Zika Virus Disease: Diagnosis, Management, and Prevention

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Overview: Zika virus belongs to Flaviviridae family (includes West Nile and dengue viruses); transmitted by Aedes mosquito; documented intrauterine and transfusion-related infections; identified in breast milk (but no infections linked to breastfeeding) and semen; as of February 2016, active cases in 30 countries; not commonly seen outside of Africa and Asia; current spread secondary to invasion by Aedes mosquito; in 1970, Aedes restricted to Caribbean and South America; by 2002, Aedes population had spread significantly; primary vectors Aedes aegypti (most common) and Aedes albopictus (tiger mosquito)

Zika virus: incubation ≤2 wk (similar to dengue); 80% of infected individuals asymptomatic; symptoms — fever, rash, joint pain, eye redness, muscle pain, headache, retro-orbital pain, and vomiting; course of infection — mild, with symptoms lasting few days to 1 wk; severe disease requiring hospitalization uncomon; cases of Guillain-Barré observed in Brazil thought to be related to Zika virus; rarely fatal; microcephaly — complication of Zika virus infection; 147 cases reported in 2014 in Brazil; increased to >4000 cases in 2015; defined as head circumference (HC) >3 standard deviations below mean HC; associated with periventricular calcifications; infection worse in first 12 wk of pregnancy; other symptoms — hearing and vision loss; swallowing difficulties

History of Zika virus: April 1947 — novel virus isolated from macaque monkey during routine surveillance; Zika virus named for forest in Uganda where it was identified; September 1956 — researcher unable to identify transmission of Zika virus from himself to mice or monkeys via mosquitoes; 1968 — Zika virus responsible for human infections in Nigeria; 1971 — first children identified with Zika virus in Nigeria; 1981 — 7 cases identified in Indonesia; 2007 — large outbreak on Yap Island in South Pacific; 2013 — health advisory issued by Centers for Disease Control and Prevention (CDC) for French Polynesia where >20,000 cases of Zika virus reported; 2014 — World Cup in Brazil possibly linked to appearance of Zika virus in Western Hemisphere; first case of Zika virus confirmed in Brazil 1 yr later; November 28, 2015 — increase in microcephaly cases linked to Zika virus in Brazil; December 16, 2015 — Brazilian minister of health warns women not to become pregnant; similar statements made by officials in Ecuador, Columbia, El Salvador, and Jamaica

2016 statements: January 16 — Hawaiian baby with brain damage first case linked to Zika virus; mother spent most of pregnancy in Brazil; January 26 — CDC issues travel warning (alert level 2 “enhanced precautions”) for regions with Zika virus; January 29 — concerns about Zika virus and Olympic Games in Rio de Janeiro, Brazil, including potential for spread to Northern Hemisphere after event; February 1 — World Health Organization (WHO) declares public health emergency of international concern; predicted >4 million cases of Zika virus in 2016; February 3 — CDC confirms sexual transmission from man returning from Venezuela to his female partner in Texas; no documented female-to-male or male-to-male transmission; February 5 — 5 confirmed cases and 265 suspected cases in Tonga; CDC releases guidelines on sexual transmission; men in Zika-endemic regions who have pregnant partners should abstain from all sexual contact or use condom correctly throughout entire pregnancy; men in Zika-endemic regions with nonpregnant partners should consider abstaining from intercourse; no current recommendations for testing men returning from Zika-endemic areas before sexual activity; February 8 — President Obama asks for $1.8 billion in emergency funding to combat Zika virus (mosquito control, vaccine development); February 10 — CDC confirms 2 stillbirths and 2 neonatal deaths in Brazil

Management: fetuses and infants of women with Zika virus infection require evaluation for congenital infection; report suspicion of Zika virus infection to local health departments; obtain maternal history of exposure to Zika-endemic regions

Infants with possible congenital Zika virus infection: measure HC, height, and weight; look for neurologic abnormalities; order cranial ultrasonography to identify periventricular calcifications; assess hearing; consider ophthalmologic examination

Infants with microcephaly and/or intracranial calcifications: consult with genetic specialist and pediatric neurologist; screen for other congenital infections; obtain complete blood count with differential and liver function tests; labs for Zika virus — infant serology (polymerase chain reaction [PCR] for Zika virus RNA, Zika virus immunoglobulin [Ig] M, and neutralizing antibodies); infant cerebrospinal fluid
Algorithm for possible exposure and no microcephaly:
if maternal history positive for Zika virus infection,
proceed with testing assuming infant also infected;
if no maternal history, test mother and treat accordingly;
if maternal testing negative, provide routine
care to infant

Treatment: supportive; no effective antiviral therapy;
no vaccine available; emphasize anticipatory guidance;
report case; conduct hearing screen; measure HC
and follow developmental milestones; refer to appro-
priate specialists as needed

Prevention: use insect repellant; wear long sleeves
and pretreated clothing; review list of effective insect
repellants (eg, DEET, picaridin, ethyl butylacetylami-
nopropionate [IR3535], lemon and eucalyptus oils)
issued by CDC

Suggested Reading

CDC Zika Response: Vital signs: preparing for local mosquito-
borne transmission of Zika virus — United States 2016. MMWR
Morb Mortal Wkly Rep, 2016 Apr;65(13):352; Citil-Dogan et al:
The Zika virus and pregnancy: evidence, management, and pre-
vention. J Matern Fetal Neonatal Med, 2016 Apr;1-41; Flores MS
Apr;83(4):261-70; Hammond A et al: A CRISPR-Cas9 gene drive
system targeting female reproduction in the malaria mosquito vector
Anopheles gambiae. Nat Biotechnol, 2016 Jan;34(1):78-83; Mlakar
Mar;374(10):951-8.