Neuroimaging essential for Zika cases

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Sarah B. Mulkey, M.D., Ph.D., a fetal-neonatal neurologist in the Division of Fetal and Transitional Medicine at Children's National in Washington, D.C. Credit: Children's National in Washington, D.C.

Seventy-one of 110 Brazilian infants at the highest risk for experiencing problems due to exposure to the Zika virus in the womb experienced a wide spectrum of brain abnormalities, including calcifications and malformations in cortical development, according to a study published July 31, 2019 in *JAMA Network Open*.

The infants were born at the height of Brazil's Zika epidemic, a few months after the nation declared a national public health emergency. Already, many of the infants had been classified as having the severe form of congenital Zika syndrome, and many had microcephaly, fetal brain disruption sequence, arthrogryposis and abnormal neurologic exams at birth.

These 110 infants "represented a group of ZIKV-exposed infants who would be expected to have a high burden of neuroimaging abnormalities, which is a difference from other reported cohorts," Sarah B. Mulkey, M.D., Ph.D., writes in an invited commentary published in *JAMA Network Open* that accompanies the Rio de Janeiro study. "Fortunately, many ZIKV-exposed infants do not have abnormal brain findings or a clinical phenotype associated with congenital Zika syndrome," adds Dr. Mulkey, a fetal-neonatal neurologist in the Division of Fetal and Transitional Medicine at Children's National in Washington, D.C.

Indeed, a retrospective cohort of 82 women exposed to Zika during their pregnancies led by a research team at Children's National found only three pregnancies were complicated by severe fetal brain abnormalities. Compared with the 65% abnormal computed tomography (CT) or magnetic resonance imaging (MRI) findings in the new Brazilian study, about 1 in 10 (10%) of babies born to women living in the continental U.S. with confirmed Zika infections during pregnancy had Zika-associated birth defects, according to the Centers for Disease Control and Prevention.

"There appears to be a spectrum of brain imaging abnormalities in ZIKV-exposed infants, including mild, nonspecific changes seen at cranial US [ultrasound], such as lenticulostriate vasculopathy and germinolytic cysts, to more significant brain abnormalities, such as subcortical calcifications, ventriculomegaly and, in its most severe form, thin cortical mantle and fetal brain disruption sequence," Dr. Mulkey writes.

About three years ago, Zika virus emerged as a newly recognized congenital infection, and a growing body of research indicates the damage it causes differs from other infections that occur in utero. Unlike congenital cytomegalovirus infection, cerebral calcifications associated with Zika are typically subcortical, Dr. Mulkey indicates. What's more, fetal brain disruption sequence seen in Zika-exposed infants is unusual for other infections that can cause microcephaly.

"Centered on the findings of Pool, et al, and others, early neuroimaging remains one of the most valuable investigations of the Zika-exposed infant," Dr. Mulkey writes, including infants who are not diagnosed with congenital Zika syndrome. She recommends:

- Cranial ultrasound as the first-line imaging option for infants, if available, combined with neurologic and ophthalmologic exams, and brainstem auditory evoked potentials
- Zika-exposed infants with normal cranial ultrasounds do not need additional imaging unless they experience a developmental disturbance
- Zika-exposed infants with abnormal cranial ultrasounds should undergo further neuroimaging with low-dose cranial CT or brain MRI.

Provided by Children's National Medical Center