A Tale of the Pancreas Tail

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Patient G.B.

- 60M with a hx of severe COPD and a recently discovered 5x5cm right renal cell carcinoma

- An abdominal CT study was performed to plan for a nephrectomy, and a 2x2cm mass was discovered incidentally on the tail of the pancreas.
Patient G.B.

Image courtesy of Charles Vollmer, M.D., BIDMC
Patient G.B.--Abdominal CT

2 cm pancreatic lesion
5 cm RCC

Transaxial abdominal C+ CT

Image courtesy of Charles Vollmer, M.D., BIDMC
ΔDx of a Solid Pancreatic Lesion

Common
- Adenocarcinoma
- Focal Pancreatitis

Uncommon
- Spenule
- Hemangioma
- Islet Cell Tumor
- Metastases (esp. from kidney, breast, stomach, lung, gallbladder, melanoma)
- Lymphoma
- Lipoma
- Solid and papillary epithelial neoplasm
- Many more…
Pancreatic Adenocarcinoma

- The most common and concerning lesion on the differential is pancreatic adenocarcinoma.
- In this instance, however, we can effectively rule out pancreatic adenocarcinoma since these lesions tend to be hypoenhancing on C+ abdominal CT.
Companion Patient: Pancreatic Adenocarcinomas

Hypoenhancing mass in the head of the pancreas

Transaxial abdominal C+ CT

Image courtesy of Dr. Hines-Peralta, BIDMC
Our patient G.B.: Abdominal CT

Homogeneously hyperenhancing pancreatic lesion

Transaxial abdominal C+ CT

Image courtesy of Charles Vollmer, M.D., BIDMC
ΔDx of a Solid, Hyperenhancing Pancreatic Lesion on CT

- Metastases (esp. from kidney, breast, stomach, lung, gallbladder, melanoma)
- Islet Cell Tumor
- Hemangioma
- Spenule
ΔDx of a Solid, Hyperenhancing Pancreatic Lesion on CT

• Metastases from RCC
• Islet Cell Tumor
• Hemangioma
• Spenule
A RCC Met is less likely

- Pancreatic mets are rare, and usually come from cancers in adjacent organs (kidney, stomach, GB)
- Mets usually enhance in a pattern similar to the parent tumor, but you cannot make a diagnosis based on this trait alone
- Note that the renal lesion enhances very differently from the pancreatic lesion
The Pancreatic Lesion Enhances Differently than the Renal Mass

Homogeneously enhancing pancreatic lesion
Heterogeneously enhancing RCC

Transaxial abdominal C+ CT

Image courtesy of Charles Vollmer, M.D., BIDMC
ΔDx of a Solid, *Hyperenhancing* Pancreatic Lesion on CT

- Metastases from RCC
- *Islet Cell Tumor*-the most likely culprit
- Hemangioma
- Spenule
Islets of Langerhans Contain the Cells of the Endocrine Pancreas

Islet immunostained for insulin

Image courtesy of Dr. Susan Bonner-Weir
Islet Cell Tumors can Produce Clinical Syndromes Related to the Hormones they Secrete

- β-cell → Insulinoma
- α-cell → Gastrinoma
- δ-cell → Glucagonoma
- PP-cell → VIPoma
- ε-cell → Somatostatinoma
- PP→PPoma
Clinical Characteristics of Islet Cell Tumors

- Only 50% of islet cell tumors are produce symptoms related to hormone overproduction.
- Non-hyperfunctional islet cell tumors (as with G.B.) tend to produce symptoms from mass effects and have the greatest potential for metastasizing.
- Islet cell tumors are difficult to manage once they metastasize.
Islets are Highly Vascularized Structures

Bonner-Weir and Orci, *Diabetes* 1982

Corrosion cast of islet microvasculature
Radiologic Features of Islet Cell Tumors

• Islet tumors are *hyper*enhancing on CT (usually on both arterial and portal-venous phases) due to increased vascular supply related to their endocrine function.

• Most sensitive radiologic modality for detecting islet cell tumors is abdominal CT +/- contrast, and is the gold standard.

• In patients that cannot tolerate contrast, MR has been shown to have similar sensitivity to contrast-enhanced CT.
ΔDx of a Solid, Hyperenhancing Pancreatic Lesion on CT

- Metastases from RCC
- Islet Cell Tumor
- Hemangioma
- Spenule

While an islet cell tumor is the most likely diagnosis in this instance, we need to rule out possible benign lesions, since this will drastically change the treatment plan.
What about a hemangioma?

- Very rare, seen predominantly in kids, or in association with inherited disorders (von-Hippel-Lindau).
- Could be distinguished with endoscopic ultrasound (would be hyperechoic).
- Pt did not want a biopsy performed, especially if the procedure was going to be invasive and the diagnosis rare.
ΔDx of a Solid, *Hyperenhancing* Pancreatic Lesion on CT

- Renal Cell Metastases
- Islet Cell Tumor
- Hemangioma
- Spenule
A Typical Accessory Spleen

Transaxial abdominal C+ CT

Lobulated, surrounded by fat

Image courtesy of Karen Lee, M.D.
Intrapancreatic Spenule

• An intrapancreatic spenule is a rare, but hypothetically possible “fake out.”

• Anatomically: A large post-mortem study found that the tail of the pancreas was the 2nd most common site of ectopic splenic tissue.

• Physiologically: Would mimic an islet tumor since splenic tissue is relatively vascular.
Our patient G.B.: Abdominal CT

Hyperenhancing to the pancreas, isoenhancing to the spleen

Transaxial abdominal C+ CT

Image courtesy of Charles Vollmer, M.D., BIDMC
I know what some of you may be thinking…

From: http://alumnus.caltech.edu/~kantner/zebras/pictures.html
Spleen Scintigraphy
(\(^{99m}\text{Tc}\)-labeled Heat Damaged RBCs)

Inject back into patient, and labeled RBCs selectively retained by reticuloendothelial system of spleen.
Patient Course

- The possibility of an intrapancreatic spenule was explored because it is the most benign condition on the differential.

- The radiologic study to identify an intrapancreatic spenule is also the least invasive.
A Case Where Spleen Scintigraphy was Not Performed

Gastroenterology 2006; 131 (2): 350
Intrapancreatic Spleenule

• Only five case reports of an intrapancreatic spleen mimicking a neuroendocrine tumor.

• It is rare for an intrapancreatic spleenule to be large enough to mimic a non-functioning islet cell tumor.

• This rare, but interesting, “fake out” will probably rise in the future as the use of contrast-enhanced CT increases.
Patient Course

• G.B. needed no further work-up for his pancreatic lesion

• Pt decided to pursue RF ablation therapy for his RCC and is doing well.
Summary/Conclusions

• Islet cell tumors can be differentiated from other solid pancreatic tumors by their tendency to be hyperenhancing on CT.

• The differential diagnosis of hyperenhancing lesions must be tailored to each patient.

• Understanding the radiologic features of pancreatic masses are essential for correctly diagnosing, localizing, and treating these lesions.
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