

SPR 2013 Neuroradiology Session

May 18, 2013

SAM Questionnaire

HEAD INJURY

Parturitional Brain Injury

Thierry A.G.M. Huisman, MD

1. Which of the following statements related to parturitional injuries is correct?

- A. Caput succedaneum refers to a hemorrhage/edema within the subcutaneous fat.
- B. Subgaleal hematoma refers to a hemorrhage between the skin and galea aponeurotica.
- C. Subgaleal hematoma refers to a hemorrhage between the cranial periost and calvarial bone.
- D. Cephalohematoma refers to a hemorrhage between the cranial periost and calvarial bone.
- E. Cephalohematoma refers to a hemorrhage between the skin and galea aponeurotica.

Correct Answer: D

2. Which of the following hematomas may result in a life threatening hypovolemic shock?

- A. Caput succedaneum
- B. Subgaleal hematoma
- C. Cephalohematoma
- D. Epidural hematoma
- E. Subdural hematoma

Correct Answer: B

3. Which statement is correct?

- A. Cephalohematoma are often associated with a brachial plexus injury
- B. Cephalohematoma are often associated with a linear skull fractures
- C. Cephalohematoma are often associated with a depressed skull fractures
- D. Cephalohematoma frequently result in a leptomeninegal cyst
- E. Cephalohematoma typically occur at the level of the sutures

Correct Answer: B

Reference

1. Reichard R. Birth injury of the cranium and central nervous system. Brain pathology 2008;18: 565-570

Abusive Head Trauma

V. Michelle Silvera, MD

4. Diffuse axonal injury in abusive head trauma is:

- A. a common finding and the cause of the diffuse cerebral swelling
- B. a common finding and involves the gray-white matter junction
- C. a common finding and involves the corpus callosum and midbrain
- D. a rare finding and if present most commonly involves the cervicomedullary junction
- E. a rare finding and if present most commonly involves the white matter and basal ganglia

Correct Answer: D

References

1. Geddes et al. Neuropathology of inflicted head injury in children. I. Patterns of brain damage. *Brain*. 2001 Jul;124(Pt 7):1290-8
2. Geddes et al. Neuropathology of inflicted head injury in children. II. Microscopic brain injury in infants. *Brain*. 2001 Jul;124(PT 7):1299-306

5. The preferred medical term for abused children with brain injury is:

- A. Shaken Baby Syndrome
- B. Abusive Head Trauma
- C. Shaken-whiplash Syndrome with Head Trauma
- D. Trauma-X with Brain Injury

Correct Answer: B

Reference

1. Christian CW, Block R; Committee on Child Abuse and Neglect; Abusive Head Trauma in Infants and Children. *Pediatrics*. American Academy of Pediatrics. *Pediatrics*.2009 May;123(5):1409-11.

Abusive Head Injury or Not? Differential Diagnoses to Consider

Marguerite M. Caré, MD

6. A 6-month old child presents to the emergency department with new right parietal soft tissue swelling. The parents state that the child fell off a changing table two days ago. A head CT scan is performed and demonstrates a nondisplaced right parietal bone fracture with a small adjacent extra-axial hematoma. All of the following statements are true EXCEPT:

- A. Parietal bone fractures are the most common location for skull fractures in accidental injury.
- B. Parietal bone fractures are the most common location for skull fractures in abusive head injury.
- C. Linear fractures are the most common fracture type in both accidental and abusive injury.

- D. A follow-up skeletal survey in two weeks will help determine the age of the fracture.
- E. The fracture is unlikely to be birth-related.

Correct Answer: D

Reference

1. Kemp AM, Dunstan F, Harrison S, Morris S, Mann M, Rolfe K, Datta S, Thomas DP, Sibert JR, Maguire S. Patterns of skeletal fractures in child abuse: systematic review. *British Medical Journal* 2008; 337: a1518.

7. A 2-week old female infant is brought to the emergency department with reports that she was “found down” at home. The infant has shallow breaths and activity concerning for seizures. A head CT is performed which demonstrates thin, high attenuation subdural hemorrhage in the right parietal-occipital region and posterior fossa. Which one of the following is the LEAST likely cause of the imaging findings?

- A. Birth-related hemorrhage
- B. Menkes disease
- C. Abusive head injury
- D. Vitamin K deficiency

Correct Answer: B

References

1. Nassogne MC, et al. Massive Subdural haematomas in Menkes disease mimicking shaken baby syndrome. *Childs Nerv Syst* (2002) 18: 729-731.
2. Fernando S, Obaldo RE, Walsh IR, Lowe LH. Neuroimaging of nonaccidental head trauma: pitfalls and controversies. *Pediatric Radiology* 2008 Aug; 38 (8): 827-38.
3. Rooks VJ, Eaton JP, Ruess L, Petermann GW, Keck-Wherley J, Pedersen RC. Prevalence and evolution of intracranial hemorrhage in asymptomatic term infants. *AJNR American Journal of Neuroradiology* 2008 Jun; 29 (6): 1082-9.
4. Cekinmez M, Cemil T, Cekinmez EK, Altmörs N. Intracranial hemorrhages due to late-type vitamin K deficiency bleeding. *Childs Nerv Syst* (2008); 24: 821-825.

EMERGENCY DEPARTMENT NEUROIMAGING

Arterial Ischemic Stroke in Children: A Neurointerventionalist's Perspective

Darren B. Orbach, MD, PhD

8. Are the guidelines for TPA administration in children with acute ischemic stroke similar to those in adults?

- A. Yes, both clinical and radiographic criteria are virtually identical
- B. Clinical criteria are the same but radiographic criteria are different (e.g. a large region of CT hypodensity in children is not a contraindication)
- C. Radiographic criteria are the same, but clinical criteria differ (e.g. there is a longer time window for thrombolysis in children)
- D. Both clinical and radiographic criteria in children have been established to be different from adults

- E. There are no guidelines for TPA administration in children. In fact, the first IV TPA dose-escalation study in children with stroke is just now getting underway (TIPS)

Correct Answer: E

References

1. Amlie-Lefond et al., Circulation 2009, 119:1417
2. Mackay et al., Annals of Neurology 2011, 69:130
3. AHA Scientific Statement: Management of Stroke in Infants & Children, Stroke 2008, 39:2644
4. Amlie-Lefond et al., Methods in Neuroepidemiology 2008, 32:279

9. Ischemic stroke in children is an important clinical problem – True or False?

- A. False – Ischemic stroke is so rare, across all cohorts of children, that it does not merit serious clinical attention
- B. True – There are some cohorts, such as children with sickle cell disease, in whom stroke incidence is as high as it is in adults
- C. False – Almost all children who have an ischemic stroke recover to baseline functionality, so there is little point in devoting time and resources to it
- D. True – Although the incidence of pediatric ischemic stroke overall is low compared to the adult incidence, the socioeconomic and personal burden is enormous, given that it is manifest over many decades
- E. Both B & D are true

Correct Answer: E

References

1. Bigi et al., Annals of Neurology 2011, 70:245
2. Mackay et al., Annals of Neurology 2011, 69:130
3. Behpoour et al., Pediatric Neurology 2013, 48:188

10. Is moyamoya in children the same as moyamoya in adults, in terms of its natural history, radiographic appearance, and treatment?

- A. Yes, they are very similar – both pediatric and adult moyamoya present overwhelmingly with AIS
- B. Yes, they are very similar – both pediatric and adult moyamoya present overwhelmingly with intracranial hemorrhage
- C. No, they differ – children's elastic vessels allow for effective treatment with angioplasty and stenting, while adults require bypass or synangiosis
- D. No, they differ – children present overwhelmingly with AIS, while adults present much more frequently with intracranial hemorrhage
- E. No, they differ – in children, it is most commonly the internal carotid artery tree that is involved, while in adults it is the vertebrobasilar system.

Correct Answer: D

References

1. Kassim & DeBaun, Annual Review of Medicine 2013, 64:451
2. Scott & Smith, NEJM 2009, 360:1226
3. Bao et al., Cerebrovascular Disease 2012, 34:305

Emergency Imaging of the Head and Neck

Timothy N. Booth, MD

11. Select the most correct statement.

- A. The piriform aperture normally measures 5 to 10mm
- B. The retropharyngeal space is well differentiated from the danger space on CT
- C. Orbital infarction in sickle cell is more common in adults
- D. Retroantral fat involvement in the immunocompromised patient has less than a 70% PPV for invasive fungal sinusitis
- E. Enlarged lymph nodes in Castleman disease demonstrate central hypervascularity on ultrasound.

Correct Answer: D

References

1. Belden CJ, Mancuso AA, Schmalfluss IM. CT features of congenital nasal piriform aperture stenosis: initial experience. Radiology 1999; 213: 495-501.
2. Hoang JK, Branstetter BF, Eastwood JD, Glastonbury CM. Multiplanar CT and MRI of collections in the retropharyngeal space: is it an abscess? AJR 2011; 196: 426-432
3. Saito N, Nadgir RN, Flower EN, Sakai O. Clinical and radiologic manifestations of sickle cell disease in the head and neck. Radiographics 2010; 30: 1021-1035
4. Finkelstein A, Contreras D, Pardo J, et al. Paranasal sinuses computed tomography in the initial evaluation of patients with suspected invasive fungal rhinosinusitis. Eur Arch Otorhinolaryngol 2011; 268: 1157-1162
5. Ko SF, Hsieh MJ, Ng SH, et al. Imaging spectrum of Castleman's disease. AJR 2004; 182: 769-775

12. Select the false statement concerning blunt cerebrovascular injuries in children.

- A. A large percentage of children are initially asymptomatic
- B. Grade 5 injuries on CTA have a high incidence of cerebrovascular ischemic event
- C. Grade 1 injuries on CTA are treated conservatively
- D. There are well defined screening criteria for children
- E. Most commonly results from motor vehicle collisions

Correct Answer: D

References

1. Munera F, Foley M, Chokshi FH. Multidetector CT angiography of the neck in blunt trauma. Radiol Clin N Am 2012; 50: 59-72
2. Rozycki GS, Tremblay L, Feliciano DV, et al. A prospective study for the detection of vascular injury in adult and pediatric patients with cervicothoracic seat belt signs. J Trauma 2002; 52: 618-624

3. Jones TS, Burlew CC, Kornblith LZ, et al. Blunt cerebrovascular injuries in the child. *Am J Surgery* 2012; 204: 7-10

13. Select the correct statement concerning mastoiditis in children.

- A. A Bezold abscess results from inferior extension of acute coalescent mastoiditis
- B. Mild mastoiditis should be treated surgically
- C. Mastoiditis is not usually associated with otitis media
- D. The presence of mastoid fluid is diagnostic of acute coalescent mastoiditis
- E. Otitic hydrocephalus results from obstruction at the level of the cerebral aqueduct

Correct Answer: A

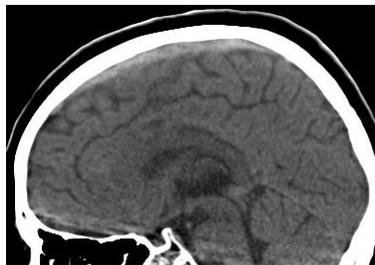
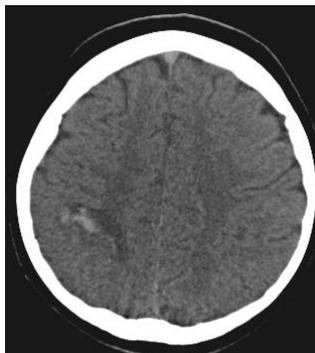
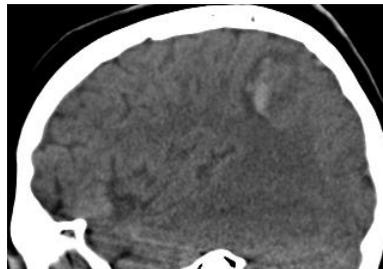
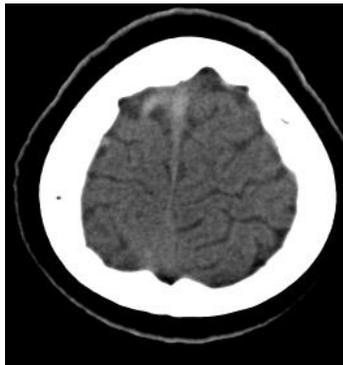
References

- 1. McDonald MH, Hoffman MR, Gentry LR. When is mastoid fluid in the mastoid cells a worrisome finding? *J Am Board Fam Med* 2013; 26: 218-220
- 2. Lemmerling MM, De Foer B, Verbist BM, VandeVyver V. Imaging of inflammatory and infectious diseases in the temporal bone. *Neuroimag Clin N Am* 2009; 19: 321-337
- 3. Otitic hydrocephalus associated with lateral sinus thrombosis and acute mastoiditis in children. *Int J Pediatr Otorhinolaryngol* 2006; 70: 1817-1823

Beyond Trauma: Pediatric Emergency Brain Imaging Pearls and Pitfalls

Laura Z. Fenton, MD

- 14. You are shown multiple non-contrast brain CT images in a 10 year old girl with lymphoma and altered mental status, what is the most likely cause of the parasagittal hemorrhage?**



Hemorrhagic lymphoma

- A. Vascular Malformation
- B. Venous Thrombosis
- C. Arterial ischemic stroke
- D. Chemotherapy

Correct Answer: C

References

1. Provenzale JM and Kranz PG. Dural sinus thrombosis: sources of error in image interpretation. *AJR* 2011; 196: 23-31.
2. Leach JL, Fortuna RB, Jones BV et al. Imaging of cerebral venous thrombosis: current techniques, spectrum of findings and diagnostic pitfalls. *Radiographics* 2006; 26: S19-S43.
3. Rodallec MH, Krainkik A, Feydy A et al. Cerebral venous thrombosis and multidetector CT Angiography: Tips and Tricks. *Radiographics* 2006; 26: S5-S18.
4. Slone HW, Blake JJ, Shah R et al. CT and MRI findings of intracranial lymphoma. *AJR* 2005; 184: 1679-1685.

15. True or False?

You are reviewing a brain CT on a comatose child in your emergency department and note the reversal sign, this indicates a poor prognosis.

Correct Answer: True

Reference

1. Han BK, Towbin RB, De Courten-Myers G et al. Reversal sign on CT: Effect of anoxic/ischemic cerebral injury in children. *AJR* 1990; 154: 361-368.