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**Within what timeframe are post-pancreatitis fluid collections considered acute?**

Peripancreatic fluid collections are considered to be acute for 4 weeks following pancreatitis.

**What are some basic differences between an acute necrotic collection and an acute peripancreatic fluid collection?**

An acute necrotic collection is a non-encapsulated collection of heterogeneous though non-liquified material within 4 weeks following necrotizing pancreatitis.

An acute peripancreatic fluid collection is a non-encapsulated fluid collection within 4 weeks following non-necrotizing interstitial edematous pancreatitis.

Note that acute peripancreatic fluid collections classically have no well-defined wall on CT and often resolve spontaneously.

**If an acute peripancreatic fluid collection persists longer than 4 weeks and becomes encapsulated, this fluid collection is termed what?**

A pancreatic pseudocyst.

**If an acute necrotic collection persists beyond 4 weeks and becomes encapsulated, what is this termed?**

Walled-off necrosis.

**True or False: Pancreatic infected necrosis has a high mortality rate?**

True. The most common cause of death in patients with acute pancreatitis is infected necrosis. Pancreatic abscesses may be found in the acute setting or greater than 4 weeks following pancreatitis. If you see air contained within the pancreatic fluid collection that will often be thick-walled pancreatic abscess/infected necrosis is a diagnostic consideration. One reason why you may wait to see if an acute pancreatic fluid collection or an acute necrotic collection resolve on their own is that percutaneous or surgical drainage have a high risk of introducing infection which should be avoided.

**What are some common causes of splenic vein thrombosis?**

Common causes of splenic vein thrombosis include acute and chronic pancreatitis, pancreatic malignancy, aneurysms of the celiac and/or splenic arteries, and retroperitoneal fibrosis. Note also that pancreatitis can cause pseudoaneurysms of the pancreaticoduodenal artery which are often treated with coil embolization by interventional radiology. Note that splenic vein thrombosis can lead to gastric varices. Therefore, pancreatitis can indirectly cause gastric varices by means of first causing splenic vein thrombosis.

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**What are some of the classic features of a mucinous cystic pancreatic tumor?**

A mucinous cystic pancreatic tumor is a low-grade but potentially malignant tumor that is classically found in middle-aged women. These are loculated, often large thick-walled cystic masses most commonly arising from the pancreatic tail. Mural nodules and papillary projections may be present.

**What is the mechanism by which afferent loop syndrome can cause pancreatitis?**

In afferent loop syndrome, you often see a closed-loop bowel obstruction and this causes obstruction of biliary and pancreatic drainage from dilation of the afferent limb post-billroth 2, which can cause pancreatitis.

**True or False: Ectopic pancreatic rests can cause a small bowel target sign?**

True. Other causes of the small bowel target sign can be GISTs, lymphoma, melanoma, and primary bowel adenocarcinoma. If there are multiple small bowel target signs, think lymphoma or melanoma metastatic disease first.

**On MRI, what is the expected normal T1 signal of the pancreas?**

The pancreas should be extremely bright on T1-weighted MRI due to the high enzyme content of the pancreas.

**If a patient presents with painless jaundice what are common tumors that can cause this presentation?**

Cholangiocarcinoma and pancreatic adenocarcinoma.

**Which of these involves the pancreas: primary or secondary hemochromatosis?**

Primary hemochromatosis involves the pancreas and spares the spleen and is an inherited disease that causes increased iron absorption.

Secondary hemochromatosis results from multiple transfusions and/or chronic inflammation and classically involves the spleen and spares the pancreas.

Both primary and secondary hemochromatosis involve the liver.

**What is “bronze diabetes”?**

This is when the pancreas becomes sufficiently damaged from primary hemochromatosis that the patient develops diabetes.

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### **What are different types of annular pancreas?**

Annular pancreas occurs when the ventral pancreatic bud does not adequately rotate with the duodenum during development, causing duodenal encasement. This can be complete or incomplete and extramural or intramural. Complete means there is complete encasement of the duodenum. Extramural has pancreatic tissue from the ventral bud that drains into the main pancreatic duct. Intramural has pancreatic tissue from the ventral bud draining via its own small ducts into the duodenum. Complications from annular pancreas can include duodenal obstruction and pancreatitis.

### **What are some common features of pancreatic divisum?**

Pancreatic divisum occurs when the drainage of the pancreas into the duodenum is split or divided, hence “divisum”. This is the result of failure of the dorsal and ventral pancreatic anlagen to fuse. With pancreatic divisum the main drainage of the pancreas occurs through the dorsal pancreatic duct through the minor or accessory papilla which is more superiorly located and small compared to drainage through the major papilla. This potentially predisposes to development of pancreatitis. Treatment is usually conservative but if severe symptoms like recurrent pancreatitis develop and for treatment the minor papilla can be dilated or stented.

### **True or False: Dorsal pancreatic agenesis is associated with polysplenia?**

True. There is also a risk for diabetes due to beta cell loss in the pancreatic tail.

### **What are key features of autoimmune pancreatitis?**

Autoimmune pancreatitis has an IgG4 association with classic imaging appearance of a sausage shaped pancreas. Clinical presentation, unlike other forms of pancreatitis, is not often associated with an acute onset of inflammation and abdominal pain but rather things like jaundice, new onset diabetes, weight loss and other autoimmune diseases such as inflammatory bowel disease. Importantly, this disease can regress with steroid treatment. Laboratory testing often shows elevated IgG and antinuclear antibody levels.

### **What are key features of paraduodenal aka groove pancreatitis?**

This is a chronic pancreatitis affecting the space “groove” between the pancreatic head, duodenum, and common bile duct. Classic history is that of a middle aged male with chronic alcohol abuse. Classic symptoms are recurrent episodes of upper abdominal pain, nausea, and vomiting secondary to marked duodenal stenosis and reduced duodenal motility that is worse after fatty meals. The etiology is fibrosis and scar tissue within the pancreaticoduodenal groove and space superior to the pancreatic head with scarring and fibrosis also involving the duodenal wall causing stenosis of the duodenum. On imaging look for thickening of the duodenal wall which may have some associated cystic changes and a sheet like mass between the pancreatic head and duodenum.

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## **Episode 2**

### **True or false: Pancreatic pseudocysts can be located within the mediastinum?**

True. Pancreatic pseudocysts, if large and appropriately positioned, can extend through the diaphragmatic hiatus into the mediastinum.

### **What are key features of serous cystic tumors of the pancreas?**

First, serous cystic tumors of the pancreas are benign. The most common are the microcystic pancreatic serous adenomas and the less common are the serous macrocystic adenomas. Microcystic means something like you have greater than 6 cysts that are all smaller than 2 cm in size. These are highly vascular though benign tumors that are most commonly seen in elderly females. These are benign so surgery should be avoided. MRI is often most helpful for definitive diagnosis. A central stellate scar and a lobulated contour are characteristic for these lesions.

### **If you see multifocal serous pancreatic tumors what syndrome should you first consider?**

Von Hippel Lindau. Also, if you simply see a true pancreatic cyst VHL should come to mind.

### **What are key features of a mucinous cystic neoplasm of the pancreas?**

First, these are premalignant and are not always benign unlike the serous cystic tumors. Mucinous cystic tumors are surgical lesions. These often have fewer and larger cystic components compared to the serous cystic tumors. Serous cystic tumors are most common in elderly females and mucinous cystic neoplasms are most common in perimenopausal aged females. A key imaging feature is a fibrous capsule and these are round/oval and not lobulated. Mucinous cystic neoplasms have an association with elevated CEA levels.

### **True or false: Solid pseudopapillary neoplasms (SPN) aka solid and papillary epithelial neoplasms (SPEN) are most common in middle aged females?**

False. SPN/SPEN are most common in young females to include teenagers.

### **What are classic imaging findings for SPN/SPEN?**

SPN/SPEN are classically encapsulated, solid masses with hemorrhage from internal autoinfarction. Classic features for diagnosis are encapsulated pancreatic solid masses with internal hemorrhage in a young female.

### **What is the prognosis of metastatic SPN/SPEN?**

The prognosis is often good, even if metastatic. These tumors should be resected as they are most often benign but have low-grade malignant and metastatic potential.

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**What pancreatic tumors have a capsule?**

Serous pancreatic tumors and IPMNs are not encapsulated. Tumors of the pancreas that are encapsulated are mucinous, solid pseudopapillary neoplasms, and so called sugar tumors. The best imaging study to evaluate for a capsule is MRI. If you see a macrocystic pancreatic tumor and it has no capsule think of a macrocystic serous tumor; if there is a capsule think macrocystic mucinous tumor.

**What is the cystic pancreatic lesion that is more common in males?**

IPMNs are the only pancreatic cystic lesion that is more common in males. This is the most common mucin secreting tumor and is the only intraductal mucin secreting tumor. Because this is intraductal there is an association with elevated amylase levels and a high CEA. These may be multifocal (other pancreatic cystic lesions are often not multifocal) and these are classically non-septated lesions. These can be sub-classified by location as main duct or side-branch IPMNs.

**True or false: Side-branch IPMNs are classically associated with chronic pancreatitis.**

False. There is an association between chronic pancreatitis and main duct IPMNs.

**What pancreatic tumor is nicknamed the “daughter” lesion? What about “mother”, “grandma” and “grandfather”?**

Daughter lesion: SPN/SPEN (teenage girls)

Mother: Mucinous tumors

Grandma: serous tumors

Grandfather: IPMNs

**What is the most common solid tumor of the pancreas?**

Pancreatic adenocarcinoma

**What is the most common location for pancreatic adenocarcinoma?**

Pancreatic head. Therefore, look for abrupt pancreatic duct obstruction and vascular invasion surrounding the pancreatic head. Unfortunately, pancreatic adenocarcinoma has a high rate of vascular invasion and is unresectable at presentation in the majority of cases. Resectability usually requires no metastatic disease, minimal to no encasement of the celiac, superior mesenteric, and hepatic arteries and no contact with the superior mesenteric vein and portal vein, or contact that is mild enough that these can be surgically reconstructed.

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**What is the most common location for pancreatic neuroendocrine tumors?**

The pancreatic body and tail are the most common sites for neuroendocrine tumors as these are where islet cells are present.

**What are some of the most common pancreatic neuroendocrine tumors?**

The most common pancreatic tumors in no specific order include insulinoma, gastrinoma, somatostatinoma, VIPoma and glucagonoma. These also have syndromic associations. On imaging for pancreatic neuroendocrine tumors look for circumscribed, solid masses that are encapsulated. Remember the potential role for somatostatin-receptor imaging with Gallium 68 dotate PET/CT.

A few key features to remember for board exams:

Gastrinoma in the pancreas should make you consider MEN1. Also, remember association between gastrinoma and peptic ulcer disease (Zollinger Ellison Syndrome) with a MEN1 association.

All neuroendocrine tumors have hormone secretion and when hyperfunctioning can cause characteristic clinical symptoms.

VIPoma secrete vasoactive intestinal peptides (VIPs) and result in severe watery diarrhea, hypokalemia and achlorhydria.

**If you see a pancreatic mass in a young male of Asian descent, what is the top differential consideration for board exams?**

A pancreaticoblastoma is classic in this setting. Look for associated elevated AFP levels. Classic imaging features are that of a circumscribed large pancreatic head lesion with internal necrosis and blood products.

**True or false: Accessory splenic tissue can be located in the pancreas?**

True. When present in the pancreas, accessory splenic tissue can look like a solid, encapsulated pancreatic mass. Key is to look for signal/appearance identical to spleen on multiphase CT or MRI and, if necessary, consider a nuclear medicine tagged RBC or sulfur colloid scan for confirmation.