Management of Pancreatic Cystic Lesions

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Pancreatic Cystic Lesions - Objectives

- Why the concern?
- Imaging Triage
  - Imaging features
  - Imaging evaluation steps
- Multidisciplinary Approach
- Management Guidelines
Pancreatic Cysts – shapes and sizes
Much Ado About a Cyst?

- Prevalence
  - 2% of CT abdomen; 13-20% of MRI abdomen
  - Prevalence ↑s with age
  - Reported in 24% of autopsies
  - Higher in pts w family h/o PDAC or genetic mutation

- PCL → ~3x ↑ odds of PDAC; Multiple → >8x ↑ odds
  - ↑ Prevalence of PDAC elsewhere in gland
Pancreatic Cystic Lesions DDx

- **GOOD**
  - Pseudocyst, simple cyst, lymphoepithelial cyst
  - Serous cystadenoma - rare malignant potential

- **BAD** - *Mucinous lesions*
  - IPMN - low grade $\rightarrow$ high grade dysplasia $\rightarrow$ carcinoma
  - Br Duct IPMN – 12-47% malignancy
  - Mixed/Main duct IPMN – 38-68% malignancy
  - MCN – 10-17%

- **UGLY** – Cystic PDAC, mets, PNET, SPEN

References:
- J Gastrointest Surg 2008; 12:401-4
- JAMA 2016; 315: 1882-93
- Pancreatology 2014; 14:131-6
- Pancreas 2011; 40:67-71
IPMN
Mucinous Cystic Neoplasm
Ductal Adenocarcinoma
Endocrine Tumor
SPEN
Serous Cystadenoma
Simple Cyst
Pseudocyst
Other
Pancreatic Cystic Lesion DDX

Arch Surg 2003; 138:423-427
World J surg 2008; 32:2028-2037
Survival after “BAD” cyst resection

5-yr post resection survival

- MD-IPMN 100% Noninvasive, 60% Malignant
- BD-IPMN 100% Noninvasive, 72% Malignant
- MCN 96% Noninvasive, 75% Malignant
- PDAC 25% Noninvasive, 60% Malignant

References:
- Pancreas 2011;40(1):67-71
- Pancreatology 2010;14(2):131-136
- JAMA 2013;310(14):1473-1481
Good/Bad/Ugly – can we differentiate?

- 58 cystic pancreatic lesions, 36% malignant
- Contrast enhanced CT/MRI vs. Histology
- Correct diagnosis 46% (r1) and 43% (r2)
- 2 of 13 unilocular thin walled cysts<4cm were malignant

AJR Am J Roentgenol 2007;189(3):648-656
Management – Symptomatic lesions

- Resection
Management – Asymptomatic/Incidental

- Unilocular <3cm, no complexity (97% benign)
- Solid component, rapid growth, abnl parenchyma/duct → surgery
- Others
  - Follow up MRI/MRCP or CT
  - EUS
  - Surgery

Multidisciplinary Approach

Radiology 2006; 238:912-919
Top Magn Reson Imaging 2015; 23:117-128
Imaging Triage Steps

- Truly Cystic?
- Ductal Communication – IPMN vs. Pseudocyst
- No Ductal Communication – IPMN, Pseudocyst, MCN, SCN
- Microcystic – Serous Cystadenoma
- Unilocular/macrocytic – IPMN vs. MCN
- Cluster of Grapes – IPMN vs. SCA
  - Branch vs. main duct vs. mixed
Imaging Triage

Cyst vs. Mixed Solid? Mucinous?
Ductal Communication vs. Not?
Mucinous vs. Non-mucinous?
High Risk Stigmata vs. Worrisome Features?

PDAC elsewhere in gland??
Modified Sendai Criteria 2012

- **High-Risk Stigmata**
  - Obstructive jaundice w cystic lesion in HOP
  - Enhancing solid component within a cyst
  - Main PD≥10mm

Pancreatology 2012; 12: 183-197
Modified Sendai Criteria 2012

- Worrisome Features
  - Pancreatitis
  - Cyst ≥ 3cm
  - Thick/enhancing cyst walls
  - Main PD 5-9mm
  - Non-enhancing mural nodule
  - Abrupt PD caliber change with distal atrophy

Pancreatology 2012; 12: 183-197
- EUS Worrisome Findings
  - Mural nodule
  - Main duct involvement
  - Suspicious/malignant cytology
- If no → f/up CT/MRI or EUS based on size
- Inconclusive → surveillance MRI/EUS alternating q 3-6mos (?resection in young pts)

Pancreatology 2012; 12: 193-197
Role of EUS and FNA

- Determine connection to duct
- Characterize lesion – mucinous?
- Cyst fluid analysis
  - CEA >192ng/mL → mucinous
    - <5 = SCA vs. PC
  - Amylase >250IU/L → probable PC (>18,000 = def PC)
- Genetic analysis – mutations
- Cytology - ?dysplastic cells

CEA 32
Amylase 522

CEA 2771
Amylase 74

Gastroenterol 201; 26:122-7
Gastrointest Endosc 2005; 62:383-9
# Modified Sendai Criteria 2012

EUS – no worrisome features → Size matters!

<table>
<thead>
<tr>
<th>Size</th>
<th>Time to f/up</th>
<th>Modality</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1cm</td>
<td>2-3yrs</td>
<td>CT/MRI</td>
<td></td>
</tr>
<tr>
<td>1-2cm</td>
<td>1yr x 2</td>
<td>CT/MRI</td>
<td>Lengthen interval if stable</td>
</tr>
<tr>
<td>2-3cm</td>
<td>3-6mos</td>
<td>EUS; then alternate EUS/MRI</td>
<td>Lengthen interval if stable; consider resection (young/healthy)</td>
</tr>
<tr>
<td>&gt;3cm</td>
<td>3-6mos</td>
<td>Alternate EUS/MRI</td>
<td>Strongly consider resection (young/healthy)</td>
</tr>
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Pancreatology 2012; 12: 183-197
## Length of Follow-up?

<table>
<thead>
<tr>
<th>Source</th>
<th>Study population</th>
<th>Findings</th>
</tr>
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<tbody>
<tr>
<td>Tanno et al. Gut 2008; 57:337-343</td>
<td>82 pts</td>
<td>9(11%) grew by ≥10mm, median 59mos 4(4.9%) dev mural nodules, median 105 mos</td>
</tr>
<tr>
<td>Khannoussi et al. Pancreatology 2012; 12(3):198-202</td>
<td>53 pts</td>
<td>8pts (15%) w ↑ size – 2pts developed invasive ca – both after 84mos</td>
</tr>
<tr>
<td>Brook et al. Radiology 2016; 278:752-761</td>
<td>370 lesions, &lt;2cm, asymptomatic</td>
<td>27% grew; 6% grew after initial 2 year stability. Age, cyst size, septations not predictive of growth</td>
</tr>
<tr>
<td>Crippa et al. Am J Gastroenterol 2017; 112(7):1153-1161</td>
<td>144 pts</td>
<td>New WF/HRS in 26 (18%) - at 71/77 mos – no prior change in 19/26 pts</td>
</tr>
<tr>
<td>Kayal et al. AJR 2017; 209:320-326</td>
<td>131 lesions</td>
<td>71 cysts grew – 21 of these grew after 5yrs; baseline size &gt;2cm grew &gt;5yrs and faster</td>
</tr>
</tbody>
</table>
Other Guidelines

AGA SECTION

American Gastroenterological Association Institute Guideline on the Diagnosis and Management of Asymptomatic Neoplastic Pancreatic Cysts

Santhi Swaroop Vege, 1 Barry Ziring, 2 Rajeev Jain, 2 Paul Moi Guidelines Committee

1Division of Gastroenterology and Hepatology, Mayo Clinic, Rochester, Minnesota
2Kimmel College of Medicine, Thomas Jefferson University, Philadelphia, Pennsylvania
3Division of Gastroenterology, Hamilton Health Sciences, McMaster University

Management of Incidental Pancreatic Cysts: A White Paper of the ACR Incidental Findings Committee

Alex J. Megibow, MD, MPH, 1 Mark E. Baker, MD, 1 Desiree E. Morgan, MD, 2 Bush R. Kamel, MD, PhD, 3
Dushyanth V. Sathani, MD, 3 Elliot Newman, MD, 3 William R. Broggi, MD, 2 Lincoln L. Berland, MD, 2
Priy V. Panthapalapande, MD, MPH, 2
2. The AGA suggests that patients with pancreatic cysts ≤3 cm without a solid component or a dilated pancreatic duct undergo MRI for surveillance in 1 year and then every 2 years for a total of 5 years if there is no change in size or characteristics. *(Conditional recommendation, Very low quality evidence)*

3. The AGA suggests that pancreatic cysts with at least 2 high-risk features, such as size ≥3 cm, a dilated main pancreatic duct, or the presence of an associated solid component, should be examined with EUS-FNA. *(Conditional recommendation, Very low quality evidence)*

4. The AGA suggests that patients without concerning EUS-FNA results should undergo MRI surveillance after 1 year and then every 2 years to ensure no change in risk of malignancy. *(Conditional recommendation, Very low quality evidence)*

5. The AGA suggests against continued surveillance of pancreatic cysts if there has been no significant change in the characteristics of the cyst after 5 years of surveillance or if the patient is no longer a surgical candidate. *(Conditional recommendation, Very low quality evidence)*

6. The AGA suggests that patients with invasive cancer or dysplasia in a cyst that has been surgically resected should undergo MRI surveillance of any remaining pancreas every 2 years. *(Conditional recommendation, Very low quality evidence)*

7. The AGA suggests that patients with both a solid component and a dilated pancreatic duct and/or concerning features on EUS and FNA should undergo surgery to reduce the risk of mortality from carcinoma. *(Conditional recommendation, Very low quality evidence)*

8. The AGA suggests that patients with invasive cancer or dysplasia in a cyst that has been surgically resected should undergo MRI surveillance of any remaining pancreas every 2 years. *(Conditional recommendation, Very low quality evidence)*
- Age, cyst size, imaging features
- Manage as mucinous until proven otherwise
- Broad use of EUS/FNA → refined characterization
- Follow-up periods of 9-10 years in most pts
- Modified management >80yo
- Shared decision making – patient + physician

JACR 2017; 14(7): 911-923
Multidisciplinary Approach
Multidisciplinary Approach - Reporting

- Size, Location
- Duct communication → IPMN vs. Pseudocyst
  - Ductal abnormality?
- Unilocular vs. Multilocular
- Microcystic vs. Macrocystic
- High risk stigmata vs. Worrisome features?
- Growth/ multiple lesions?
- PDAC elsewhere in gland?
Summary - Management of PCL’s

- Multidisciplinary approach
- Truly cystic?
- Ductal communication?
- Pseudocyst vs. Serous vs. Mucinous?
- High Risk Stigmata/Worrisome Features?
- MRI/CT vs. EUS vs. Resection
- Remember to look for PDAC elsewhere in the gland!

![Diagram](diagram.png)
Thank you for your attention

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