Current Management of Pancreatic Pseudocysts

Krishna Epari
Perth, Western Australia
Atlanta Classification (1992)

- **Acute Fluid Collections** – develop early in acute pancreatitis and do not yet have a cyst wall
- **Acute Pancreatic Pseudocysts** – arise from acute pancreatitis or trauma and wall consists of granulation tissue and extracellular matrix, >4 weeks
- **Chronic Pancreatic Pseudocysts** arise from chronic pancreatitis, without preceding acute episode and are surrounded by a wall
- **Pancreatic Abscess** – intrabdominal collections of pus adjacent the pancreas without any large areas of necrosis

Arch Surg 1993;128:586-590
### Proposed revised classification

<table>
<thead>
<tr>
<th>Interstitial Oedematous Pancreatitis</th>
<th>Necrotising Pancreatitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute peripancreatic fluid collection (APFC)</td>
<td>Post-necrotic pancreatic/peri-pancreatic fluid collection (PNPFC)</td>
</tr>
<tr>
<td>Pancreatic pseudocyst</td>
<td>Walled-off pancreatic necrosis (WOPN)</td>
</tr>
</tbody>
</table>

**Fluid**
- Sterile
- Infected

“Revision of the Atlanta Classification of Acute Pancreatitis”
Acute Pancreatitis Classification Working Group
?unpublished
Prevalence – Pancreatic Pseudocysts

<table>
<thead>
<tr>
<th>Condition</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Pancreatitis</td>
<td>6-18.5%</td>
</tr>
<tr>
<td><strong>Chronic</strong> Pancreatitis</td>
<td>20-40%</td>
</tr>
<tr>
<td><strong>Alcoholic</strong> Chronic Pancreatitis</td>
<td>70-80%</td>
</tr>
<tr>
<td>Idiopathic Chronic Pancreatitis</td>
<td>6-16%</td>
</tr>
<tr>
<td>Biliary Pancreatitis</td>
<td>6-8%</td>
</tr>
</tbody>
</table>

Dtsch Arztebl Int 2009;106(38)614-21
Differential Diagnosis

Table 2  Differential diagnosis of cystic pancreatic lesions

<table>
<thead>
<tr>
<th></th>
<th>SCA</th>
<th>MCN</th>
<th>IPMN</th>
<th>SPN</th>
<th>Pseudocyst</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalent age</td>
<td>Middle age</td>
<td>Middle age</td>
<td>Elderly</td>
<td>Young</td>
<td>Variable</td>
</tr>
<tr>
<td>Sex</td>
<td>Mostly female</td>
<td>Mostly female</td>
<td>Male &gt; female</td>
<td>Mostly female</td>
<td>Male &gt; female</td>
</tr>
<tr>
<td>Presentation</td>
<td>Mass/pain</td>
<td>Mass/pain</td>
<td>Pancreatitis</td>
<td>Mass/pain</td>
<td>Pain</td>
</tr>
<tr>
<td>Location</td>
<td>Evenly</td>
<td>Body/tail</td>
<td>Head</td>
<td>Evenly</td>
<td>Evenly</td>
</tr>
<tr>
<td>Malignant potential</td>
<td>Very low</td>
<td>Moderate to high</td>
<td>Low to high</td>
<td>Low</td>
<td>None</td>
</tr>
</tbody>
</table>

Table 3  Cystic fluid analysis in cystic pancreatic diseases

<table>
<thead>
<tr>
<th></th>
<th>SCA</th>
<th>MCN</th>
<th>MCAC</th>
<th>Pseudocyst</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEA</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>CA125</td>
<td>Variable</td>
<td>Variable</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>CA19-9</td>
<td>Variable</td>
<td>Variable-high</td>
<td>Variable-high</td>
<td>Variable</td>
</tr>
<tr>
<td>Amylase</td>
<td>Low-high</td>
<td>Low-high</td>
<td>Low-high</td>
<td>High</td>
</tr>
<tr>
<td>Lipase</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

Suspicion of malignancy → Resection

Natural History

- Spontaneous regression 8-70%!
- Factors
  - Size
  - Age of cyst
    - Chronic Aetiology
    - Multiple
    - Located in tail
    - Wall >1cm
    - No communication with main duct
    - Proximal ductal stenosis
    - Biliary / Traumatic aetiology
    - Increasing size

Most Acute Pancreatic Pseudocysts less than 4cm regress spontaneously and require no treatment if asymptomatic

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**Indications for the Treatment of Pancreatic Pseudocysts**

**Complicated pancreatic pseudocyst (one criterion suffices)**
- Compression of the abdominal great vessels (clinical manifestations or radiological evidence)
- Clinically relevant gastric outlet stenosis or duodenal stenosis
- Stenosis of the common bile duct with jaundice due to compression
- Infected pancreatic pseudocyst (septic focus)
- Hemorrhage into a pancreatic pseudocyst (danger of recurrent hemorrhage)
- Pancreaticopleural fistula (risk of pneumonia, ARDS)

**Symptomatic pancreatic pseudocyst**
- Abdominal distension
- Nausea and vomiting
- Pain
- Upper gastrointestinal bleeding (10–20%)

**Asymptomatic pancreatic pseudocyst**
- Pseudocyst >5 cm, without any regression after more than 6 weeks of observation (1)
- Cyst wall >5 mm (mature cyst) = high success rate of endoscopic or laparoscopic drainage (14)
- Chronic pancreatitis with advanced pancreatic duct changes, pancreaticolithiasis = persistent irritation leading to inflammation, no more than 26% of cysts regress spontaneously in this situation; when they do not regress, the complication rate rises over the further course of illness (11)
- Suspected cystic pancreatic tumor: median 5-year survival after early resection is good (63%) (21)

ARDS, acute respiratory distress syndrome
Therapeutic Options

- Drainage
  - Percutaneous
  - Open
  - Laparoscopic
  - Endoscopic
    - Transluminal
    - Transpapillary (ERCP)

- NO RANDOMISED TRIALS!!
Percutaneous Drainage

- Population based study
- Suggests that surgical drainage of pancreatic pseudocysts, particularly when coupled with use of ERCP, leads to decreased complications, length of stay, and mortality in comparison with percutaneous drainage.

2004 SSAT Annual Meeting

A National Comparison of Surgical Versus Percutaneous Drainage of Pancreatic Pseudocysts: 1997–2001

John M. Norton, M.D., M.P.H., Alpheaus Brown, M.D., M.P.H., Joseph A. Guldau, Ph.D., Jeffrey A. Noron, M.D., Ian S. Grimm, M.D., Kevin E. Behru, M.D.

J Gastrointest:15-20 Surg 2005;
Percutaneous Drainage

- Problems
  - High recurrence rates (up to 70%)
  - Persistent pancreato-cutaneous fistula (>20%)

- Current Indications
  - Emergency treatment of infected collections or pseudocysts
  - Pancreatic Necrosis (Minimally invasive necrosectomy)
# Internal drainage

<table>
<thead>
<tr>
<th></th>
<th>Open</th>
<th>Laparoscopic</th>
<th>Endoscopic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>14 studies/253 pts</td>
<td>24 studies/1127 pts</td>
</tr>
<tr>
<td>Mortality</td>
<td>2.5%</td>
<td>0%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Morbidity</td>
<td>16%</td>
<td>9%</td>
<td>12.8%</td>
</tr>
<tr>
<td>Success</td>
<td>90-100%</td>
<td>92%</td>
<td>79%</td>
</tr>
<tr>
<td>Recurrence</td>
<td>0-12%</td>
<td>3%</td>
<td>7.6%</td>
</tr>
</tbody>
</table>

- 6.7% conversion rate in laparoscopic series
- Endoscopic ultrasound decreases risk of bleeding, perforation and increases success in endoscopic series

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BOX 2

**Prerequisites and recommendations for the endoscopic drainage of pancreatic pseudocysts**

- The distance between the pseudocyst and the gastric or duodenal wall should be less than 1 cm (15, 22).

- The chosen approach should be through the site of greatest impression by the pseudocyst on the adjacent gastric or duodenal wall (22, e24).

- Ideally, the cyst should be more than 5 cm in size and should cause impression of the gastric or duodenal wall; single cysts, mature cysts, and cysts without interruption of the pancreatic duct can be drained with high rates of success (24).

- For the drainage of mature cysts, the pancreatic ductal system should first be investigated endoscopically, and transpapillary drainage is to be preferred whenever possible (24).

- Symptomatic pancreatic pseudocysts: cysts that have been present for more than 6 weeks and have not regressed under conservative treatment should be treated (25).

- Malignant lesions and pseudocaneurysms should always be ruled out before endoscopic treatment (15).
Emerging Technologies

- Hydrid-NOTES
  - Laparoscopic port via PEG site
- NOTES
  - Per-oral flexible stapler
  - Removable self expanding metal stents
  - Endoscopic necrosectomy
<table>
<thead>
<tr>
<th>Designation</th>
<th>Definition</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute fluid collection</td>
<td>Arises in the early course of acute pancreatitis; usually immediately adjacent to the pancreas; has no cyst wall; possible infection; high likelihood of spontaneous regression. Treatment rarely needed (generally only when infected). Etiology: acute (less commonly, chronic) pancreatitis.</td>
<td>Transcutaneous drainage: Success rate 42–96%, complication rate 0–15%, mortality 0%, recurrence rate 4–24%. Fistula formation is common. Endoscopic drainage: Success rate 47–100%, complication rate 3–21%, mortality 0–1%, recurrence rate 0–22%.</td>
</tr>
<tr>
<td>Acute pancreatic pseudocyst</td>
<td>Present for more than 6 weeks; contains pancreatic secretions; over time, becomes surrounded by a cyst wall composed of collagen-containing granulation tissue, without evidence of acute infection. Etiology: acute pancreatitis or pancreatic trauma.</td>
<td>Endoscopic drainage: Success rate 79.2%, complication rate 12.8%, mortality 0.7%, recurrence rate 7.6%.</td>
</tr>
<tr>
<td>Chronic pancreatic pseudocyst</td>
<td>Contains pancreatic secretions; surrounded by a cyst wall composed of collagen-containing granulation tissue, without evidence of acute infection. Etiology: chronic pancreatitis without a prior episode of acute pancreatitis.</td>
<td>Endoscopic drainage: Success rate 85%, complication rate 13.3%, mortality 0.2%, recurrence rate 10.7%. Operative drainage: Success rate 90–100%, complication rate 16%, mortality 2.5%, recurrence rate 0–12%.</td>
</tr>
<tr>
<td>Pancreatic abscess</td>
<td>Circumscribed intra-abdominal collection of pus. Etiology: acute pancreatitis, pancreatic trauma, or chronic pancreatitis; to be distinguished from an infected (acute or chronic) pancreatic pseudocyst.</td>
<td>Transcutaneous drainage: Success rate 87%, complication rate 4–17%, mortality 8%. Fistula formation is possible. Operative removal: Success rate 90–100%, complication rate 20%, mortality 5–20%.</td>
</tr>
</tbody>
</table>
Conclusions

- ~50% of pancreatic pseudocysts regress spontaneously
- Treatment is indicated for complicated or symptomatic pseudocysts or chronic pseudocysts >5cm
- Need to exclude malignancy
- Different approach in Necrotising pancreatitis
- Transpapillary drainage favoured for communicating pseudocysts
- Endoscopic and laparoscopic approaches have comparable results with lower morbidity and mortality compared with open surgery