HHS Public Access

Author manuscript

J Clin Virol. Author manuscript; available in PMC 2022 October 17.

Published in final edited form as:

J Clin Virol. 2020 July ; 128: 104367. doi:10.1016/j.jcv.2020.104367.

Neurodevelopmental Outcomes of Infants with Congenital Cytomegalovirus Infection in Western Kenya

Martina Oneko[1], **Nancy A. Otieno**[1], **Sheila C. Dollard**[2], **Tatiana M. Lanzieri**[2]

[1]Kenya Medical Research Institute, Centre for Global Health Research, Kisumu, Kenya

[2]Division of Viral Diseases, National Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention, Atlanta, Georgia, United States

Keywords

congenital CMV; cytomegalovirus; HIV-exposed; prevalence; outcomes; Kenya

Recent studies in Africa have shown an increased prevalence of congenital CMV infection among HIV-exposed infants compared with HIV-unexposed infants, despite near universal maternal use of highly active antiretroviral therapy. [1,2] However, data on the burden of congenital CMV-related sequelae among HIV-exposed and -unexposed children in Africa are limited. In this letter, we report updated estimates of prevalence by HIV-exposure status and clinical outcomes of CMV-positive children identified by screening 1078 newborns in western Kenya during 2015–2017. [1]

Among a total 39 CMV-positive children, 14 (35.9%) were HIV-exposed, 2 more than previously reported, because the mother's infection–though diagnosed at delivery–was only documented during follow-up visits. The updated prevalence of congenital CMV infection among HIV-exposed vs. HIV-unexposed children was 6.5% (14/216) vs. 2.9% (25/862), with a prevalence ratio of 2.7 (95% confidence interval = 1.3–5.5; $p<0.01$), after adjusting for maternal age and parity, and excluding second-born twins to limit the effect of shared maternal risk factors by twins.

Per protocol, CMV-positive children would have two follow-up visits, at 4 and 24 months of age. A paediatric neurologist interviewed the mother and observed the child to assess gross motor, fine motor, speech, language comprehension, and social/cognitive development using the Malawi Developmental Assessment Tool. [3] Additionally, the neurologist performed age-appropriate physical and neurological examinations. Hearing was evaluated by observing whether the child turned the head to the sound of crumpling paper while being distracted. Vision was evaluated by observing whether the child was following objects at

Address correspondence to: Tatiana M. Lanzieri, National Center for Immunization and Respiratory Diseases, Centers for Disease Control and Prevention, 1600 Clifton Rd NE, Mail Stop A-34, Atlanta GA, 30333, tmlanzieri@cdc.gov, 404-639-3031.

Disclaimer: The findings and conclusions in this article are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Conflicts of interest

The authors have no conflicts of interest to disclose.

~1-meter distance and, if older than 10 months, whether the child could localize and grasp small objects. Data on infant HIV status were collected from medical records.

Among 36 (92.3%) CMV-positive children followed, the first visit was at median age 11 (range: 5–30) months; 24 (66.7%) children had a second visit at median age 23 (21–29) months. Thirty-four (94.4%) children had normal neurodevelopmental, hearing and vision evaluations. Two (5.6%) children were diagnosed with a speech delay at approximately 2 years of age, despite normal development at the first follow-up visit. Child A was HIV-unexposed and had a history of possible seizures with a normal EEG and Child B was HIV-exposed with no other abnormalities. Among 14 HIV-exposed children, 9 (64.3%) were HIV-negative by PCR and/or antibody test at age ≥18 months, thus HIV infection was ruled out. Among 5 (35.7%) children for whom HIV infection could not be ruled out, two (14.3%) were HIV-negative by PCR at 6 weeks and one at 11 months, and 2 children (including Child B) were not tested.

In conclusion, most CMV-positive children followed had normal neurodevelopment when assessed at roughly 1 or 2 years of age. However, we did not follow CMV-negative infants for comparison. Additionally, we may have missed some children with neurodevelopmental delays because the follow-up was short or missed, and we did not perform formal vision or hearing assessment. Further studies assessing the burden of congenital CMV-related sequelae in low-middle income countries, particularly in regions with high maternal HIV prevalence, are warranted. [4]

Acknowledgments

This work was supported by the U.S. Centers for Disease Control and Prevention. We thank all the children who participated in the study and their families, and the Influenza Program CDC Kenya, which facilitated the study.

References

1. Otieno NA, Nyawanda BO, Otiato F, et al. The impact of maternal HIV and malaria infection on the prevalence of congenital cytomegalovirus infection in Western Kenya. J Clin Virol 2019; 120: 33–37. [PubMed: 31546088]
2. Pathirana J, Groome M, Dorfman J, et al. Prevalence of Congenital Cytomegalovirus Infection and Associated Risk of In Utero Human Immunodeficiency Virus (HIV) Acquisition in a High-HIV Prevalence Setting, South Africa. Clin Infect Dis 2019; 69(10): 1789–1796. [PubMed: 30615106]
3. Gladstone M, Lancaster GA, Umar E., et al. The Malawi Developmental Assessment Tool (MDAT): the creation, validation, and reliability of a tool to assess child development in rural African settings. PLoS Med 2010 May; 7(5): e1000273. [PubMed: 20520849]
4. Lanzieri TM, Dollard SC, Bialek SR, Grosse SD. Systematic review of the birth prevalence of congenital cytomegalovirus infection in developing countries. Int J Infect Dis. 2014; 22: 44–8. [PubMed: 24631522]