The Pediatric Approach to Infants Born with Zika and their Families

Leslie Rubin MD
Morehouse School of Medicine
Developmental Pediatric Specialists
Innovative Solutions for Disadvantage and Disability
Southeast Pediatric Environmental Health Specialty Unit at Emory University
Disclaimer

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Viruses from Animals

- HIV/AIDS
- Ebola
- Zika

- Virus have a common pattern of replication
- But each behaves differently
- Each has a different effect on different hosts
Zika

• “Never before in history has there been a situation where a bite from a mosquito could result in a devastating malformation.”
  — Dr. Tom Frieden, CDC Director, Fortune, April 13, 2016

• “...the last time an infectious pathogen (rubella virus) caused an epidemic of congenital defects was more than 50 years ago...”
  — New England Journal of Medicine, April 13, 2016
Rubella

- One of the *Famous Five* pediatric infections associated with a rash
- Relatively benign in children
- But infection of a mother during pregnancy can have a major impact on the fetus and newborn
Congenital Rubella

- Between 1963 and 1965 a rubella epidemic swept the USA
- 20,000 pregnant women who contracted the disease gave birth to infants with the Congenital Rubella Syndrome
- Which mainly affected the CNS and the eyes
Lessons Learned

- Infections in pregnant women (even mild ones) can have major effects on their unborn fetus
- Other similar conditions were recognized - ToRCH
- Immunizations against childhood illnesses not only prevent complications in the children but prevent potential effects on the fetus during pregnancy
Zika Virus Disrupts Mitosis in Human Neuroepithelial Stem Cells

Onorati et al., 2016, Cell Reports 16, 2576–2592
Zika and the Fetal Brain

- Zika virus replicates by directly targeting neuronal linages
- Leads to:
  - cell-cycle disruption,
  - apoptosis, and
  - inhibition of cell differentiation

Zika and the Fetal Brain

- Resulting in a reduction in the number of brain cells and hence brain size

Congenital Zika Syndrome

- Mother with a history and lab evidence of Zika infection
- Infant with physical features:
  - Microcephaly
  - Retinal pathology
- Neurological manifestations
  - Limited responses
  - Abnormal muscle tone
  - Limited limb movement
  - Joint contractures
Initial Evaluation for Infants with Congenital Zika

- Routine newborn care with focus on neuro exam
- Eye exam by an ophthalmologist
- Auditory brainstem response (ABR)
- Serologic testing for Zika virus infection
- CBC, metabolic panel and liver enzymes
- Head ultrasound
- Consider MRI
Evaluate the Infant’s Status and Needs

- If the clinical features are uncomplicated should refer for early intervention and physical therapy.
- If there are complications then refer to appropriate specialties, e.g.
  - If there are feeding difficulties refer to a feeding team.
  - If there are contractures refer to orthopedist.
  - If there is concern about hypothalamic or pituitary dysfunction refer to endocrinologist.
- If there is concern about the diagnosis can refer to infectious disease or genetics.
Zika and Breastfeeding

• Benefits of breastfeeding outweigh theoretical risk of Zika virus transmission through breast milk

• .... recommend that infants should be fed according to usual infant feeding guidelines
Parents face emotional and practical challenges….

• Families need to be fully informed and educated about Zika and its consequences with ongoing support.
• This is particularly important for low-resource families because of the disproportionate burden they face.
• All families should be connected with local, state, and national health programs.
Infants and toddlers from birth to 36 months who have developmental delays are eligible for early intervention services.
Routine Outpatient Management

- Provide routine preventive pediatric health care, with monitoring of growth and head circumference
- Monitor development at each routine visit
- Refer for therapies and specialty medical services as necessary
- Provide support for families
- Establish a Medical Home for coordination of care
- An interdisciplinary team would be ideal
Additional Evaluations

• Complete *neurologic exam* at age 1 and 2 months, then as needed
• Repeat *eye exam* with retinal assessment at 3 months
• Repeat *ABR hearing assessment* at age 4–6 months
• Conduct *thyroid screening* at age 2 weeks and age 3 months
Congenital Zika Syndrome without Microcephaly at Birth

- Microcephaly and the associated neurological consequences from congenital infection can develop after birth

Centers for Disease Control and Prevention

MMWR Morbidity and Mortality Weekly Report

Early Release / Vol. 65

Description of 13 Infants Born During October 2015–January 2016 With Congenital Zika Virus Infection Without Microcephaly at Birth — Brazil

Later Neurological Manifestations

- Developmental delays in all areas
- Neuromotor disorders and musculoskeletal consequences consistent with cerebral palsy
- Feeding problems
- Sensory impairment – vision & hearing
- Learning and intellectual disabilities
- Behavior challenges
Zika is a Notifiable Condition

- Zika virus disease and Zika virus infection without disease, including congenital Zika virus infection, are nationally notifiable conditions.

- ....... so report all cases of Zika to your local or state health department.
In Summary

• Know about Zika transmission in your community
• Consider Zika when seeing infants with small head circumference and developmental delays
• Understand the assessment and management of infants and children with congenital Zika
• Provide support for families
• Inform your local or state health department and the US Zika Pregnancy Registry as indicated
More Information about Zika on CDC Website

www.cdc.gov/zika