The Buzz on Zika: and Ultrasound of the CNS

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The Buzz on Zika: and Ultrasound of the CNS

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Aedes mosquitoes farther north?
- Recent report demonstrated population persistence of Aedes aegypti mosquitoes in Capitol Hill region of Washington, DC
  - Typically thrives no farther north than Alabama
- Authors suggest a resident DC mosquito population, likely maintained during winter months in subterranean habitat that facilitates year-round survival (subways, etc.)
  - Small population, chances of human transmission low
- Still, DC has high concentration of global travelers so potential exists for native transmission


Ultrasound surveillance
- Microcephaly difficult to diagnose before 22 weeks
  - If exposure early (esp. if symptomatic), could potentially see intracranial findings short of microcephaly before 20-22 weeks: evolving spectrum of disease
  - Using CMV as model, likely need at least 6 weeks post exposure to see possible impact on u/s
- Current guidelines not prescriptive
  - If Zika serology negative and reasonably-timed post-exposure ultrasound is normal, then routine surveillance is appropriate

Congenital Zika Virus Syndrome
Brain Involvement
- General encephalopathy / Brain atrophy
- Microcephaly
- Calcifications
- Basal ganglia involvement
- Medullar Involvement
1. "I am not sure that I can answer this question due to the perceived difficulty in performing the US examinations in these patients due to the small size of the fontanels/sutures."

2. "Ideally you need to obtain the 3 axial planes as described in the ISUOG guidelines plus 4 coronals and 3-5 sagittals. It will be extremely difficult but not impossible to miss a significant finding this way."

- Personally and according to my own experience and after observing my own team missing findings in patients with CMV, I think that more important that the planes is to know exactly what to look for and where to find it."

Gustavo Malinger MD    Sept 28 2016
Brain Involvement

- Cerebral volume reduction / Brain atrophy
- Microcephaly / Small HC - Large subarachnoid space
- Calcifications
  - Subcortical, cortical, periventricular, cerebellar, ocular
- Abnormal gyration / sulcation
- Ventriculomegaly
- Callosal dysgenesis
- Destructive lesions.
- Cerebellar and midbrain involvement
- Basal ganglia involvement

Medullar Involvement

Congenital Zika Virus Syndrome

- Brain Involvement
  - Calcifications - Trans abdominal Ultrasound
- Calcifications - Trans vaginal Ultrasound

- Vasculitis - Trans vaginal Ultrasound
**Congenital Zika Virus Syndrome**

**Calcifications - Trans vaginal US**
CMV  
Zika  
Toxo

**Calcifications - Vasculitis - (hematoxylin and eosin staining)**
shows higher magnification of calcifications with filamentous structures

**Calcifications - Vasculitis - Medullar calcifications**

**Cysts**

**Brain Involvement**
- Cerebral volume reduction / Brain atrophy
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**Congenital Zika Virus Syndrome**
CMV – Tel-Aviv

**Congenital Zika Virus Syndrome**
CMV – Ibagué

**Congenital Zika Virus Syndrome**
Zika - Bogotá

**Congenital Zika Virus Syndrome**
Zika - Ibagué

**Congenital Zika Virus Syndrome**
Zika - Bogotá
Congenital Zika Virus Syndrome

Cortical Abnormal Development

Delayed sulcation

Irregular LV wall

M. Rebolledo - Colombia

Congenital Zika Virus Syndrome

Abnormal Cortical Development

Schizencephaly

M. Rebolledo - Colombia

Congenital Zika Virus Syndrome

Abnormal Cortical Development

Cerebral volume reduction / Brain atrophy

Microcephaly/ Small HC - Large subarachnoid space

Calcifications

Subcortical, cortical, periventricular, cerebellar, ocular

Abnormal gyration / sulcation

Ventriculomegaly

Callosal dysgenesis

Destructive lesions.

Cerebellar and midbrain involvement

Basal ganglia involvement

Medullar involvement

Congenital Zika Virus Syndrome

Ventriculomegaly

L. Espinosa - A. Salazar - Colombia

Congenital Zika Virus Syndrome

Ventriculomegaly

Congenital Zika Virus Syndrome

Ventriculomegaly
Cerebellar Involvement

Congenital Zika Virus Syndrome

Extra CNS Involvement

Eyes

Heart

Placenta
Zika virus intrauterine infection causes fetal brain abnormality and microcephaly: tip of the iceberg?

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Within first week after onset of symptoms, testing is for Zika-specific PCR on serum (compare HIV-PCR)
- PCR only done on symptomatic patients
- 2 tubes for each test (Ab or PCR), + urine if sx

All other patients: testing for Zika-specific IgM (2/5)
- Typically develop toward the end of the first week of illness
- Testing in asymptomatic patients no earlier than 2 weeks after exposure (no later than 12 weeks)
- If Ab (+), then further neutralization testing done to discriminate between cross-reacting antibodies in primary flavivirus infections.
- Test results are normally available 3-5 weeks after specimen receipt --- from CDC or county health dept

Zika Testing – What Testing can be done?

- If the HC >2SD below the mean, a careful evaluation of the fetal intracranial anatomy is indicated. If the intracranial anatomy is normal, 1/3 US in 3-4 wks.
- Isolated fetal microcephaly should be defined as "fetal HC >3SD below the mean for GA." Diagnosis of pathologic microcephaly is considered certain when the fetal HC is >5SD.
- A neurosonographic examination should be performed and 1/3 US in 3-4 wks.
- If you use a fetal biometry reporting package that provides HC measurements as %tiles, refer to the Table in the Statement to determine the SD, which is necessary in most cases to identify true microcephaly.

Am J Obstet Gynecol (June 2016) http://dx.doi.org/10.1016/j.ajog.2016.02.043
New Zika Threat to Infants: Late-Onset Microcephaly
WebMD Health News, Brenda Goodman, August 11, 2016

- CDC researchers reported seeing late-onset microcephaly among 1,200 pregnancies in Brazilian women infected with Zika virus during the third trimester

WHO Emergency Committee on Zika and microcephaly
9/1/2016

- 4th meeting of the Emergency Committee convened on regarding microcephaly, other neurological disorders and Zika virus
  - Briefing on Temporary Recommendations
  - Updated on situation during/after the Olympic Games held in Brazil
  - Update on Zika virus geographic spread
  - Natural history, epidemiology, microcephaly and other neonatal complications associated with Zika virus, Guillain-Barré syndrome
  - Current knowledge on sexual transmission of Zika virus

Brief on Zika and microcephaly
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