Boffin Access
FOSTERING KNOWLEDGE

Open Access Journal | Volume: 3.2

Journal of Neuroscience and Neurosurgery
ISSN 2517-7400

Microcephaly and Its Neurological Sequalaes Associated With Exanthematous Eruption in Pregnancy: A Cohort Study in a Zika Virus Epidemic Region of Brazil

Nilson N. Mendes Neto[1,4*]
Jessika Thais da Silva Maia[1]
Angelle Desiree Labeaud[2]
David M. Aronoff[3]
Kalyana E Fernandes[5]
Tabata de Alcantara[5]

[1]Department of Family Medicine - Hospital Universitario Onofre Lopes (HUOL), Natal, Brazil
[2]Department of Pediatrics, Stanford University, Stanford, USA
[3]Division of Infectious Diseases, Department of Medicine, Vanderbilt University Medical Center, Nashville, TN
[4]Extension Center - University of California, Davis, EUA
[5]Infant Rehabilitation Center (CRI), Natal, Brazil

Abstract

Background: An increase in the prevalence of microcephaly (MCP) was observed in Rio Grande do Norte State (RN) beginning in September 2015. This Brazilian Northeast state was highly impacted by a Zika vírus (ZIKV) outbreak over the subsequent two years. The highest rate of MCP was measured in November 2015, at 20.1 cases per 1,000 live births, compared with only 1.8 cases/year in the previous years. This study aimed to evaluate the neurological disorders in children with MCP whose mothers had exanthematous dermatitis (ED) during the pregnancy, a hallmark (and surrogate clinical marker) of ZIKV infection.

Methods: We evaluated children up to 17 months old followed at a pediatric rehabilitation center in RN. Cohort enrollment occurred with children born between January 2015 and May 2016. We interviewed their mothers about the occurrence of ED during pregnancy, as a surrogate for possible ZIKV infection.

Results: Of the 37 cases of MCP (25 male, 12 girls), 10 mothers did not know how to describe the presence of ED during pregnancy. Of the 24 cases of MCP with maternal ED, 9 patients were classified as having severe spasticity (Ashworth score 3 and 4), 4 patients were classified as mild (Ashworth score 1 and 2) and 11 had no spasticity. Eleven patients had seizure disorders and 5 reported irritability.

Conclusions: According to these data, there is a high prevalence of neurological complications in MCP cases related to ED. These patients need close follow-up care and intensive medical interventions. Longer follow-up will provide data regarding these chronic complications.

Keywords

Zika virus; Congenital zika syndrome

Background

Zika virus (ZIKV) may cause an acute febrile illness commonly associated with exanthematous dermatitis (ED) [5,6]. This flavivirus is transmitted to humans by a mosquito bite. Due to the neurotropism of ZIKV, many studies have demonstrated a causal link between ZIKV infection, microcephaly (MCP) and other neurological disorders [1]. According to the Center for Disease Control and Prevention there is sufficient evidence from epidemiological, laboratory and imaging studies to prove a direct, causal association between ZIKV congenital infection and MCP in newborns [2], which has been substantiated by several studies [3,4].

Congenital ZIKV infection is associated with severe congenital neurological abnormalities. An increased number of newborns with MCP was noted in late 2015 in the Northeast of Brazil during the ongoing ZIKV outbreak [1]. We evaluated the neurological complications in babies born in Rio Grande do Norte State (RN) during this outbreak whose mothers reported an ED during pregnancy. RN is a Brazilian Northeast state highly impacted by this outbreak which has a population of 3,400,000 inhabitants, approximately. These data might help better describe the congenital Zika syndrome, its clinical outcomes and natural history.

Study Design

We evaluated 37 children up to 17 months old followed at a pediatric rehabilitation center in RN State. Cohort enrollment occurred with children born between January 2015

Article Information

DOI:	10.31021/jnn.20203147
Article Type:	Research Article
Journal Type:	Open Access
Volume: 3	**Issue:** 2
Manuscript ID:	JNN-3-147
Publisher:	Boffin Access Limited
Received Date:	24 May 2020
Accepted Date:	12 June2020
Published Date:	13 June 2020

*Corresponding author:

Nilson Nogueira Mendes Neto

Extension Center - University of California, Davis, EUA

Email: nmendes@ucdavis.edu

Citation: Neto NM, da Silva Maia JT,Labeaud AD, Aronoff DM, Fernandes KE, et al. Microcephaly and Its Neurological Sequalaes Associated With Exanthematous Eruption In Pregnancy: A Cohort Study In a Zika Virus Epidemic Region of Brazil. J Neurosci Neurosurg. 2020 Jun;3(2);147.

Copyright: © 2020 Neto NM, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 international License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

and May 2016. We interviewed their mothers about the occurrence of ED during their pregnancy.

Definitions

I. Ashworth scale measures resistance during passive soft-tissue stretching and is used as a simple measure of spasticity. Its classification range from "0" (no increase in muscle tone) to "4" (affected part(s) rigid in flexion or extension)

II. Exanthematous rash was described as maculopapular, pruritic, symmetrical and was usually accompanied by fever.

Results

Of the 37 cases of MCP, 25 were male and 12 were female. Ten mothers did not recall an exanthematous rash during pregnancy. Of the 24 cases of MCP with maternal ED, 9 patients were classified as having severe spasticity (Ashworth score 3 and 4), 4 patients were classified as mild (Ashworth score 1 and 2) and 11 had no spasticity. Eleven patients had seizure disorders and 5 reported irritability.

Discussion

According to these data, there is a high prevalence of neurological complications in children with MCP born to mothers who experienced an exanthematous rash during pregnancy while living in a region of Brazil suffering a major ZIKV outbreak at the time. These data from a relatively large study, describe the neurological consequences in children with a possible intrauterine exposure to ZIKV. These findings provide supportive evidence linkingneurological disorders to ZIKV infection, reflecting its neurotropism. Limitations of our study include that at the time of this follow-up the children and their mothers had not yet been tested by serological and/or RT-PCR, due to lack of resources for diagnostic tests and poor clinical research infrastructure development. However, given the high frequency of ED with ZIKV infection [5,6] and given that these babies with MCP were born to mothers who were pregnant during a major ZIKV outbreak, it is reasonable to determine the extent to which ED and MCP are linked in this setting. It is likely that the cases of MCP reported here were a result of ZIKV infection. An increased prevalence of MCP and other congenital abnormalities was observed, especially after September 2015, with the highest rate in November 2015 (22.3 cases per 1000 live births). Before this ZIKV outbreak, the rate in RGN between 2010 and 2014 was approximately 1.8 cases/year [1]. Due to the high prevalence of neurological complications, these patients need close follow-up care and intensive medical interventions. Longer follow-up will provide data regarding these chronic neurological complications and how best to intervene.

Acknowledgments

We thank Dr. Martin Hirsch from Harvard Medical School for his support and assistance with this investigation.

Previous data of this research was first presented as an oral presentation at the annual meeting of Infectious Diseases Society of America (IDWEEK 2017) and at the 70th annual meeting of American Academy of Neurology (2018).

References

1. Mendes Neto NN, da Silva Maia JT, Zacarkim MR, Queiroz I, Labeaud AD, et al. Perinatal Case Fatality Rate Related to Congenital Zika Syndrome in Brazil: A Cross-Sectional Study. Pediatr Neurol. 2018 Apr;81:47-48.
2. Pan American Health Organization, World Health Organization. Epidemiological Alert. Neurological syndrome, congenital malformations, and Zika virus infection. Implications for public health in the Americas—1 December 2015. 2015.
3. Broutet N, Krauer F, Riesen M, Khalakdina A, Almiron M, et al. Zika Virus as a Cause of Neurologic Disorders. N Engl J Med. 2016 Apr 21;374(16):1506–1509.
4. Sanchez JD. PAHO WHO | Regional Zika Epidemiological Update (Americas) February 9, 2017 [Internet]. Pan American Health Organization / World Health Organization. 2017 Mar.
5. Cordel N, Birembaux X, Chaumont H, Delion F, Chosidow O, et al. Main characteristics of Zika virus exanthema in Guadeloupe. Jama dermatology. 2017;153(4):326-328.
6. Meaney-Delman D, Rasmussen SA, Staples JE, Oduyebo T, Ellington S. et al. Zika virus and pregnancy: what obstetric health care providers need to know. Obstet Gynecol. 2016 Apr;127(4):642-648.