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Self Assessment Module on Imaging of the Gallbladder and Pancreas

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CT of Acute Cholecystitis and Pancreatitis

Question 1: When comparing the utility of CT and US in the detection of acute cholecystitis, CT has the advantage of being able to detect which corroborating finding?

- a. Gallbladder wall thickening
- b. Pericholecystic fluid
- c. Stranding of the pericholecystic fat
- d. Cholelithiasis
- e. Pancreatitis

Correct Answer: c

Rationale: Stranding of the pericholecystic fat is not apparent on Ultrasound. All other signs can be seen on both CT and Ultrasound.

Reference:

Bortoff GA, Chen MY, Ott DJ, Wolfman NT, Routh WD. Gallbladder stones: imaging and intervention. *Radiographics*. 2000; 20:751-66.

Question 2: What is the name of the complication of acute cholecystitis presenting with a gastric outlet obstruction caused by a gallstone obstructing the duodenum?

- a. Mirizzi's syndrome
- b. Bouveret's syndrome
- c. Rigler's syndrome
- d. Gallstone pancreatitis
- e. Gallstone ileus

Correct Answer: b

Rationale: Mirizzi's syndrome is obstruction of the common hepatic duct by a stone in the cystic duct or gallbladder neck. Rigler's *triad* is the three findings of gallstone ileus: small bowel obstruction, air in the gallbladder, ectopic gallstone. Gallstone ileus and pancreatitis are not features of the described syndrome: Bouveret – gastric outlet obstruction with a gallstone in the duodenum.

Reference: Brennan GB, Rosenberg RD, Arora S. Bouveret syndrome. *Radiographics*. 2004; 24:1171-5.

Question 3: Which of the CT findings of acute pancreatitis is has been shown to be the most important indicator of disease severity?

- a. Pancreatic necrosis
- b. Pancreatic pseudocyst
- c. Increase in size of the pancreas
- d. Peripancreatic stranding
- e. Adjacent organ involvement

Correct Answer: a

Rationale: Pancreatic necrosis is the greatest indicator of disease severity and patient outcome. Mortality and morbidity are increased by 23% and 82% respectively. 20-70% of cases of pancreatic necrosis become infected and are the cause of 80% of the deaths from acute pancreatitis

References:

Balthazar E.J. Acute Pancreatitis: Assessment of Severity with Clinical and CT Evaluation. Radiology 2002;223:602-613.

Problem Solving Solid Pancreatic Masses

Question 4: Which imaging finding is typical of pancreatic adenocarcinoma?

- a. isodense pancreatic mass
- b. dense calcifications
- c. double duct sign
- d. diffuse glandular infiltration

Answer: c

Rationale: double duct sign represents dilatation of the pancreatic duct and the bile duct due to adenocarcinoma of the pancreatic head.

Distracters: a) isodense pancreatic mass is an uncommon appearance of pancreatic adenocarcinoma occurring in about 10% of cases. b) calcifications rarely occur in pancreatic adenocarcinoma. d) diffuse glandular infiltration is a rare form of pancreatic adenocarcinoma.

References:

1)Vanbeckevoort D. Solid pancreatic masses: benign or malignant. JBR-BTR 2007;90:487-489.

2) Prokesch RW, Chow LC, Beaulieu CF, et al. Isoattenuating pancreatic adenocarcinoma at multi-detector row CT: secondary signs. Radiology 2002;224:764-768.

Question 5: Which finding is more common in pancreatic adenocarcinoma than in autoimmune pancreatitis?

- a. appearance of a capsule-like rim
- b. peripancreatic stranding
- c. enhancement of the bile duct wall
- d. dilatation of the pancreatic duct

Answer: d

Rationale: dilatation of the pancreatic duct occurs more commonly with adenocarcinoma of the pancreas which originates in the duct. The dilated pancreatic duct typically occurs beyond the level of the malignant mass.

Distracters: a) appearance of a capsule-like rim around a diffusely enlarged pancreas is a feature of autoimmune pancreatitis. b) stranding of the peripancreatic fat is more commonly seen with autoimmune pancreatitis. c) Enhancement of the bile duct wall is much more commonly seen with autoimmune pancreatitis.

References:

1) Takahashi N, Fletcher JG, Fidler JL, et al. Dual-phase CT of autoimmune pancreatitis: a multireader study. *AJR* 2008;190:280-286.

2) Sahani DV, Sainani NI, Deshpande V, et al. Autoimmune pancreatitis: disease evolution, staging, response assessment, and CT features that predict response to corticosteroid therapy. *Radiology* 2009;250:118-129.

Question 6: Which is true regarding insulinomas?

- a. most are large by the time of diagnosis.
- b. they appear as a hypodense mass on contrast-enhanced CT.
- c. they are the least common islet cell tumor.
- d. the majority are benign.

Answer: d

Rationale: the majority are benign tumor. Unlike other islet cell tumors most insulinomas (about 90%) are benign tumors.

Distracters: a) most insulinomas are small at the time of diagnosis. b) they appear as highly enhancing masses on contrast-enhanced CT. c) they are the most common islet cell tumor (neuroendocrine tumor) of the pancreas accounting for about 50%.

Reference:

Rha SE, Jung SE, Lee KH, et al. CT and MR imaging findings of endocrine tumor of the pancreas according to WHO classification. *Eur J Radiol* 2007;62:371-377.

Imaging Workup of Cystic Pancreatic Masses

Question 7: Which is the most common cystic pancreatic neoplasm?

- a. serous cystadenoma
- b. mucinous cystic neoplasm
- c. intraductal papillary mucinous tumor
- d. solid and papillary epithelial neoplasm

Answer: b

Rationale: mucinous cystic neoplasm is the most common cystic pancreatic neoplasm accounting for about 50%.

References:

- 1) Sahani DV, Kadavigiere R, Saokar A, et al. Cystic pancreatic lesions: a simple imaging-based classification system for guiding management. *RadioGraphics* 2005;25:1471-1484.
- 2) Figueiras RG, Martin CV, Figueiras AG, et al. The spectrum of cystic masses of the pancreas: imaging features and diagnostic difficulties. *Curr Probl Diagn Radiol* 2007;36:199-212.

Distractions: a) serous cystadenoma of the pancreas is not as common as mucinous cystic neoplasm. c) intraductal papillary mucinous tumor of the pancreas is much less common than mucinous cystic neoplasm. d) solid and papillary epithelial neoplasm is a rare tumor of the pancreas.

Question 8: Which type of intraductal papillary mucinous tumor (IPMT) of the pancreas is associated with a lower likelihood of malignancy?

- a. branch duct type
- b. main duct type
- c. combined duct type
- d. intraductal calcifications

Answer: a

Rationale: branch duct type of IPMT is associated with a lower likelihood of malignancy.

References:

- 1) Kawamoto S, Horton KM, Lawler LP, et al. Mucinous neoplasm of the pancreas: can benign lesions be differentiated from malignant lesions with multidetector CT? *RadioGraphics* 2005;25:1451-1468.
- 2) Lim JH, Lee G, Oh YL. Radiologic spectrum of intraductal papillary mucinous tumor of the pancreas. *RadioGraphics* 2001;21:323-337.

Distractions: b) main duct type of IPMT is associated with a higher incidence of malignancy particularly when there is marked dilatation of the main pancreatic duct. c) combined duct type of IPMT has a higher chance of malignancy compared to branch duct type since the main pancreatic duct is involved. d) calcification of the intraluminal contents in IPMT is associated with increased chance of malignancy.