Pearls of Pancreatic Cytology
- Case based learning

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Aim

• Standardized terminology and nomenclature for pancreatobiliary cytology
• Common pitfalls in fine needle aspiration of pancreatic lesions
Indication of EUS-Guided Pancreatic FNA

• Clinical evaluation and imaging study suggestive of pancreatic neoplasia
• Imaging study reveals definitive evidence of unresectability for pancreatic or biliary tract cancer
• A non-operative candidate due to comorbidities
• Pre-operative neoadjuvant chemotherapy and/or radiation
• EUS-guided FNA can be performed as an integral part of EUS examination, allowing definitive tissue acquisition and rapid diagnosis
The Papanicolaou Society of Cytopathology System for Reporting Pancreaticobiliary Cytology

Definitions, Criteria and Explanatory Notes

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Springer
Pancreatobiliary Terminology Classification Scheme
Proposed By The Papanicolaou Society of Cytopathology

I. Nondiagnostic
II. Negative for malignancy
III. Atypical
IV. Neoplastic: benign and other
V. Suspicious for malignancy
VI. Positive for malignant cells
Negative for Malignancy

- A negative cytology sample is one that contains adequate cellular and/or extracellular tissue to evaluate or define a lesion that is identified on imaging.

- When using the negative category one should give a specific diagnosis
  - Benign pancreatobiliary tissue in the setting of vague fullness and no discrete mass
  - Acute pancreatitis/Chronic pancreatitis/Autoimmune pancreatitis
  - Benign cyst
    - Pseudocyst
    - Lymphoepithelial cyst
    - Serous cyst
  - Splenule/accessory spleen

- False negative rate is approximately 15% for solid and up to 60% on cystic pancreatic lesions
Atypical

- Cells present with cytoplasmic, nuclear, or architectural features that are not consistent with normal or reactive cellular changes of the pancreas, and are insufficient to classify them as a neoplasm or suspicious for a high-grade malignancy
  - Scant atypical cells
  - Mucinous neoplasm vs. gastric mucosal contamination
  - High grade pancreatic intraepithelial neoplasia (PanIN) vs. mucinous neoplasm (IPMN, MCN, Mucinous adenocarcinoma)
  - Benign acinar cells and islet cells vs. pancreatic neuroendocrine tumor
Neoplastic: Benign and Other

• Neoplastic: Benign
  • A cytological specimen sufficiently cellular and representative, with or without the context of clinical, imaging, and ancillary studies, to be diagnostic of a benign neoplasm
    • Serious cystadenoma
    • Lymphoepithelial cyst

• Neoplastic: Other
  • A neoplasm that is either premalignant or a low-grade malignant
    • Intraductal papillary mucinous neoplasm (IPMN), mucinous cystic neoplasm with dysplasia
    • Well-differentiated pancreatic neuroendocrine tumor (PanNET), solid pseudopapillary neoplasm (SPN), gastrointestinal stromal tumor (GIST)
Suspicious for Malignancy

• Some but an insufficient number of the typical features of a specific malignant neoplasm are present, mainly pancreatic adenocarcinoma.

• The morphologic features must be sufficiently atypical that malignancy is considered more probable than not
Positive for Malignant Cells

- A group of neoplasms that unequivocally display malignant cytologic characteristics
  - Pancreatic ductal carcinoma and its variants
  - Acinar cell carcinoma
  - High-grade neuroendocrine carcinoma
  - Pancreatoblastoma
  - Lymphoma
  - Sarcoma
  - Metastatic malignant neoplasm
Normal Components in EUS-guided Pancreatic FNA

• GI contaminants
  • Gastric mucosa
    • Gastric epithelium
    • Chief cells and parietal cells
    • Smooth muscle
  • Duodenal mucosa
    • Small intestinal epithelium
    • Brunner’s glands
    • Smooth muscle

• Pancreatic parenchyma
  • Ductal cells
  • Acinar cells
  • Islet cells

Ketan Kulkarni. The Journal of Lancaster General Hospital 2010;5
Gastric mucosal components

Fundic Type  Antral Type
Gastric mucosal components

- Gastric chief cells
  - Single, acinar, or small tubular configurations
Gastric mucosal components

- Gastric parietal cells
  - Cuboidal or pyramidal shaped cells with centrically located nuclei
  - Granular or fine vacuolated cytoplasm
Gastric mucosal components

- Gastric Foveolar cells
  - Sheets and strips; occasional isolated cells and gastric pits
  - Visible mucin
  - Grooved naked nuclei
Intestinal Mucosal Components

- **Duodenal mucosa**
  - Flat, cohesive monolayer sheets with a honeycomb pattern
  - Non-mucinous glandular cells with brush border
  - Sporadically placed goblet cells appear as “fried eggs” within the sheet
Intestinal Mucosal Components

- Duodenal mucosa
  - May present in isolated columnar cells with basally located nuclei
Intestinal Mucosal Components

- Brunner’s cells
  - Columnar with basally located nuclei and abundant foamy cytoplasm
Benign Pancreatic components

- Ductal cells
- Acinar cells
- Islet cells
Pancreatic Ductal Cells

- Flat, cohesive sheets with evenly spaced nuclei (Honeycomb)
- Cuboidal or columnar shaped cells with round to oval nucleus with evenly distributed, finely granular chromatin
- Inconspicuous nucleolus
- Well-defined cytoplasmic borders
Pancreatic Acinar Cells

- Cohesive acinar or grapelike aggregates
- Eccentrically placed round nucleus with evenly distributed, finely granular chromatin
- Small nucleolus
- Abundant granular cytoplasm
Pancreatic Acinar Cells

- Tissue fragments attached to fibro-vascular stroma
Case 1

• A 47 years old male patient who started having abdominal pain thought related to pancreatitis about 6 months ago

• CT scan showed a mass in the tail of his pancreas and was referred here for EUS-FNA

• The past medical history includes diabetes and pancreatitis
Cytologic diagnosis

A. Squamous cell carcinoma
B. Adenocarcinoma
C. Adenosquamous cell carcinoma
D. Acinar cell carcinoma
E. Neuroendocrine tumor
Case 2

• A 25 years old female patient with abdominal pain and abnormal LFTs
• The pain started a couple years ago. It is intermittent and sometimes radiated to her back
• CT showed a 1.5cm low density mass in the head of pancreas
• Clinically the differential diagnosis included neuroendocrine tumor and solid pseudopapillary tumor
Cytologic diagnosis

A. Pancreatic neuroendocrine tumor
B. Acinar Cell carcinoma
C. Intrapancreatic splenule
D. Solid pseudopapillary tumor
E. Metastatic renal cell carcinoma
Case 3

- A 63 years old female patients with chronic abdominal pain associated with nausea for 6 years, S/P abdominal aortic aneurysm repair
- Imaging studies performed 6 years ago showed:
  - MRI and CT: a 3.8 X 3.1 cm cystic mass in the head of pancreas with encasement of superior mesentery artery and up-stream pancreatic duct dilation
  - EUS confirmed solid/cystic mass displacing the regional vasculature and invading the bile duct and duodenal wall
  - Clinically an advanced unresectable pancreatic mass
- The mass had been stable since and the recent imaging study was in favor of pancreatitis
Cytologic diagnosis

A. Negative for Malignant cells
B. Atypical Cells
C. Mucinous Neoplasm
D. Suspicious for adenocarcinoma
E. Adenocarcinoma
Case 4

• A 57 years old male patient with long history of chronic pancreatitis
• CT showed a 5.6 X 4.7 mass in the head of pancreas with microcalcification and abutment of the common hepatic artery, superior mesenteric vein and portal vein
• EUS and ERCP impression: pancreatic ductal carcinoma
Cytologic diagnosis

A. Negative for Malignant cells
B. Atypical Cells
C. Mucinous Neoplasm
D. Suspicious for adenocarcinoma
E. Adenocarcinoma