What Neonatal Nurses Need to Know About the Zika Virus

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Although the medical news is reporting what may appear to be a new virus in Brazil, the Zika virus is not new. The virus that causes Zika infection was first isolated in 1947.[1] The first known case of Zika fever was in a sentinel rhesus monkey in the Zika Forest of Uganda in 1947.[2] The first human cases were reported in Nigeria in 1954.[3] The first documented outbreak among people occurred in 2007 in the Yap Islands of Micronesia.[2,4–6] A large outbreak occurred in French Polynesia in 2013–2014.[7] Outbreaks have been reported in tropical Africa, Southeast Asia, and the Pacific Islands. As of January 2016, the locally acquired infection first reported in Brazil in May of 2015, has now been reported in 20 regions of the Americas.[4] Because of the outbreak in Brazil in 2015, the World Health Organization has declared a public health emergency of international concern as of February 2016.[8]

The virus was named after the Ugandan forest where it was first isolated. The virus is a member of the Flaviviridae family, which includes a diverse array of pathogens affecting both humans and animals including hepatitis C, dengue, yellow fever, Japanese encephalitis, and West Nile viruses.[9] These viruses are often borne by insects. It is suspected that the Zika virus may act like its family member pestivirus, which is not classically spread by insect vectors, but rather by transfer of bodily fluids. Like the pestivirus, the Zika virus is suspected to be able to be transmitted vertically, meaning the unborn is affected in a variety of ways if the mother is infected while pregnant. Clinical signs may range from transient infection with no signs of clinical disease to severe illness and death in those affected. The mother's stage of pregnancy

when exposed dramatically impacts fetal outcomes, which include birth defects and pregnancy loss.[10] The eyes and central nervous system are particular targets for this virus. Characteristic deformations of the brain and skull have been observed including hydranencephaly, hydrocephalus, and microcephaly.[11]

The Zika virus is spread primarily through the bite of an infected Aedes species of mosquito. This is the same mosquito that spreads Chikungunya and dengue fever. The mosquito becomes infected when biting an infected person. Infected persons may become symptomatic with a mild fever, rash, joint pain, and conjunctivitis typically 2–7 days after a bite. Symptoms last several days to a week. The virus may be spread from an infected mother to the fetus; there are few well documented reports of this type of transmission.[12] There have been cases of possible sexual transmission, as well as cases of vertical perinatal transmission.[4, 13–19] The virus may be transmitted transplacentally or during delivery.[13] Zika virus RNA has been detected in blood, urine, semen, saliva, cerebrospinal fluid, amniotic fluid, and breast milk.[6,13,20] Transmission through breastfeeding has not been observed.[18,20] Transmission of some of the other flavivirus via breast milk has been described, however.[22,23] Transmission has been described via blood products.[4,20,24]

Persons at-risk are those who live in or travel to areas where Zika lives and who are not already infected. There is currently no vaccine or medication to specifically treat Zika viral infection. Prevention efforts include protection from mosquito bites, and eradicating mosquito breeding areas. The Centers for Disease Control and Prevention recommend that women who are pregnant or who are trying to become pregnant consider postponing travel to areas where transmission is ongoing. If travel must occur,

prevention of mosquito bites is important.[4,25] Because Zika may be sexually transmitted, men who have traveled to an area where Zika is occurring should either abstain from sex or use condoms if their partner is pregnant, and should consider condom use if their partner is not pregnant.[14]

Knowledge regarding the link between Zika infection and outcomes is evolving. The full spectrum of outcomes that may be associated with Zika infection and the factors that increase the risk to the fetus are not yet fully understood. Known potential risks of infection during pregnancy include microcephaly and other poor pregnancy outcomes, including pregnancy loss.[16,17,26] Zika virus-related microcephaly is defined as a head circumference greater than or equal to two standard deviations below the mean for sex and gestational age at birth.[26] In a November 2015 report, amniocentesis confirmed the presence of Zika virus in the amniotic fluid of two severely affected fetuses.[27,28] Ultrasound findings showed microcephaly.[29] One fetus also had eye calcifications and microphthalmia.

The CDC recommends screening for pregnant women who have traveled to affected areas between two and twelve weeks after travel, even if there are no symptoms of infection.[30] For women living in affected areas, the CDC recommends testing at the first prenatal visit, as well as the mid second trimester.[30] The greatest risk of microcephaly and malformations appears to be during the first trimester. Additional testing should be done if there are any signs of viral disease. Women with positive test results for infection should have the fetus observed by ultrasound every three to four weeks to monitor anatomy and growth.[30] The CDC recommends serologic and molecular assays such as RT-PCR, IgM ELISA, and plaque reduction neutralization test (PRNT) for

infants with suspected congenital Zika virus infection.[31] The newborn of a mother who was potentially exposed, and who has positive blood tests, microcephaly or intracranial calcifications should have further testing, including a thorough physical examination for neurologic abnormalities, presence of dysmorphic features, splenomegaly, hepatomegaly, rash or other skin lesions.[31] Additional recommended tests include a hearing evaluation, eye examination and cranial ultrasound as ocular involvement including macular atrophy, optic nerve abnormalities, and intracranial calcifications have been reported with Zika infection.[31–33] The presence of other congenital infections such as syphilis, toxoplasmosis, rubella, cytomegalovirus, lymphocytic choriomeningitis, and herpes simplex should be ruled out.[31] Real-time PCR is not helpful for confirming infection in infants, so for now, Zika viral-related microcephaly is diagnosed clinically.[2,34–36]

The Cord Blood Association has issued guidelines for Zika virus screening that includes questions about recent travel and potential exposure to the virus. The guideline also asks about illness during pregnancy. Information about the guidelines can be found at www.cb-association.org/cord-blood-association-issues-guidelines-for-zika-virus-screening. Delivery and cord blood collection personnel should pay close attention to the newborn physical exam. If microcephaly or other brain or head deformity is noted on examination, the cord blood should not be banked.[37]

Information is being updated daily, so it is imperative that neonatal nurses keep informed. Neonatal nurses provide support and education to parents, can be a voice for prevention in endemic areas, and can contribute to disseminating knowledge gained so

we can protect the unborn from the poor outcomes being seen with this preventable viral infection.

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