Pancreatobiliary
Body Imaging Postgraduate Course - May 15, 2018
SAM References

Neonatal Cholestasis

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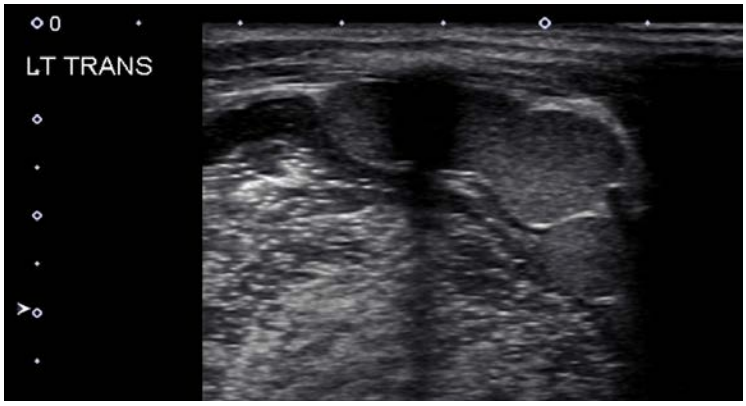
1. Choose the most appropriate order of imaging for a 6 week-old with direct hyperbilirubinemia:

A. US > MRI > cholangiogram > HIDA
B. MRI > US > cholangiogram > HIDA
C. HIDA > US > MRI > cholangiogram
D. US > cholangiogram > HIDA > MRI

Correct Answer: A
Rationale: In a 6 week-old with jaundice and elevated direct bilirubin, the first thing that must be excluded is biliary atresia as an earlier diagnosis of this condition confers the best prognosis. MRI/MRCP is a second line study that can be used to better evaluate the biliary anatomy. Once biliary atresia is suspected, intra-operative cholangiogram is indicated for confirmation. There is little role for HIDA scan in this scenario. Note that not all imaging modalities may be needed to make a diagnosis.
Reference:

- Shamir SB, Kurian J, Kogan-Liberman D, Taragin BH. Hepatic Imaging in Neonates and Young Infants: State of the Art. Radiology. 201 7;285(3):763–777http://pubs.rsna.org/doi/10.1148/radiol.2017170305.

2. Ultrasound in a 6 month-old with biliary atresia status post Kasai portoenterostomy. What finding is demonstrated that has a known association with biliary atresia?



A. Byler disease
B. Hemangiomas
C. Polysplenia
D. Lymphadenopathy

Correct Answer: C
Rationale: There are many associations with biliary atresia, including heterotaxy syndrome/polysplenia, intestinal malrotation, and preduodenal portal vein.
Reference:

- Bassett, M. D., & Murray, K. F. (2008). Biliary atresia: Recent progress. *Journal of Clinical Gastroenterology*, *42*(6), 720–729. https://doi.org/10.1097/MCG.0b013e3181646730

Acute Recurrent and Chronic Pancreatitis

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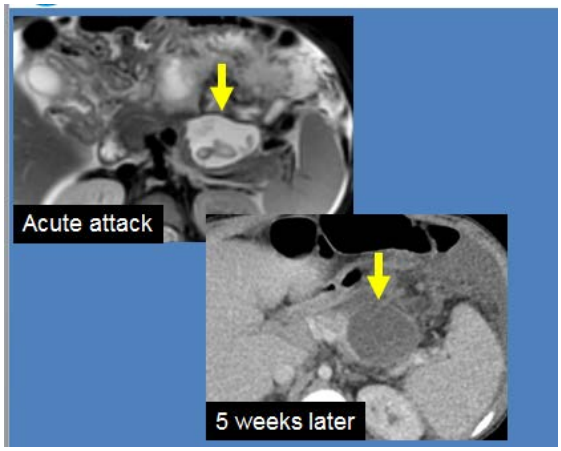
3. Which of the following is part of the criteria for acute recurrent pancreatitis (ARP)?

A. Pancreatic parenchymal changes apparent by imaging or endoscopy
B. Exocrine pancreatic insufficiency
C. Endocrine Pancreatic insufficiency
D. Resolution of symptoms and normalization of enzymes between episodes.

Correct Answer: D
Rationale: Diagnostic criteria for acute recurrent pancreatitis include the following: ≥ 2 episodes of acute pancreatitis along with resolution of the pain (≥ 1 month between episodes) or normalization of enzyme levels and resolution of pain irrespective of time interval.
References:

- Morinville VD et al. DEFINITIONS OF PEDIATRIC PANCREATITIS AND SURVEY OF CURRENT CLINICAL PRACTICES: REPORT FROM INSPPIRE(INTERNATIONAL STUDY GROUP OF PEDIATRIC PANCREATITIS: IN SEARCH FOR A CURE) *J Pediatr Gastroenterol Nutr* . 2012 September ; 55(3): 261–265
- Kumar S et al. Risk Factors Associated with Pediatric Acute Recurrent and Chronic Pancreatitis, Lessons from INSPPIRE, *JAMA Pediatrics* ePub April 11,2016

4. In this 5 year old with pancreatitis, at 5 weeks what is the collection indicated by the arrow?



A. Acute fluid collection
B. Pseudocyst
C. Walled off necrosis
D. Choledochal cyst

Correct Answer: C
Rationale: Answer A is incorrect. This collection is organized with a well-defined wall. Acute fluid collections are not organized. Answer B is incorrect. There is debris/material in the collection on the first scan reflective of necrotic material. Also, the collection is intra-pancreatic. Once walled off necrosis, always walled off necrosis. Answer D is incorrect. This collection is in the body/tail of the pancreas. Choledochal cysts are abnormalities of the common bile duct, and if they involve the pancreas, they involve the head and uncinate process.
Reference:

- Banks PA, Bollen TL, Dervenis C, Gooszen HG, Johnson CD, Sarr MG, Tsiotos GG, Vege SS; Acute Pancreatitis Classification Working Group. Classification of acute pancreatitis--2012: revision of the Atlanta classification and definitions by international consensus. Gut. 2013 Jan;62(1):102-11.

Pancreatic Trauma

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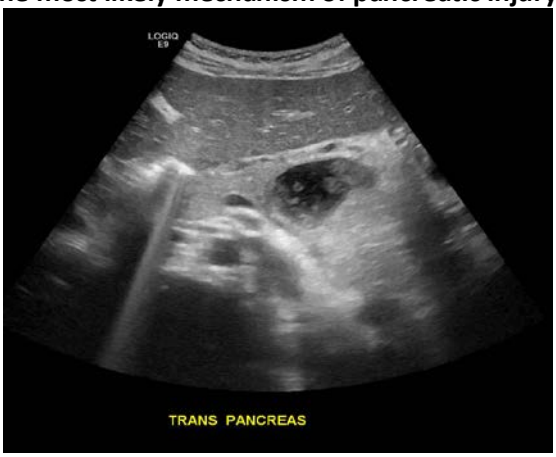
5. Which of the following statements is INCORRECT?

A. ERCP can be diagnostic and therapeutic for pancreatic duct injury
B. MRCP can be used to confirm pancreatic duct injury when CT is equivocal
C. Pancreatic duct injury is more likely with deep lacerations >50% thickness on CT
D. Oral contrast significantly increases CT sensitivity for detection of pancreatic duct injury

Correct Answer: D
Rationale: A large, prospective, multicenter study of children with blunt torso trauma involving >12,000 patients demonstrated poor sensitivity of CT for detecting pancreatic injuries. There was no significant difference between CT performed with versus without oral contrast.
References:

- Ellison AM, Quayle KS, Bonsu B, Garcia M, Blumberg S, Rogers A, Wootton-Gorges SL, Kerrey BT, Cook LJ, Cooper A, Kuppermann N. Use of oral contrast for abdominal computed tomography in children with blunt torso trauma. Annals of emergency medicine. 2015 Aug 1;66(2):107-14.
- Garvey EM, Haakinson DJ, McOmber M, Notrica DM. Role of ERCP in pediatric blunt abdominal trauma: a case series at a level one pediatric trauma center. Journal of pediatric surgery. 2015 Feb 1;50(2):335-8.

6. In this 10-year-old boy, what is the most likely mechanism of pancreatic injury from the choices below?



A. Penetrating laceration to the back
B. Diving into a shallow pool
C. Blunt abdominal injury from football helmet
D. Two-story fall

Correct Answer: C
Rationale: Bicycle accidents account for 5-14% of blunt abdominal trauma in children, and handlebar injuries account for 27% of blunt pancreatic trauma in children. An additional well-described mechanism of pancreatic injury in children is related to blunt abdominal injury from playing American football. Children are at a substantially increased risk of blunt traumatic intra-abdominal injuries because of an incompletely ossified rib cage, underdeveloped chest and abdominal wall musculature, less intra-abdominal fat to cushion blows, and proportionally larger visceral organs relative to total body size compared with an adult. The mechanisms of pancreatic injury listed in A, B, and D would be substantially less likely to cause a pancreatic laceration.
References:

- Sivit CJ, Eichelberger MR, Taylor GA, Bulas DI, Gotschall CS, Kushner DC. Blunt pancreatic trauma in children: CT diagnosis. AJR Am J Roentgenol 1992;158: 1097-1100
- Podberesky D, Unsell BJ, Anton CG. Imaging of American Football injuries in children. Pediatr Radiol 2009; 39: 1264-1274

Evaluation of Pediatric CBD Dilation

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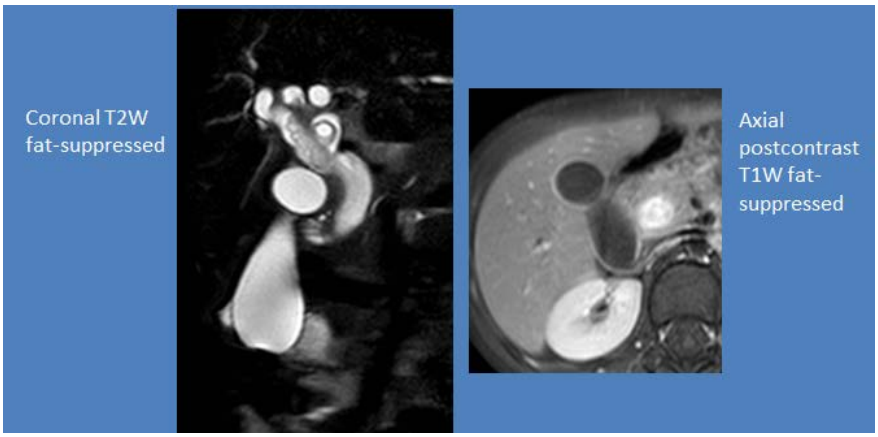
7. Which statement best characterizes CBD dilatation after cholecystectomy

A. The published data on post-cholecystectomy CBD dilatation is non-controversial
B. The CBD dilatation post-cholecystectomy is a rare feature on ultrasound
C. The CBD dilatation post-cholecystectomy does not usually exceed 10 mm
D. The CBD dilatation post-cholecystectomy is gender specific

Correct Answer: C
Rationale: Two publications following patients after cholecystectomy have shown that CBD dilatation does not exceed 10 mm; in fact, most measurements were still within normal limits. These data are from adults.
References:

- McArthur et al. J Ultrasound Med 2013; 32:1385–1391 " The CBD dilates post-cholecystectomy and with advanced age"
- Mueller PR et al AJR 136:355-358, February 1981 "Post-Cholecystectomy bile duct dilatation: Myth or reality?"
- Park SM et al. J Korean Surg Soc 2012;83:97-101" Common bile duct dilatation after cholecystectomy: a one-year prospective study"

8. Based on the MR images shown, what is the most likely cause of common bile duct dilatation?



A. Papillomatosis
B. Cholangiocarcinoma
C. Embryonal rhabdomyosarcoma
D. Hemobilia

Correct Answer: C
Rationale: Embryonal rhabdomyosarcoma appears are polypoid intraluminal projections that may have cystic spaces. It most commonly involves extrahepatic bile ducts but may originate in or grow into intrahepatic biliary ducts.
References:

- Ellen M. Chung, Grant E. Lattin, Jr, Regino Cube, Rachel B. Lewis, Carlos Marichal-Hernández, Robert Shawhan, and Richard M. Conran. From the Archives of the AFIP: Pediatric Liver Masses: Radiologic-Pathologic Correlation Part 2. Malignant Tumors. RadioGraphics 2011 31:2, 483-507
- Singh A, Sharma N, Panda SS, Bajpai M, Jana M. Benign papillomatosis of common bile duct in children: A rare case report. Journal of Indian Association of Pediatric Surgeons. 2014;19(1):44-45. doi:10.4103/0971-9261.125966.