IMAGES IN Gastroenterology

Imaging of Pancreatic Cystic Neoplasms

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In this review, neoplasms that can present as cystic lesions are categorized based upon the pathologic classification of pancreatic neoplasms[1], as following:

I. Epithelial neoplasms
  a. Exocrine tumors
    i. Duct cell origin
      1. Mucinous adenocarcinoma
      2. Microcystic adenoma
      3. Mucinous cystic tumor
      4. Intraductal papillary mucinous tumor (IPMT)
    ii. Uncertain cell origin
      1. Solid papillary epithelial neoplasm (SPEN)
  b. Endocrine tumors
    i. Insulinoma
    ii. Gastrinoma
    iii. Glucagonoma
    iv. Non-functioning islet cell tumor
II. Nonepithelial neoplasms
  a. Lymphoma

Mucinous Adenocarcinoma (Figure 1)

Mucinous adenocarcinoma is an uncommon variant of adenocarcinoma. This neoplasm produces large amount of mucin, which is responsible for its cystic appearance. Its prognosis is as poor as the typical adenocarcinoma.

Microcystic Adenoma (Figure 2)

This is a benign neoplasm that usually occurs in women in the seventh decade (grandmother tumor).

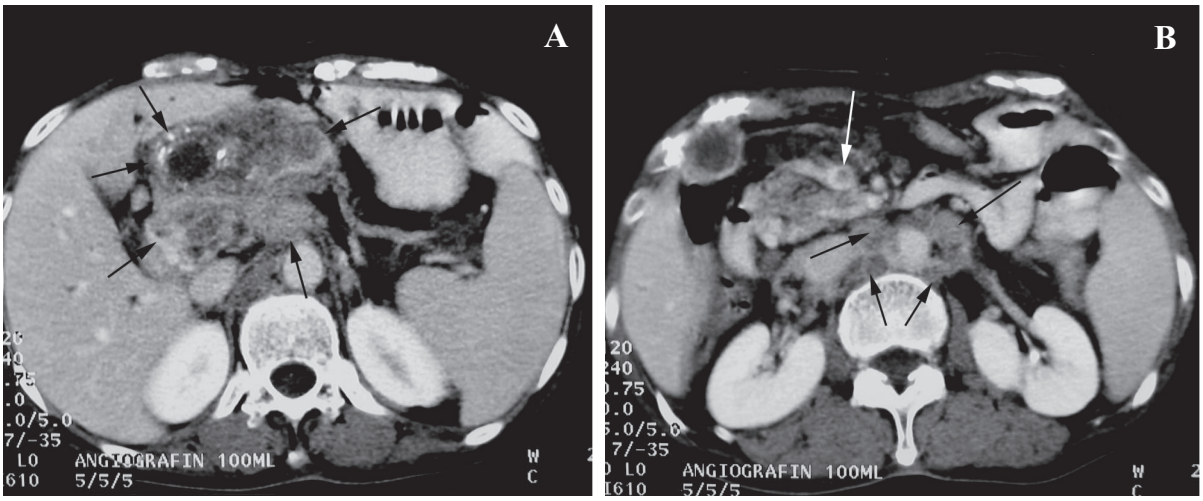

Figure 1 Mucinous adenocarcinoma of the pancreatic head in a 45-year-old female.
A CT shows a large mass at the pancreatic head (arrows) with low-density cystic component, secondary to mucin.
B Invasion of SMV (white arrow) and multiple aortocaval lymphadenopathy (black arrows) are indicative of an advanced stage.

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Cysts are usually multiple and small (less than 2 cm). Central stellate scar with or without calcification is an uncommon finding, but highly specific for this tumor[2]. Microcystic adenoma contains intracellular glycogen, a feature that differentiate this neoplasm from mucinous cystic tumor, which contains mucin content.

Mucinous Cystic Tumor (Figure 3)

This neoplasm is common in women in the fourth and fifth decades (daughter-in-law tumor). It is potentially malignant, which will eventually develop into frankly malignant if left to progress[3]. Mucinous cystic tumor may be unilocular or multilocular and cysts are usually larger than 2 cm. Peripheral or curvilinear calcifications of cyst walls are different from central calcification of microcystic adenoma. Mucinous content is characteristic feature of this tumor at the percutaneous aspiration biopsy.

Intraductal Papillary Mucinous Tumor (IPMT) (Figure 4)

This is a low-grade, slowly growing potentially malignant tumor with a much better prognosis than adenocarcinoma. Mucin, produced by this tumor, is secreted into pancreatic ducts causing ductal dilatation. There are three types of IPMT: main duct type,

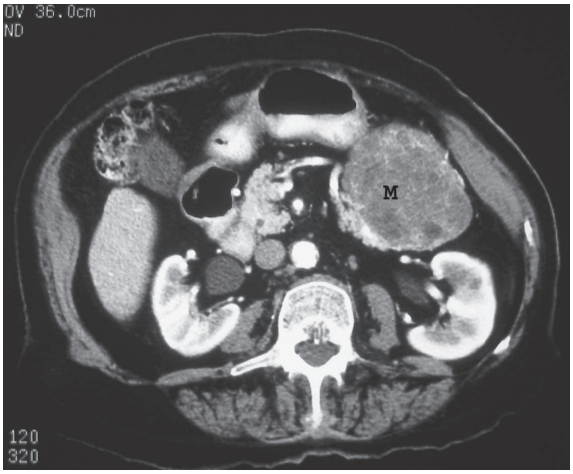

Figure 2 Microcystic adenoma in a 75-year-old female. CT shows a well-defined mass (M) at the pancreatic tail. This mass is composed of multiple small cysts of less than 2 cm.

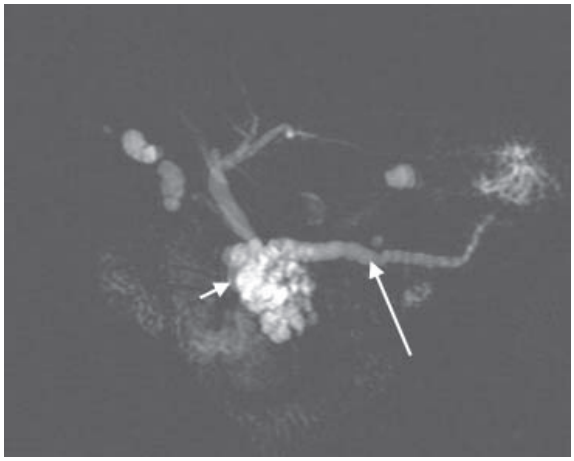

Figure 4 IPMT, combined type, in a 67-year-old male. MRCP shows dilated main pancreatic duct (long arrow) as well as side branches at uncinate process (short arrow).

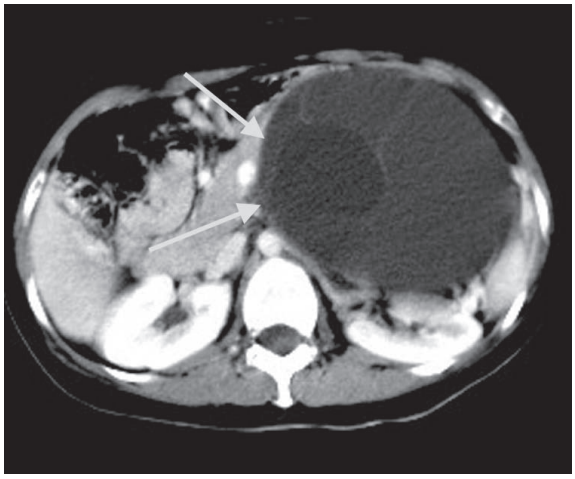

Figure 3 Mucinous cystic tumor in a 37-year-old female. CT shows a large multiloculated mass at the pancreatic tail (arrows). Each cyst is larger than 2 cm.

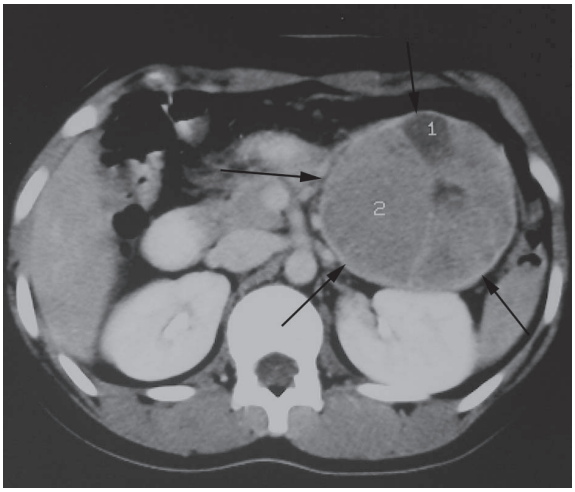

Figure 5 Solid papillary epithelial neoplasm (SPEN) in a 20-year-old female. CT shows a predominantly solid mass with minimal hemorrhagic, cystic component at the pancreatic tail (arrows).

branch duct type, and combined type4. ERCP is highly diagnostic if there is mucin extruded from the bulging papilla.

Solid Papillary Epithelial Neoplasm (SPEN) (Figure 5)

This is a low-grade malignancy that usually occurs in young women (mean age, 24 years old)5. Multiloculated hemorrhagic cysts with solid component are characteristic of this neoplasm.

Islet Cell Tumors

Insulinoma

Insulinoma is the most common functioning islet cell tumor. This tumor is usually small and cystic change is very rare.

Gastrinoma (Figure 6)

Gastrinoma is the second most common functioning islet cell tumors, after insulinoma. This tumor is usually associated with Zollinger-Ellison syndrome. Gastrinoma is hypervascular and cystic component occurs secondary to intratumoral necrosis or hemorrhage.

Glucagonoma (Figure 7)

Glucagonoma is the third most common functioning islet cell tumor and is usually malignant. Most

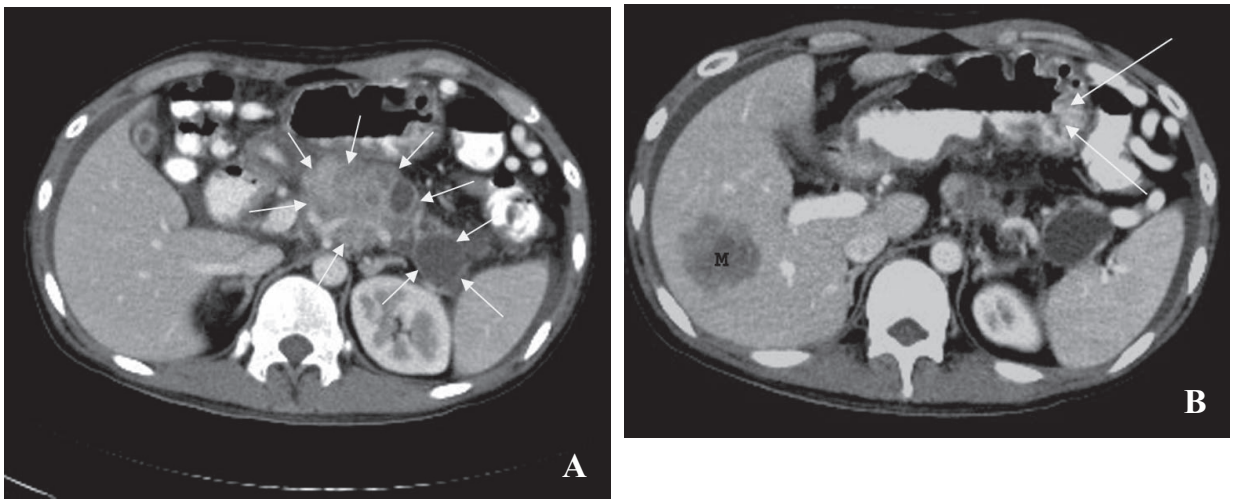

Figure 6 Gastrinoma associated with Zollinger-Ellison syndrome in a 21-year-old male who presented with chronic, intractable peptic ulcer disease.
A CT shows a mixed solid and cystic mass at pancreatic tail (arrows).
B Thickened mucosal gastric folds secondary to hyperchlorhydria as well as liver metastasis (M) are observed.

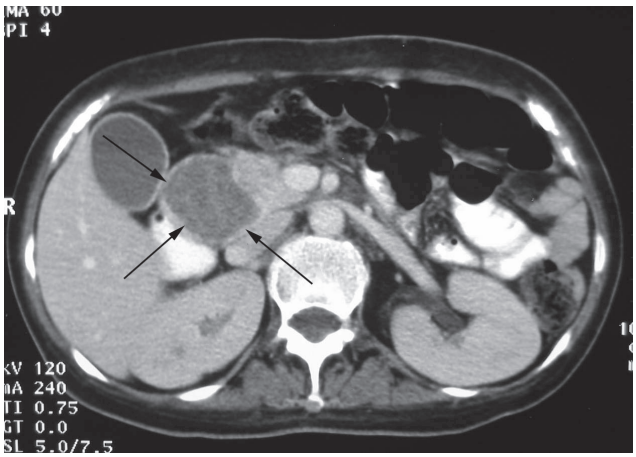

Figure 7 Glucagonoma in a 43-year-old female who presented with skin rash and DM. CT shows a cystic mass at the pancreatic head (arrows).

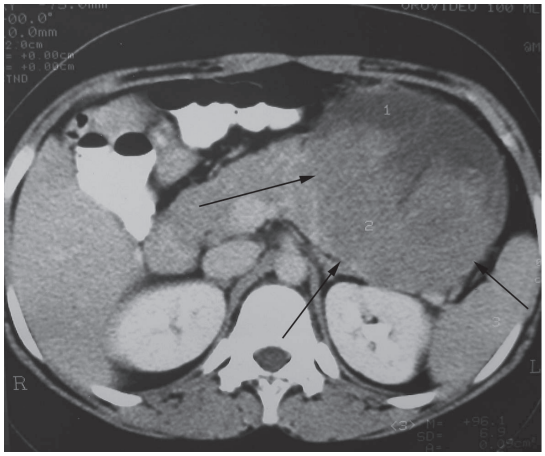

Figure 8 Non-functioning islet cell tumor in a 16-year-old female. CT shows a large complexed, solid/cystic mass at pancreatic tail.

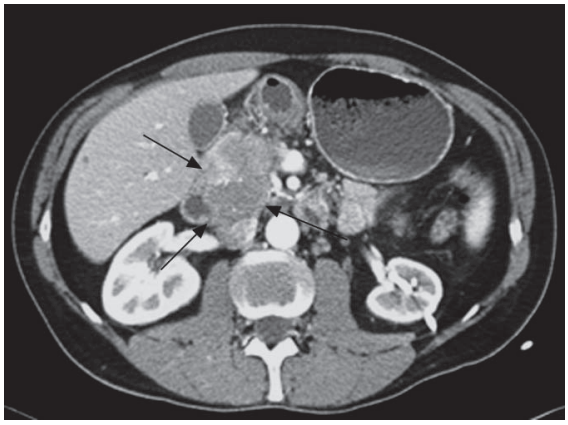

Figure 9 Lymphoma in a 35-year-old man. CT shows a cystic mass at the pancreatic head (arrows).

patients present with a necrolytic migratory rash. Tumor is usually large and metastasis occurs at the time of diagnosis. Cystic lesion is usually secondary to tumor necrosis or hemorrhage, similar to gastrinoma.

Non-functioning Islet Cell Tumor (Figure 8)

This tumor actually produces some hormones, but at a low level that it does not cause any clinical symptoms. By the time of presentation, the tumor is usually large with area of cystic degeneration.

Lymphoma (Figure 9)

Primary lymphoma of the pancreas is not common. It is usually associated with peripancreatic lymphadenopathy. Cystic change is a rare finding.

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