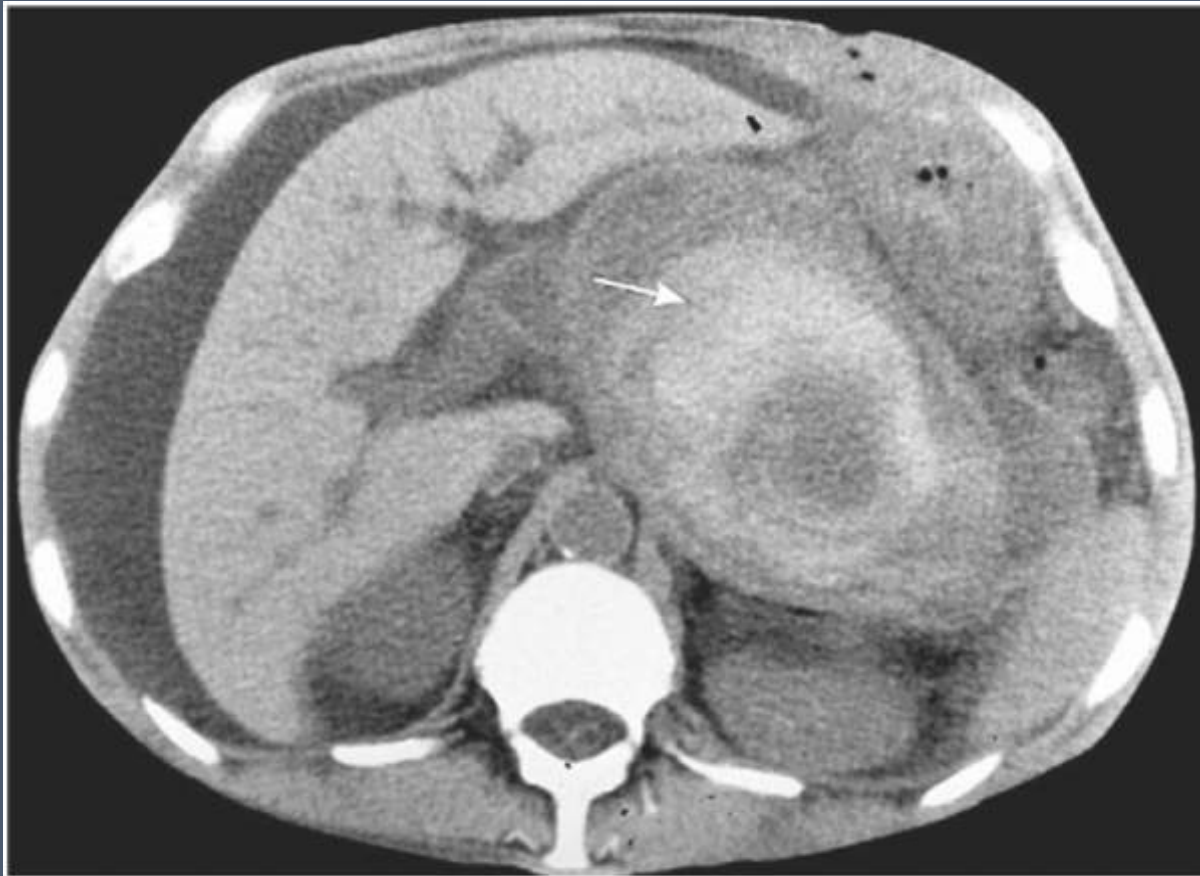
PANCREATIC PSEUDOCYST



INFECTED PSEUDOCYST



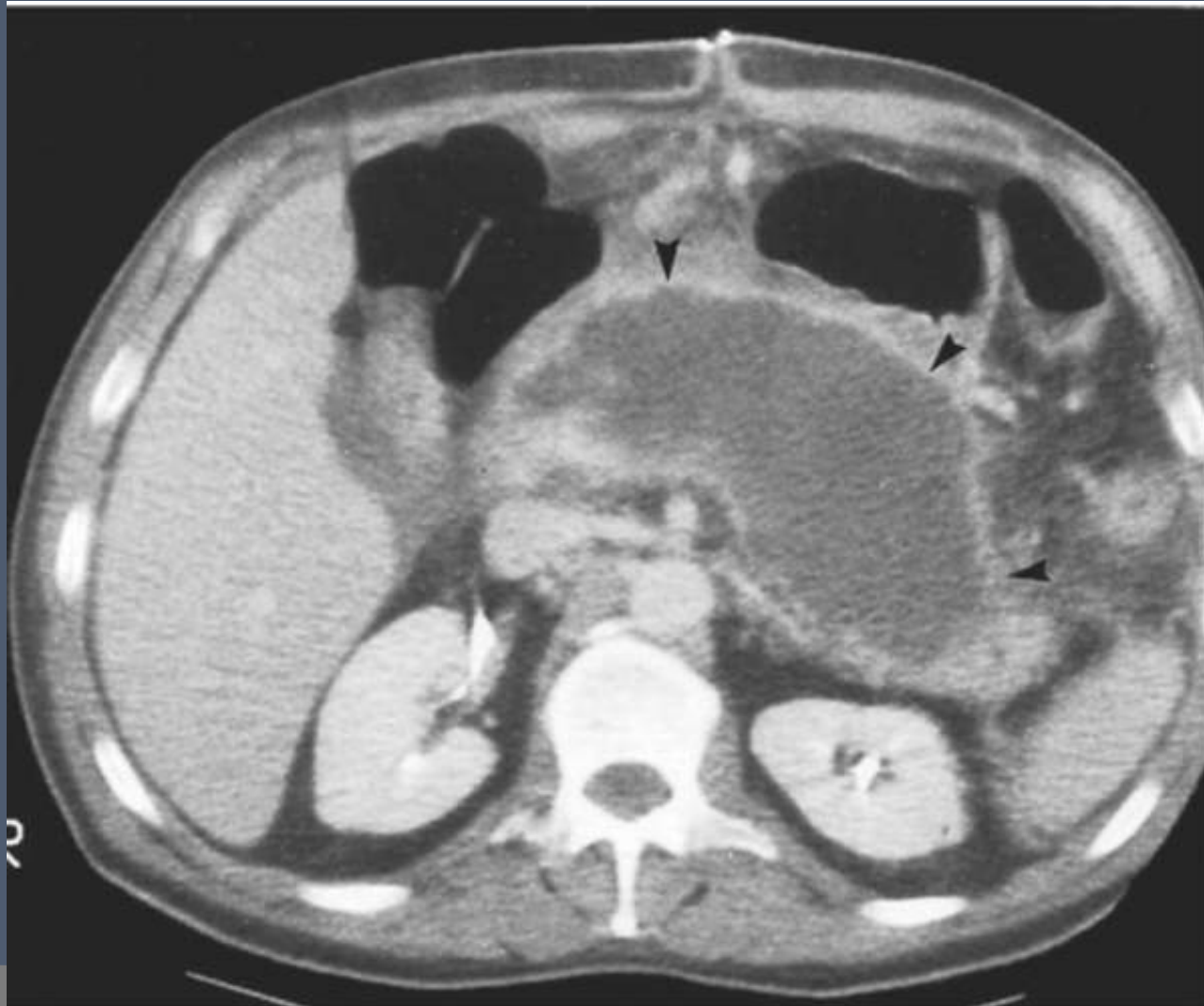
HEMORRHAGE INTO A PSEUDOCYST



INFECTED NECROSIS

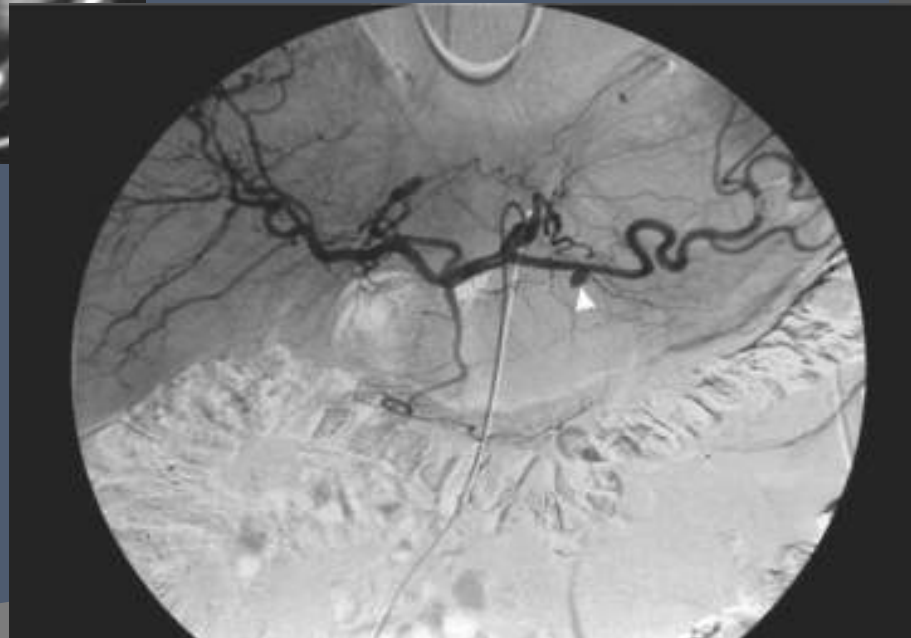


PANCREATIC ABSCESS

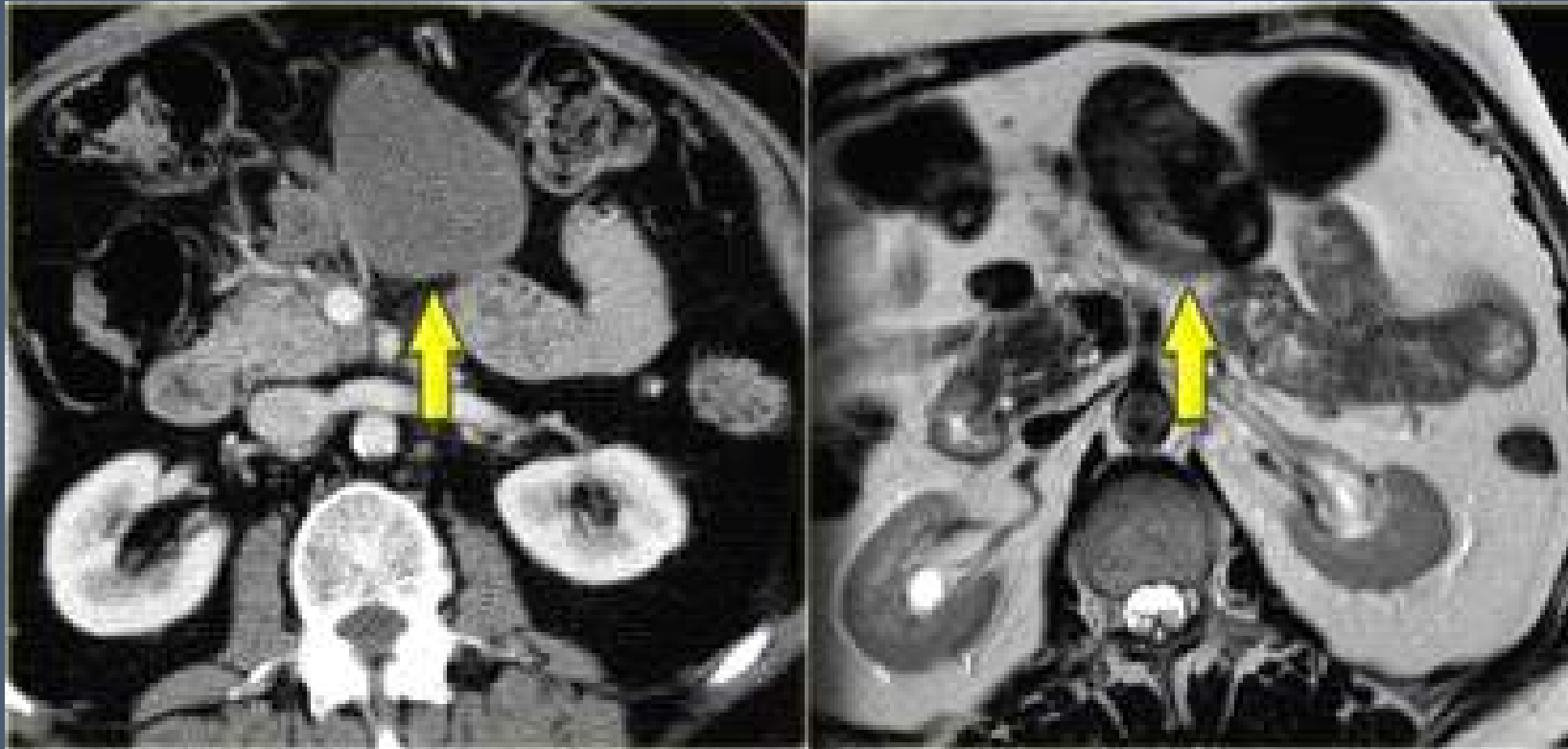




VASCULAR COMPLICATIONS



ROLE OF MRI

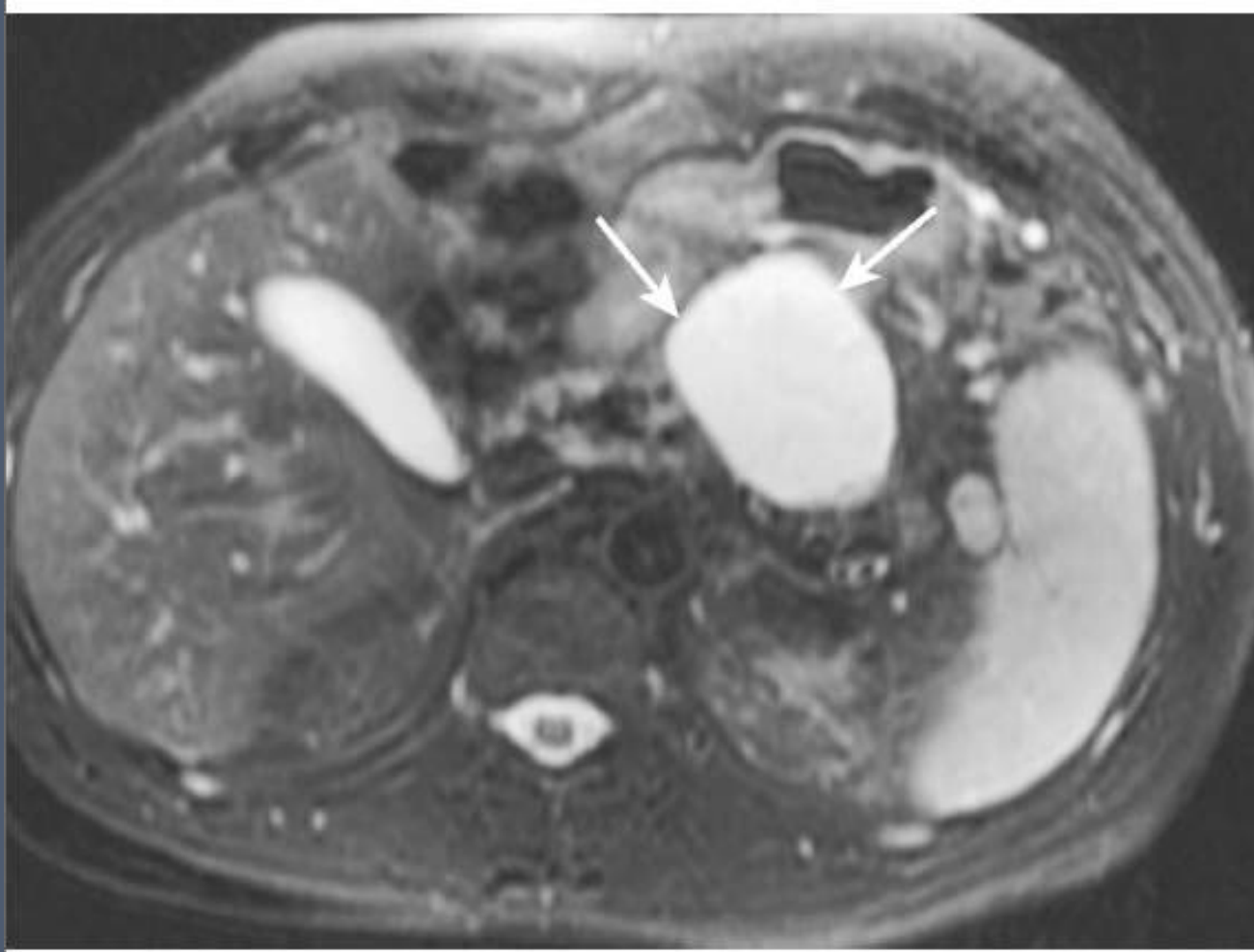


MRI is superior to CT in differentiating between fluid and solid debris

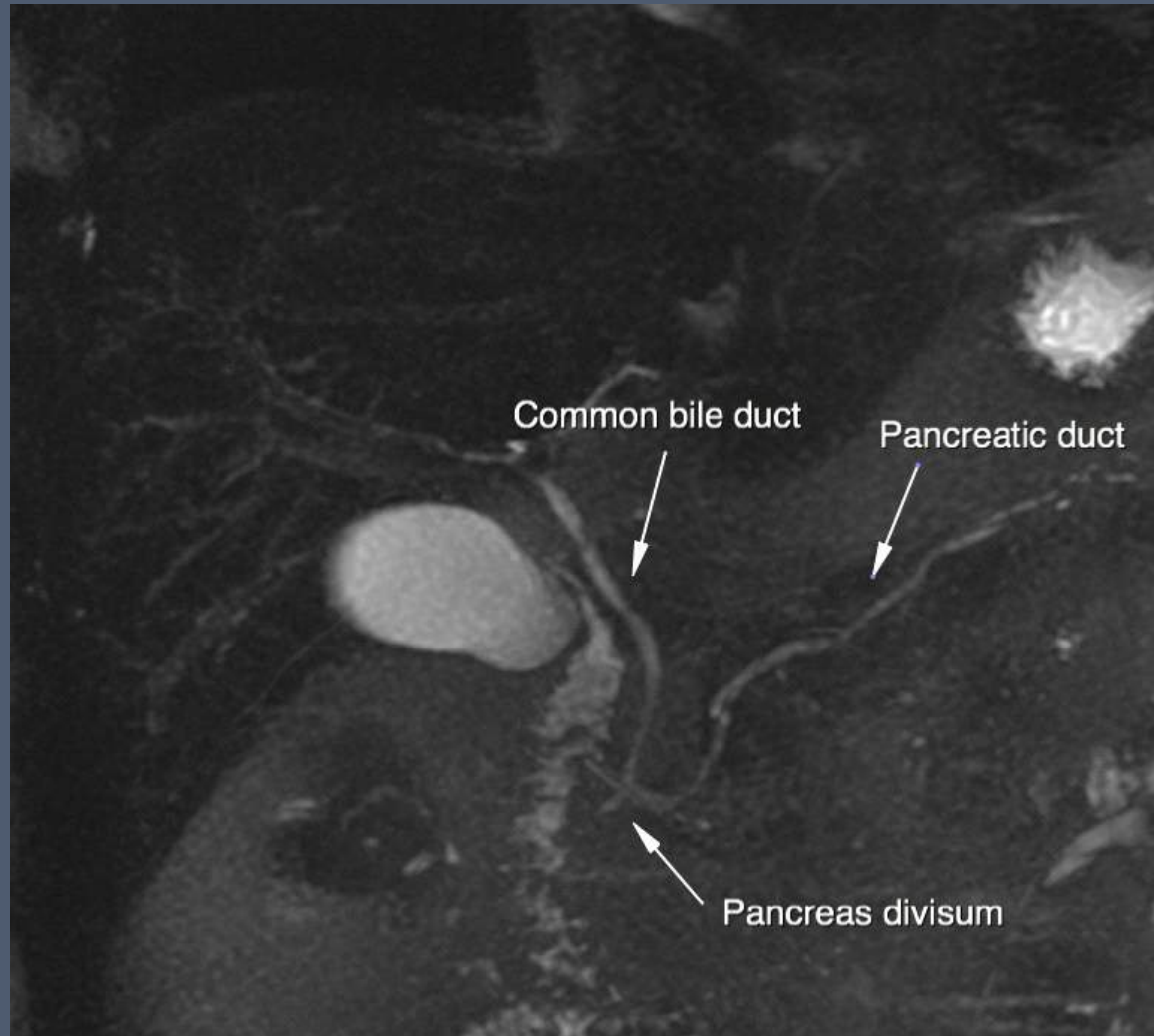
Limitations of imaging in peripancreatic collections

- CT can not differentiate between fluid and debris.
- MRI is superior to CT in differentiating between fluid and solid debris
- Imaging can **not** differentiate between sterile and infected collections.
- Air is only present in 20% of infected collections!

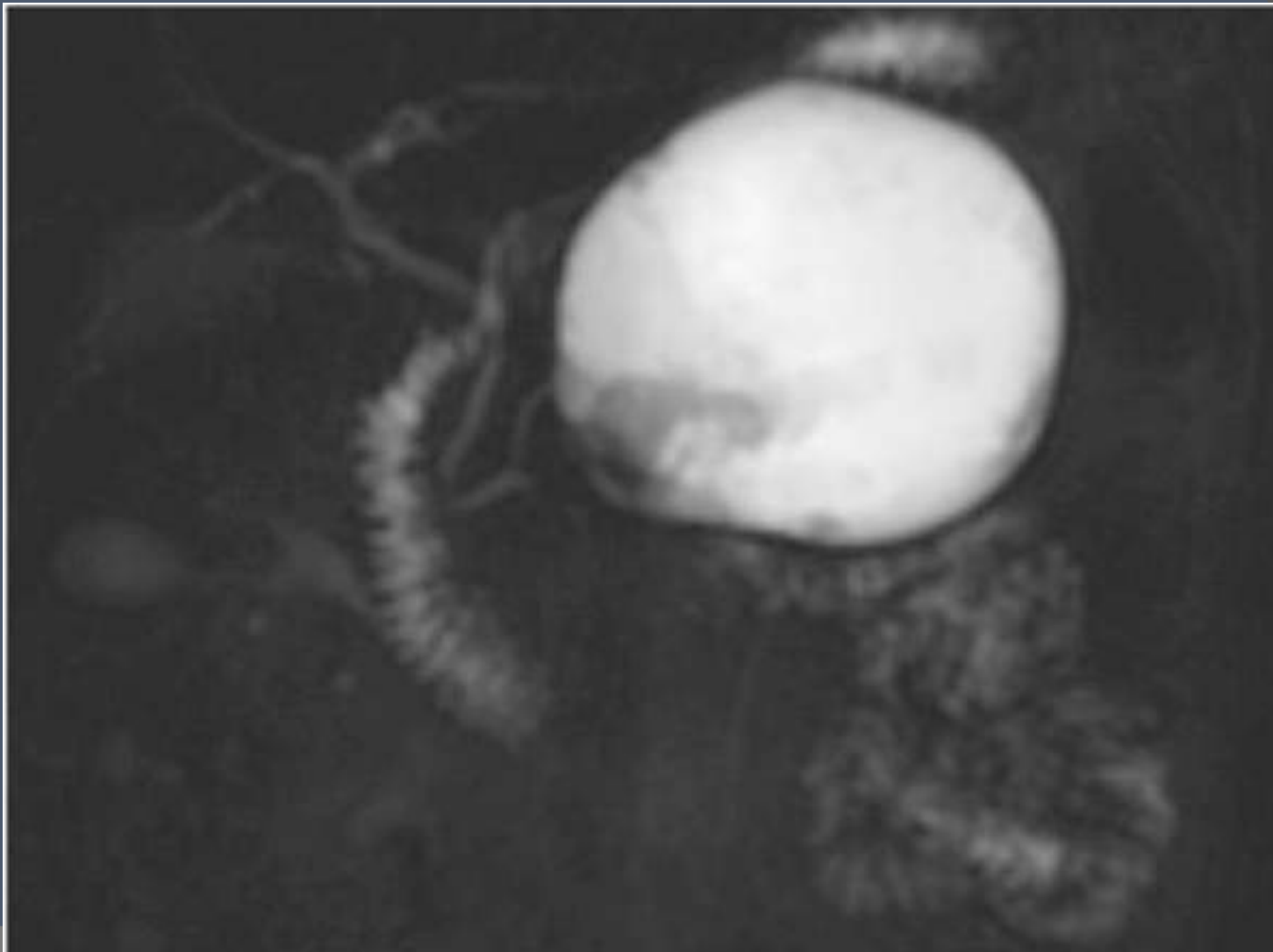
PSEUDOCYST



MRCP



PSEUDOCYST ON MRCP



INTERVENTIONAL RADIOLOGY

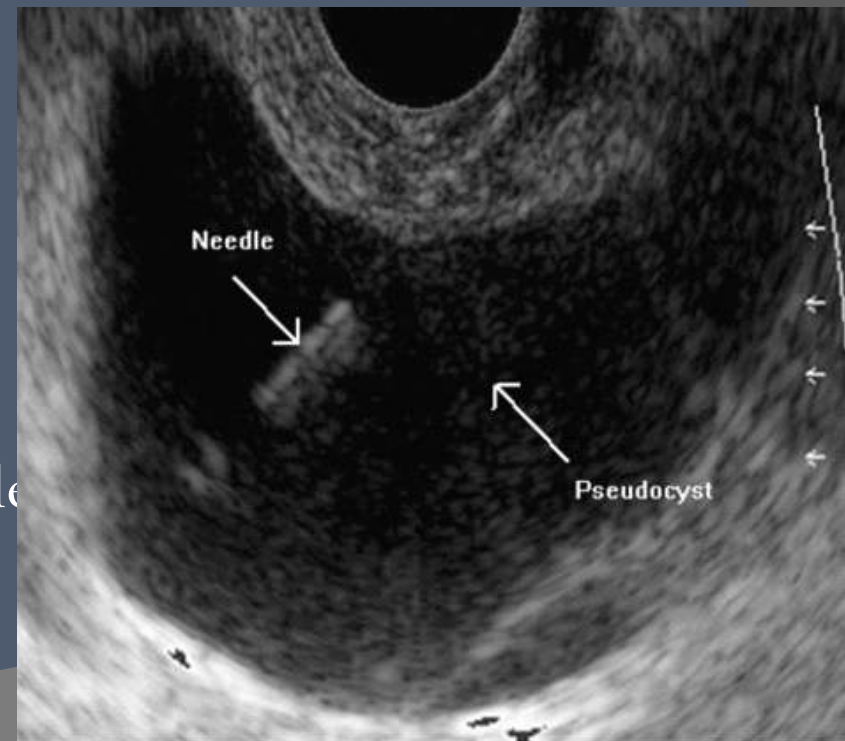
⊙ Percutaneous drainage using either needles or pig tail catheters, of pancreatic abscess or pseudocyst or fluid collections using either ultrasound or CT guidance.

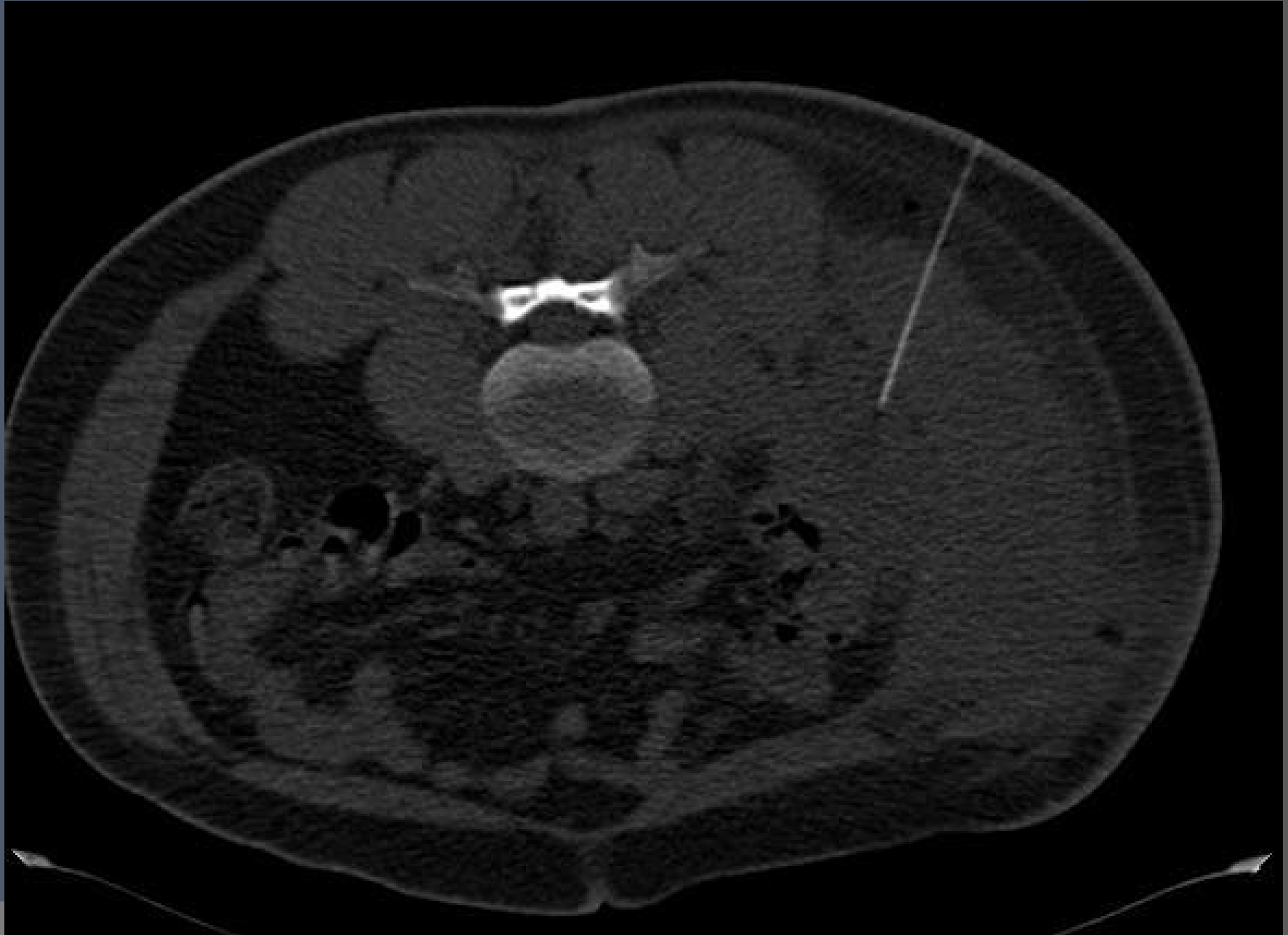
⊙ Coiling of pseudoaneurysms

⊙ Treatment of upper GI bleeds

Due to erosion of the vessels by

- embolization using PVA particles
- coils





TAKE HOME MESSAGE

- Imaging plays a major role in the management of acute pancreatitis.
- **Ultrasonography** is the **initial** investigation, however may not be able to diagnose or confirm the diagnosis on all occasions.
- **THE INVESTIGATION OF CHOICE IS CECT**
- Grading of the severity of the disease done according to the **MODIFIED CT SEVERITY INDEX.**
- Identification of complications early in the disease process can help in better treatment of the patient.
- *Vascular or non-vascular complications can be treated with minimal invasion by image guided interventions.*

REFERENCES

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- ◎ DIAGNOSTIC ULTRASOUND, VOL 1, 4TH EDN, CAROL M. RUMACK
- ◎ *Mortele KJ, Wiesner W, Intriere L, et al: **A Modified CT Severity Index for evaluating acute pancreatitis: Improved correlation with patient outcome.** AJR Am J Roentgenol 183:1261-1265, 2004.*

Thank
You