Cystic Lesions of the Pancreas

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ROSE Rapid Onsite Evaluation

- ROSE has been shown to be effective in optimizing the yield and efficiency of EUS-FNA
- Only solid tumors should be asked for ROSE
- Like frozen and intra-operative consultation, definitive diagnosis should NOT be demanded on ROSE
- Staffing, time, and cost constraints limit availability

Pancreatic Cyst Terminology

- Unsatisfactory (Reason)
- Negative (Consider descriptive)
- Cystic contents: Mucinous epithelium is not identified
- Negative for high grade dysplasia or malignancy, no cyst contents
- Debris/inflammatory cells present without mucinous epithelium c/w $\ensuremath{\mathsf{pseudocyst}}$
- Atypic
 - Mucinous epithelium present, no evidence of high grade dysplasia
 - of uncertain origin
 - c/w mucinous neoplasm (most likely IPMN)
- C/W serous cystadenoma
- Suspicious for malignancy
- Mucinous epithelium present with at least high grade dysplasia/CIS $\,$
- Abnormal epithelium suspicious for invasiv adenocarcinoma
- Positive for malignanc;
- Adencarcinoma

Pancreatic Lesions Solid Pseudocyst Chronic pancreatitis Serous cyst • Ductal • Mucinous cyst (MCN and IPMN) adenocarcinoma • Acinar cell carcinoma Cystic degeneration of • Pancreatic endocrine typically solid tumors neoplasm (PEN) • PEN • Solid pseudo-papillary • SSPT tumor (SSPT) • other • Pancreatoblastoma • Other more rare cysts • Metastasis • Simple cysts • Lymphoepithelial cyst • Peripancreatic cysts

| EUS-Fine Needle Aspiration | |
|--|--|
| | |
| | |
| | |
| | |
| | |
| | |
| Transgastric body and tail | |
| Transgastric: body and tail Transduodenal: head | |

Cysts of the pancreas

- Non-neoplastic
- Pseudocyst
- Retention cyst
- Congenital cyst
- Foregut cyst
- Endometriotic cyst
- Cystic nonepithlial neoplasms
- Lymphangioma
- Hemangioma

- Secondarily cystic solid neoplasms
- Ductal adenocarcinoma
 - Endocrine neoplasms
 - Acinar cell neoplasms
 - Solid-pseudo papillary
 neoplasm

Cysts of the pancreas

• Secondarily cystic solid

Ductal adenocarcinoma

Solid pseudo papillary

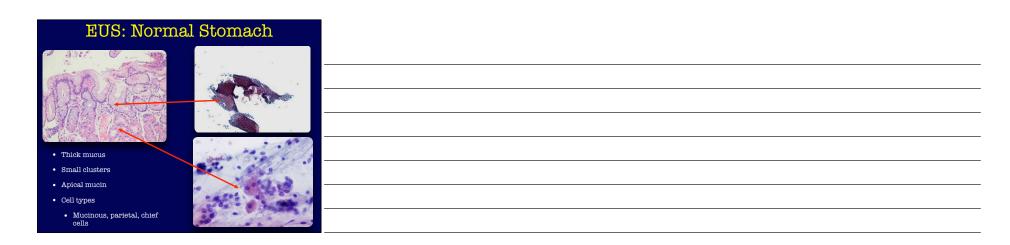
neoplasms

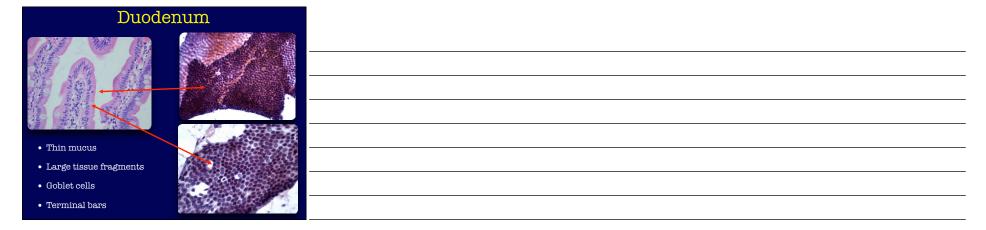
Endocrine

Acinar cell

• Primarily cystic epithelial neoplasms

- Serous cystadenoma
- Mucinous cystic
- w/ low grade dysplasia
- w/ high grade dysplasia
- w/ invasive carcinoma
- Intraductal papillary mucinous
 neoplasm (IPMN)
 - w/ low grade dysplasia
 - w/ high grade dysplasia
 - w/ invasive carcinoma





| Pancreas | 1 Million | |
|-------------------|---------------|--|
| | | |
| | Mar Service | |
| Conception of the | Section 2 | |
| | 18 3. 8 12 | |
| | | |
| • Ductal cells | and the | |
| Acinar cells | | |
| • Islet cells | CERT . | |

International Guidelines for Pancreatic Cysts 2012 Version Are any of the following high-risk stigmata of malignancy present? i) obstructive jaundice in a patient with cysic lesion of the head of the pancreas. I) enhancing solid component within cyst, iii) main pancedic dud > 10 min in size Yes No Consider surgery, if clinically appropriate Are any of the following worrisome features present? Clinical: Panceatits * Imaging: i) cyst ≥3 cm, ii) thicknederhanding cyst walls, iii) main duct size 5-9 mm, iii) non-enhancing mural nodule iv) abrupt change in catiber of pancreatic duct with distal pancreatic atrophy. Ļ No If yes, perform endoscopic ultrasound Are any of these features present? i) Definite mural nodule (s)^b ii) Main duct features suspicious for involvement ^c iii) Cytology: suspicious or positive for malignancy No → What is the size of largest cyst? Yes + Inconclusive 2.3 cm EUS in 3.6 months, then lengthen interval alternating MRI wth EUS as appropriate. Consider surgery in young, fit patients with need for prohoned surveillance 1-2 cm <1 cm >3 cm CT/MRI yearly x 2 years, then lengthen interval if no change ^c CT/MRI Close surveillance alternating MRI with EUS every 3-6 months. Strongly consider surgery in young, fit patients in 2-3 years c noed surve

Pancreatic pseudocyst

• Clinical

- Age: All ages (pancreatitis – older)
- Males>Females
- Tail more common
- 2-30 cm
- Gross: fibrous, necrortic wall
- Chemistry: high amylase and lipase, low CEA

Adsay NV. ModPathol (2007): 20:S71-S93

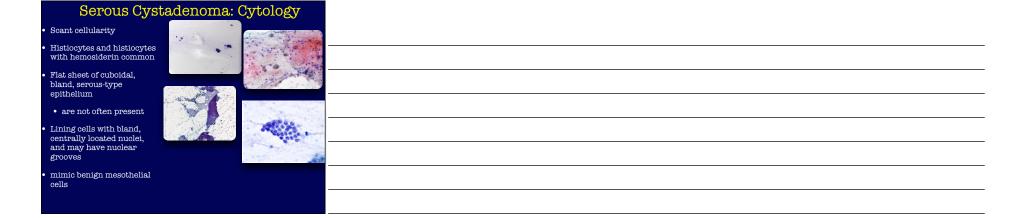
| Pancreatic pseudocyst | |
|--|--|
| Hypocellular and lack epithelial cells Nonspecific cyst Necrosis, protein debris, inflammation, cholesterol crystals, and etc. | |
| | |

Serous cystadenoma

Adsay NV. ModPathol (2007): 20:871-893

| Clinical | |
|------------------------------|--|
|------------------------------|--|

- Gender: more common in women than men (7:3)
- Older (average 61-68)
- Location: anywhere
- Symptoms: abdominal pain and weight loss
- Site predilection: None, maybe heaad
- Prognosis: vast majority benign
- Gross: Numerous tightly packed small cyst and stellate scar; sponge-like
- Chemistry: low amylase and CEA



| | Low diagnostic accuracy ancer (Cytopathology), 104:102-110, 2008 |
|------------------------------|---|
| | All histology confirmed SCA (n=21) |
| CT confirmed | 3/12 (25%) |
| Histiocytes present | 16/21 (76%) |
| Histiocytes with hemosiderin | 11/21 (52%) |
| GI contamination | 7/15 (47%) |
| | |
| SCA cells | 5/21 (24%) |
| Prospectively Dx | 1/21 (5%) |
| | |

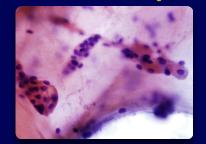
Mucinous Cystic Neoplasm

| Gender: much more common in women than men | |
|---|--|
| • Age: mean age at diagnosis – 50 | |
| Location: Tail > head | |
| Gross: Thick fibrous wall, multicystic; usually larger | |
| than 2cm | |
| • Lined by ovarian stroma, septa may CA++ | |
| • Chemistry: low amylase, high CEA | |
| | |

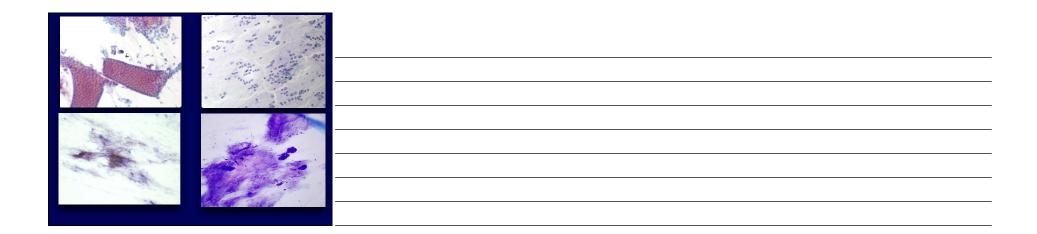
| Mucinous cystic • Thick mucous, if present, extremely helpful | c neoplasm: cytology | | |
|--|---|--|--|
| • Low cellularity | | | |
| • Flat sheet or single mucous cells | | | |
| • Ovarian-type stroma | | | |
| often absent | | | |
| Cytologic atypia depend on differentiation | | | |
| Cytology often | | | |
| underestimate the final histologic grade | Pitman et al. Cancer Cytopathol. 2010:1181-13 | | |

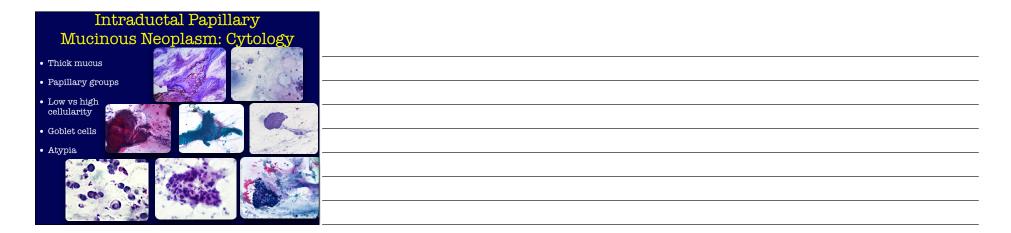
| Cooperative Pancreatic Cyst Study Brugge, Gastroenterol 2004 | | | |
|--|------------------------|----------------------|--|
| Table 3. Accuracy of the Tested Tumor Markers in Differentiating Extension B Tumor matrix Sentitify Specificity Accuracy ROC value* 04 P Out 01 C4 7.9 8.4 7.9 7.903 <0.01 | 20 0.40 0.60 0.80 1.00 | Sensitivity | |
| ROC, receiver operator characteristics curve (area); Cut official/culated optimal cutoff values for each marker (reg/mL), "P value: algisticance vs. chance in predicting a motinous lesion. | 007 | Specificity 2 CI2-10 | |
| | | | |

Is this a mucinous cyst?



Neoplastic mucin or GI mucin? If there are abundant "gut" epithelium, be careful!



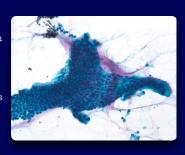


| IPMN - | Oy 1010 | 57 | |
|------------------|---------|----------|----------|
| | Stelow | Michaels | Layfield |
| Thick mucus | 18/18 | 10/11 | 10/13 |
| Papillary | 3/18 | 5/11 | 8/13 |
| Low cellularity | 9/18 | 4/11 | 5/13 |
| High cellularity | 9/18 | 7/11 | 8/13 |
| Goblet cells | 6/18 | N/A | N/A |
| Atypia | 3/18 | 7/11 | 8/13 |

IPMN – Triple Test

• Clinical-EUS: Thick mucin and cystic dilated duct system

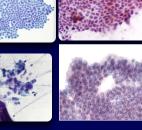
- Radiographic: Cyst communicate with pancreatic duct
- Cytology: Mucinous neoplasm



Adenocarcinoma

| Majo | r cri | teri | a. |
|------|-------|------|----|
| | | | |

- Nuclear overlap and crowding
- Nuclear contour irregularity
- Chromatin clearing or clumping
- Minor criteria
- Single epithelial cells
- Necrosis, mitosis
- Nuclear enlargment
- Acta Cytol, 1995; 39:1-10



Cystic Neuroendocrine Neoplasms

- Rare; 5-10% of pancreatic neoplasms
- Cyst formation not due to necrosis in contrast to cystiic adenocarcinoma
- Usually unilocular; up to 25 cm

| Cystic Neuroendocrine Neoplasms: |
|---|
| Cellularity: varies Cytology |
| Loose aggregate and single cell pattern |
| Monomorphic appearance; |
| some cells out of proportion to others |
| • Plasmacytoid, bi-nucleate |
| Salt and pepper chromating and the second |
| Pink granules of air dry |
| • Synaptophysin + |
| |
| |
| |

| ¹⁰ − |
|---|
| 2 - |