



UNIVERSITY OF MIAMI
MILLER SCHOOL
of MEDICINE

Estroke [sic] in Adolescents and Children

Board questions for business and pleasure

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Case 1

Seizure in a Neonate



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4 day old infant male presenting with lethargy and poor suck for 3 hours and whole body shaking which lasted about 2 minutes and appeared to start on the left side 30 min ago. On further questioning the birth history is as follows:

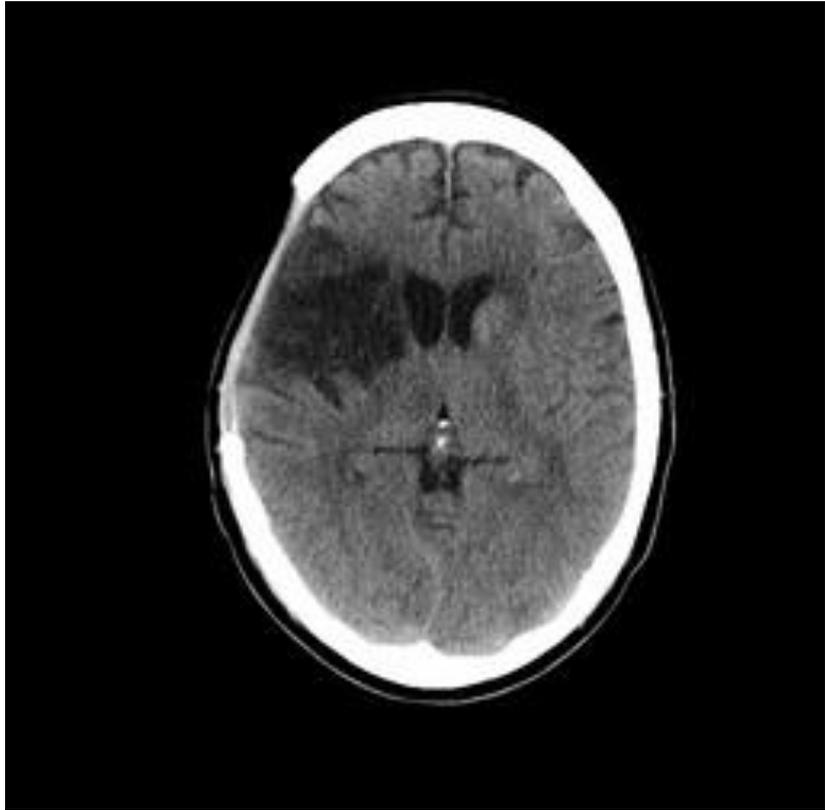
-Product of 39 week NSVD weighing 3.45 kg. Moderate meconium was noted at birth but infant did not require resuscitation. APGARs 8,9,9.

Case Continued

- Patient spent a regular two day post natal hospital course with his mother breast feeding well, no acute complications.**
- On hospital follow up on day 3 of life The infant is noted to weight just 3.25 kg and is moderately jaundiced, but bili remains just inside low intermediate risk for 72 hours. The patient is discharged to Follow up in the AM.**

Case Continued

- **In the ED the patient's ABCs are WNL, but patient has a weak cry with asymmetric grimace and Moro on the left**
- **CT demonstrates hyper-dense MCA sign on the right.**



Which of the following is most true about this patient's presentation

- A. This patient would have been a candidate for tPA if he had presented earlier.
- B. This presentation is rare because most pediatric stroke happens after the first week of life.
- C. This presentation is rare because most pediatric strokes occur in premie's
- D. Seizure rather than hemiparesis is the most common presentation of neonatal stroke.
- E. Breast feeding and male sex should in theory be protective against neonatal stroke
- F. Recurrence of stroke within the next 10 years for this patient is greater than 20%.

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Explanation

- A. The AHA recommends against the use of thrombolysis in the management of acute neonatal stroke. Anticoagulation however may be considered in neonates with clear thrombophilia or multiple emboli. Management is focused on supportive care and ABCs.
- B. The majority of strokes in the pediatric population happen in neonates, and of these approx. 87% happen in the first week of life. The rate of stroke in neonates is 10 fold higher than in the general pediatric population.

Explanation

- C. In the largest cohort of neonatal strokes to date, the majority were found in full term infants with normal APGAR scores. Only a small percentage were found in premie's.
- E. Dehydration, such as from breast feeding, and male sex are known risk factors for neonatal stroke, though etiology remains poorly elucidated.

Explanation

- F. Stroke reoccurs in between 1% and 3% of patient's who suffer their first neonatal stroke.
- D. In the vast majority of neonatal CVAs seizure is the most common harbinger. Facial and upper extremity involvement is most common, but requires an expert clinician to recognize.

Fun Facts

- The Break down is 70% ischemic, 20% Hemorrhagic, 10% venous thrombi
- Neonatal stroke is broken down into three groups
 - Diagnosed prior to birth
 - Diagnosed from birth to 28 days of life
 - Diagnosed after 28 days, but presumed to have occurred in the peri-natal period

6 yo Haitian male, recently immigrated to the US, presents at the Holtz ER with a chief complaint of “He isn’t acting right”. The patients mother states that since waking he has been acting funny though because of language barrier you have a hard time understanding her. On exam vitals are 110, 22, 90/76, 100% on RA.

- You notice pure motor weakness involving his right side, excluding his forehead. He is alert and oriented though his speech is hard to understand but sensible. He has a GCS of 15, follows commands and is breathing comfortably.**
- CBC Demonstrates WBC 15, Hgb 8.0, Plt of 300**
- CT is unremarkable, but MRI demonstrates small thalamic infarct on the left side.**

Of the following which next step will have the most impact on survival and functional status at hospital discharge?

- A. Call a stroke alert because the window for tPA in children is larger than in adults.
- B. Get an echo to rule out underlying congenital heart disease
- C. Start Steroids for probably vasculitis
- D. Get a good past medical history then Type and screen
- E. Bolus with weight dosed Heparin or Lovenox

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Explanation

- A. tPA is still not recommended by any of the major authorities on stroke for acute management in pediatric patients.
- B. While congenital heart disease underlies a significant number of cases of pediatric stroke early echo has no implications for early management.

Explanation

- C. Vasculitis is another reported cause of acute stroke in pediatric patient's however steroids have no role in the acute management.
- E. The ACCP recommends the use of heparin or LMWH in pediatric patients with stroke prior to ruling out embolism or carotid dissection. This would not trump a good H and P however.

Explanation

- D. The rate of stroke in sickle cell patient's is 300 times the rate in the general population. Initial management for patients with SCD and stroke varies dramatically from that of other patients. Once A diagnosis of SCD related stroke is made, all efforts to begin exchange transfusion should be made. In the mean time the patient should be hydrated with NS.

Knowledge

- Antithrombotic therapy in neonates and children: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines. Monagle P, Chan AK, Goldenberg NA, Ichord RN, Journeycake JM, Nowak-Göttl U, Vesely SK, American College of Chest Physicians Chest. 2012 Feb;141(2 Suppl):e737S-801S.
- Management of stroke in infants and children: a scientific statement from a Special Writing Group of the American Heart Association Stroke Council and the Council on Cardiovascular Disease in the Young. Roach ES, Golomb MR, Adams R, Biller J, Daniels S, Deveber G, Ferriero D, Jones BV, Kirkham FJ, Scott RM, Smith ER, American Heart Association Stroke Council, Council on Cardiovascular Disease in the Young Stroke. 2008;39(9):2644.

Knowledge continued

- **Symptomatic neonatal arterial ischemic stroke: the International Pediatric Stroke Study.** [Kirton A](#), [Armstrong-Wells J](#), [Chang T](#), [Deveber G](#), [Rivkin MJ](#), [Hernandez M](#), [Carpenter J](#), [Yager JY](#), [Lynch JK](#), [Ferriero DM](#); [International Pediatric Stroke Study Investigators](#). [Pediatrics](#). 2011 Dec;128(6):e1402-10. Epub 2011 Nov 28
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