Pancreas pathology – inflammatory changes

Alina Popescu
Dept. of Gastroenterology and Hepatology
University of Medicine and Pharmacy "Victor Babes"
Timisoara, Romania
WFUMB Center of Excellence
ACUTE PANCREATITIS

- Is an unpredictable disease with frequent complications in its evolution
- Acute pancreatitis accounts for 2% to 3% of all acute abdominal diseases
- The overall mortality in acute pancreatitis is approximately 5%
- Mild forms – mortality 3%
- Severe forms – mortality around 17% (30% in infected necrosis)

Banks PA et al - Am J Gastroenterol 2006;101:2379–2400
• The diagnosis is based on the clinical signs (pain in the upper part of the abdomen) and the elevated serum lipase (more than 3 times the normal value).

• Where doubt exists, imaging modalities may be used

AGA Institute medical position statement on acute pancreatitis.


UK guidelines for the management of acute pancreatitis - Gut 2005;54;1-9
• Approximately 80% of cases – mild forms (clinical course will improve in 48-72h)
  – associated with minimal organ dysfunction and an uneventful recovery; lacks the features of severe acute pancreatitis.

• Approximately 20% of cases – severe forms (frequent complications)
  – associated with organ failure and/or local complications such as necrosis, abscess or pseudocyst

• Severity stratification should be made in all patients within 48 hours of diagnosis

Banks PA et al - Am J Gastroenterol 2006;101:2379–2400
UK guidelines for the management of acute pancreatitis - Gut 2005;54;1-9
Terminology of acute pancreatitis (Atlanta – 1992)

• Acute interstitial pancreatitis
• Necrotizing pancreatitis
  – sterile necrosis
  – infected necrosis
• Pancreatic fluid collection
  – sterile
  – infected
• Pancreatic pseudocyst
  – sterile
• Pancreatic abscess

Bollen TL - British Journal of Surgery 2008; 95: 6–21
Prediction of severity

• CRP values can be used as predictor for the severe forms of acute pancreatitis
• At 48 h, CRP values over 150 mg% have a sensitivity of 80%, specificity 76%, PPV 67%, NPV 86%
• APACHE II score, Ranson score, CT criteria
• Contrast enhanced Computed tomography

Banks PA et al - Am J Gastroenterol 2006;101:2379–2400
UK guidelines for the management of acute pancreatitis - Gut 2005;54;1-9
Ultrasonography (US) is one of the diagnostic procedures that should be performed first in all patients suspected of having acute pancreatitis.

Abdominal ultrasound

• At the onset of symptoms
  – Positive diagnostic elements
  – Differential diagnosis
  – Etiology – gallbladder stones, suspicion of MBD stones
  – Severity
Ultrasound diagnostic elements for acute pancreatitis

• Mild forms
  – Pancreas increased in size
  – Hypoechoic aspect, +/- inhomogenous

• Severe forms
  – Inhomogenous aspect
  – Hyperechoic aspect of the bursa omentalis
  – Pancreatic and peripancreatic fluid collections
  – Doppler – vascular complications (splenic thrombosis)

Etiology

- Ultrasonography is the gold standard for the diagnosis of gallbladder gallstones.
- The sensitivity for gallstones is > 90% in the acute situation, and > 95% when symptoms have resolved.
- Initial US examination negative and there is a suspicion of gallstones (history or biochemical tests) - US should be repeated under optimal conditions.
- US of the gallbladder should be performed within 24h of admission - allow planning of early intervention.
- After a long period of fasting, the interpretation of the presence of biliary sludge and even of gallbladder stones may be difficult.

Johnson C, Lévy P - Pancreatology 2010;10:27–32
Severity

- Dynamic real time examination
- Can be repeated at any moment
- Clinical deterioration – complications
  - fluid collection
Fluid collection diagnosis

- Sterile vs infected
- Puncture and aspiration
Limits

- Impaired acoustic window - overlying bowel gas or obesity.
  - the visualization rate is 62% to 90% for the pancreas

- It is an operator dependent method.

- The main problem is that the detection of pancreatic necrosis is difficult because it cannot assess organ perfusion.

CEUS

- Allows the assessment of the organ’s vascularity – assessment of the necrosis
- Safe method
- Fewer complications vs CECT
- Can be used in impaired renal function

Rickes S et al – Gut 2006; 55: 74-78
Based on CT findings as the gold standard, sensitivity, specificity, positive predictive value, and negative predictive value of ultrasound for detecting severe acute pancreatitis were

- sensitivity 82%,
- specificity 89%,
- PPV 95%,
- NPV 67%

Rickes S et al – Gut 2006; 55: 74-78
CEUS can be also useful for the differential diagnosis of cystic pancreatic lesions.
Ultrasound can not replace (yet) contrast enhanced computer tomography for the evaluation of patients with acute pancreatitis.

On the other hand US has several advantages that make it the first line imaging method for the evaluation of these patients and the most cost-effective and accessible method for their follow up.

In severe acute pancreatitis, CEUS may help identify and delineate necrotic areas, which do not enhance.

If the pancreatic region is clearly visible on US, CEUS can be used in the follow-up of acute pancreatitis after CT staging, in order to reduce the number of CT examinations.

Chronic pancreatitis

• an inflammatory disease characterized by the replacement of the pancreatic glandular structures by fibrous tissue.

• We can find
  – reduced pancreas parenchyma
  – dilatation of main pancreatic duct
  – calcifications
  – pseudocysts.
• Transabdominal ultrasound has a satisfactory accuracy for the diagnosis of chronic pancreatitis and its complications, being currently considered the method of first choice for the examination of the patients.

• The most important diagnostic criteria - the presence of pancreatic calcifications

• Wirsung’s duct larger than 3 mm, (sensitivity 60%–70%, specificity 80%–90%).

D’Onofrio M et al - Pancreas in EFSUMB – European Course Book
• When the ultrasound image is good, the sensitivity of the method in detecting chronic pancreatitis is 70%, with a specificity of almost 90% (1).

• (EUS) permits a significant improvement of the image quality because it allows the transducer to be closely situated near the target lesions and avoids other intervening structures.

1. Owyang C – Texbook of Gastroenterology, 1999
EUS criteria for chronic pancreatitis

• Parenchymal criteria
  – Hyperechoic foci
  – Hyperechoic strands
  – Lobularity
  – Heterogeneity
  – Shadowing calcifications
  – Cysts

• Pancreatic ductal criteria
  – Dilation (4 mm in head, 3 mm in body, 2 mm in tail)
  – Irregularity
  – Hyperechoic duct margins
  – Visible branch ducts
  – Intraductal stones

Jones SN - Clin Radiol 1988
Wiersema MJ - Endoscopy 1993
• Using 4-5 diagnostic criteria, the EUS sensitivity ranges between 84% and 100%, while specificity ranges between 60% and 95%

• Ultrasound can also visualize the complications induced by chronic pancreatitis: stenosing duodenitis, main bile duct compression, pseudocysts

Seicean A - J Gastrointestin Liver Dis. 2007
Chronic pancreatitis vs pancreatic cancer

- 173 pancreatic masses evaluated
- CEUS was able to diagnose mass-forming chronic pancreatitis with a sensitivity of 88.6%, specificity of 97.8%, negative predictive value of 91.2%, and accuracy of 96%.
- In 94% mass-forming chronic pancreatitis cases, CEUS showed moderate enhancement of the tumor, similar with the pancreatic parenchima.