Update Article
Artigo de Atualidade
Artículo de Actualidades

DOI: http://dx.doi.org/10.12957/reuerj.2019.34029

Seizures in newborn with microcephaly associated to Zika virus infection

Crises convulsivas em neonato com microcefalia associada à infecção pelo Zika vírus

Crisis convulsivas en neonato con microcefalia asociada a la infección por el virus de Zika

Lívia Pinheiro Pereira[I]; Aglaya Oliveira Lima Cordeiro de Almeida[II]; Carla Cristina Oliveira de Jesus Lima[III]; Josely Bruce Santos[IV]; Mauricio dos Santos Barbosa[V]; Ridalva Dias Martins Felzemburgh[VI]

ABSTRACT
Objective: to analyze, from the case of newborn with microcephaly related to Zika virus infection, its clinical characteristics and implications for health care and nursing. **Content:** microcephaly is a congenital anomaly in which the cephalic perimeter (CP) is smaller than or equal to 32cm. In 2015/2016, an outbreak of microcephaly associated with the Zika virus evoked an international debate on the subject. From a case report, we analyzed and discussed findings of a child with microcephaly and with severe neurological repercussions in the first 24 hours of life. The newborn, few hours after birth, presented recurring episodes of tonic-clonic seizures lasting about three minutes. That way, epilepsy associated with microcephaly becomes an aggravation, demanding special attention. **Conclusion:** Raising awareness and sensitizing caregivers is imperative for clarification about epilepsy in the family setting in a very clear and accessible way.
Descriptors: Microcephaly; Zika virus; seizures; newborn.

RESUMO
Objetivo: analisar, a partir do caso de recém-nascido com microcefalia relacionada à infecção do vírus Zika, suas características clínicas e implicações para o cuidado em saúde e enfermagem. **Conteúdo**: a microcefalia é uma anomalia congênita em que o perímetro cefálico é menor ou igual a 32cm. Em 2015/2016, um surto de microcefalia associado ao vírus Zika provocou um debate internacional sobre o assunto. Através de relato de caso, descrevemos os achados característicos de uma criança com microcefalia e com repercussões neurológicas graves nas primeiras 24 horas de vida. O recém-nascido, pouco após o nascimento, apresentou episódios recorrentes de convulsões tônico-clônicas que duraram cerca de três minutos. A epilepsia associada à microcefalia torna-se um agravamento, exigindo atenção especial. **Conclusão:** Aumentar a conscientização e sensibilizar os cuidadores é imperativo para esclarecimentos sobre a epilepsia no ambiente familiar de forma muito clara e acessível.
Descritores: Microcefalia; Zika vírus; convulsões; recém-nascido.

RESUMEN
Objetivo: analizar, a partir del caso de un recién nacido con microcefalia relacionada con la infección por el virus del Zika, sus características clínicas y sus implicaciones para el cuidado en salud y de enfermería. **Contenido:** la microcefalia es una anomalía congénita en la que el perímetro cefálico es menor o igual a 32cm. En 2015/2016, un brote de microcefalia asociado al virus Zika provocó un debate internacional sobre el tema. Descubrimos los hallazgos característicos de un niño con microcefalia y con repercusiones neurológicas graves. El recién nacido fue dirigido a una Unidad de Cuidados Intensivos algunas horas después del nacimiento, con episodios recurrentes de convulsiones tónico-clónicas que duraron cerca de tres minutos. De esta forma, la epilepsia asociada a la microcefalia se vuelve un agravamiento, exigiendo atención especial. **Conclusión:** aumentar la concienciación y sensibilizar a los cuidadores es imperativo para aclaraciones sobre la epilepsia en el ambiente familiar de forma muy clara y accesible.
Descriptores: Microcefalia; Zika virus; convulsiones; recién nascido.

INTRODUCTION

In November 2015, a microcephaly epidemic was in course in Brazil, subsequently attributed to congenital infection caused by the Zika virus. In 2016, up until the last epidemiologic report, 214.193 cases of fever probably caused by the Zika virus were registered in Brazil (incidence rate of 104,8 cases/100 thousand hab)[1-3].

[I]Nurse. Master. Federal University of Bahia. Salvador, Brazil. E-mail: liv_pp@hotmail.com
[II]Nurse. Master. Federal University of Bahia. Salvador, Brazil. E-mail: aglayatriz@hotmail.com
[III]Nurse. Master. PhD student. Federal University of Bahia. Salvador, Brazil. E-mail: carlaenf78@gmail.com
[IV]Nurse. Master. PhD student. Federal University of Bahia. Salvador, Brazil. E-mail: joselybruce3@gmail.com
[V]Nurse. Federal University of Bahia. Salvador, Brazil. E-mail:msbarbosa@hotmail.com
[VI]Nurse. PhD. Adjunct Professor. Federal University of Bahia. Salvador, Brazil. E-mail: ridalva@gmail.com

Received: Sep 28th 2018 – Accepted: Dec 12h 2019

Update Article
Artigo de Atualidade
Artículo de Actualidades

DOI: http://dx.doi.org/10.12957/reuerj.2019.34029

Several maternal infections may cause fatal loss or malformations – mainly in the beginning of the pregnancy-, and the congenital infection related to the Zika virus has similar characteristics. Its effects, however, are teratogenic, which is the distinction in relation to other congenital infections. For that reason, additional exams are needed in order to discard infections such as the commonly called TORSCH: Toxoplasmosis, Rubeola, Syphilis, Cytomegalovirus and Hepatitis, and others (examples: Parvovirus, HIV, Herpes, West Nile fever)[4].

Clinical characteristics of children with microcephaly related to the Zika virus are: severe intracranial calcifications, neurological abnormalities, severe malformations on cortical development, ventriculomegaly, cerebellar hypoplasia and abnormal hypodensity of white matter[4,5].

Besides the aforementioned neurological repercussions, microcephaly associated to Zika virus may present later manifestations[4]. Seizures are considered the most common pediatric disturbs, and are caused by increase or aberrant frequency of neuronal discharges. The seizures may stem from infectious, neurological, metabolical and traumatic origins, or from toxin ingestion.

Epilepsy, on the other hand, is a condition defined by two or more unprovoked seizures, and may be caused by a variety of pathological processes in the brain. A single convulsive event is not classified as epilepsy, and in general is not treated with long term anticonvulsant medication[6]. Severe epilepsy is considered one of the possible clinical repercussions of microcephaly associated with Zika virus. In this report, we study the case of an infant who presented seizures in the first 24 hours of life.

CONTENT

The details of this case confirm other pre-existing reports in literature about the association between epilepsy, microcephaly and the infection by the Zika virus. Retrospective data from the medical record – with permission from the Ethics Committee under CAEE nº 53441216.1.1001.5028 – were used for this study.

We are dealing with a confirmed case with complete laboratorial results, clinical observations and neuroimage findings, considered compatible with congenital infection by Zika virus. The neonate was born in December 2015, in the northeast of Brazil[7].

A neonate from 39 weeks and 4 days of pregnancy, male, born out of a c-section, cephalic presentation, intact amniotic sac, recommendation of c-section due to polyhydramnios and microcephaly detected in obstetric ultrasound. Born slightly depressed, the neonate required tactile stimuli and oxygen mask, had the apgar score of seven at the first minute after birth and nine at the fifth, and presented face – cephalic pole disproportion.

Mother was twenty years old, declaring herself black, unemployed, affirms to have had six pre-natal consults, denies use of alcohol, cigarettes and other drugs and denies high blood pressure, vaginal discharge and blood transfusion. There was negative serology for toxoplasmosis and Rubeola, and negative IgM for Citomegalovirus. As she was admitted to the hospital, VDRL and HIV tests were ordered and came back negative. Computed Tomography (CT) on week 39, day 4, show polyhydramnios, ventriculomegaly and findings suggesting microcephaly.

The aforementioned exams eliminate the possibility of the microcephaly being related to other congenital infections. The main agents of congenital infections that cause cerebral calcification and microcephaly are known as STORCH. IgM and IgG antibody for Zika virus were positive. The gold standard test to confirm Zika virus is RT-PCR, which was not applied due to limitations of the institution and of time for the collection. For the diagnostic, the exam used was the ELISA (“Enzyme Linked Immunono Sorbent Assav”).

Microcephaly can be caused by congenital infections, chromosomal anomalies, exposure to alcohol and other drugs or by exposure environmental toxins, premature fracture of cranial bones (craniosynostosis) and by some metabolic disorders[8]. Long term consequences of microcephaly depend on the subjacent cerebral anomalies and may vary from light, moderate or severe delay on motor development, to intellectual deficit, such as cerebral palsy.

The newborn was in regular general state, hypoactive, hypo reactive, afebrile, hydrated, colored, minor jaundice, acyanotic, bradypneic, microcephalic, small fontanelles, well distributed ventricular murmurs in the respiratory system, no adventitious noises; rhythmic sounds in cardiovascular system, normophonetic, no murmurs; globose and flaccid gastrointestinal system, no visceromegalies, presence of hydro-areal noise; typical male genitalia; perforated extremities with no edemas, 2 seconds time of capillary refill; good tolerance to 20 ml/time diet, no episodes of residue, abdominal distention and/or regurgitation; urinary diuresis pattern with an average of 4,4ml/kg/h and no dejection.

Update Article
Artigo de Atualidade
Artículo de Actualidades

DOI: http://dx.doi.org/10.12957/reuerj.2019.34029

The newborn was directed to an Intense Care Unit few hours after birth, with recurring episodes of tonic-clonic seizures lasting about 3 minutes. That way, epilepsy associated with microcephaly becomes an aggravation, demanding special attention. After seven days following commitment to the Intensive Care Unit, the newborn showed considerable progress regarding the seizures. Phenobarbital was the drug of choice, being adjusted daily after birth. There aren't, however, detailed reports from the multiprofessional team concerning the convulsive crisis and the neurological aspects of the neonate, denying the possibility of a deeper elucidation of the care given.

The first episode of tonic-clonic seizures occurred on the first day of life, and so was administered the first dose of Phenobarbital as the drug of choice. In spite of that, seizures continued and adjustments on the dose administered were necessary. The neonate then made progress and was stabilized clinically and after seven days, was discharged from the ICU and eventually from the hospital on the 28th day of life.

Phenobarbital is an effective and complete medicine, whose main advantage is the low cost. It can be used in its full potential for generalized tonic-clonic crisis and for simple partial crisis. Phenobarbital pharmacological effects act boosting the synaptic inhibition mediated by γ-aminoburytic acid (GABA). It is worth pointing out that, in virtue of biological maturation, the pharmacokinetics of Phenobarbital in neonates is different from that observed in pediatric and adult populations[9-11].

Instead to scenarios of other congenital infections, it is assumed that children who suffer with infections related to the Zika virus have cortical malformations (pachygyria and polymicrogyria) located mostly on the frontal lobes. Such frontal predominance had not been described in other congenital infections of the central nervous system[12]. Malformations of the central nervous system are the second most common cause of congenital anomaly, preceded only by cardiac diseases.

Congenital malformations represent a challenge to the multidisciplinary team, mostly on what concerns diagnosis and treatment, due to the complexity of prognosis and care with the newborn, seeing as skilled and effective care is closely related to clinic evolution[13,14].

In the case reported, however, it was not possible to get access to information on the neurological patter and what tests were applied, seeing as the records of clinical evolution from the multiprofessional team did not include such details. Findings suggest that proper control and handling after successive tries of adjusting the drug of choice guarantee hemodynamic stability, early family relationship and development of other areas that are fundamental for the rehabilitation of the child with life quality.

Unhandled seizure episodes may lead to death, cerebral palsy and other neurological damages. Case studies are indispensable for a clinic practice based on scientific evidence, leaving empiricism and unfocused care aside. When it comes to seizures, they need flexible, informed and descriptive approaches, based on the specific or recurring episodes presented. We recommend creating a Standard Operating Protocol or instruments of multiprofessional evaluation that provides subsidies for quick and effective management, resolutive in the face of convulsive crisis episodes in the hospital sphere.

Caring for children with microcephaly who have seizures requires the nursing professional to develop a set of important technical and scientific skills related to the pathology, as well as a humanized care for the child and the family. Unfamiliarity with congenital malformation and its complications can get in the way of the assistance, in addition to hindering crisis control and early stimulation. According to WHO (2016), correct care and early intervention in mycrocephalic babies will enable neuronal plasticity, also allowing amplitude and flexibility for progression of development in motor, cognitive and language areas[15].

FINAL CONSIDERATIONS

Raising awareness and sensitizing care takers is imperative for clarification about epilepsy in the family setting in a very clear and accessible way. We suggest empowering these kids' care takers because it brings about benefits in several aspects: it facilitates the care, promotes health, prevents aggravations and minimizes costs in primary and secondary care.

Admittedly, the data revealed here describe a local and particular reality of epilepsy associated with children with microcephaly and are not to be generalized as experiences and repercussions of other regions. That is not the purpose of this study. However, this research supports the importance of the nursing systematization process in the care of children with microcephaly, favoring the work process, the early identification of clinical signs, in addition to feedback of educational actions instrumentalizing professionals and caregivers.

Update Article
Artigo de Atualidade
Artículo de Actualidades

DOI: http://dx.doi.org/10.12957/reuerj.2019.34029

In addition, the understanding is that knowledge about microcephaly allows for a fresh look at this context and from there, it becomes possible to enforce safe, humanized, critical and reflective nurse care, assisting in consolidating the transformation of realities of these and other families who suffer from this condition brought by the Zika virus.

REFERENCES

1. Ministério da Saúde (Br). Secretaria de Vigilância em Saúde. Ministério da Saúde. Boletim Epidemiológico Monitoramento dos casos de dengue, febre de chikungunya e febre pelo vírus Zika até a Semana Epidemiológica 51, 2016. [cited 2019 Nov 11]. Avaliable from: http://portalarquivos2.saude.gov.br/images/pdf/2017/janeiro/12/2017_001%20-%20Dengue%20SE51_publicacao.pdf
2. Ministério da Saúde (Br). Secretaria de Vigilância em Saúde. Departamento de Vigilância das Doenças Transmissíveis. Protocolo de vigilância e resposta à ocorrência de microcefalia relacionada à infecção pelo vírus Zika. Brasília (DF): Ministério da Saúde, 2015. [cited 2019 Nov 11]. Available from: http://portalarquivos2.saude.gov.br/images/pdf/2015/dezembro/09/Microcefalia---Protocolo-de-vigil--ncia-e-resposta---vers--o-1----09dez2015-8h.pdf
3. Ministério da Saúde (Br). Secretaria de Vigilância em Saúde. Boletim Epidemiológico. v. 46:25 – 2016 [cited Nov 11 2019]. Available from: http://combateaedes.saude.gov.br/situacao-epidemiologica#boletins
4. Hockenberry MJ, Wilson D. Wong - Fundamentos de enfermagem pediátrica. Tradução Maria Inês Corrêa Nascimento. 9th ed. Rio de Janeiro: Elsevier, 2014.
5. França GVA, Schuler-Faccini L, Oliveira WK, Henriques CMP, Carmo EH, Pedi VD, et al. Congenital Zika virus syndrome in Brazil: a case series of the first 1501 livebirths with complete investigation. The Lancet. 2016; 388(10047):891-7. DOI: https://doi.org/10.1016/S0140-6736(16)30902-3
6. Goodman B. Nova ameaça do vírus Zika para os bebês: microcefalia de apresentação tardia. Medscape. 2016 [cited 2019 Nov 11]. Available from: http://portugues.medscape.com/verartigo/6500435
7. Ministério da Saúde (Br). Portal da Saúde. Dengue: Perguntas e Respostas. 2015 [cited 2019 Mar 03]. Available from: http://portalsaude.saude.gov.br/index.php/perguntas-e-respostas-dengue
8. Pitkänen A, Löscher W, Vezzani A, Simonato M, Lukasuiuk K, Gröhn O, et al. Advances in the development of biomarkers for epilepsy. Lancet Neurol [internet]. 2016 [cited 2019 Nov 11]; 15(8): 843–56. DOI: https://doi.org/10.1016/S1474-4422(16)00112-5
9. Schuler-Faccini L, Ribeiro EM, Feitosa IM, Horovitz DD, Cavalcanti DP, Pessoa A, et al. Possible association between Zika virus infection and microcephaly—Brazil, 2015. Morb Mortal Wkly Rep. [internet]. 2016 [cited 2019 Nov 11]; 65:59–62. DOI: https://doi.org/10.15585/mmwr.mm6503e2
10. Pastore ME, Ofuchi AS, Nishiyama P. Therapeutic control of phenobarbital. Acta Sci. Health Sci. [internet]. 2007 [cited 2019 Nov 11]; 29(2):125-31. DOI: https://doi.org/10.4025/actascihealthsci.v29i2.1082
11. Kwan P. Sills GJ, Brodie MJ. The mechanisms of action of commonly used antiepileptic drugs. Pharmacol. Therapeut. [internet]. 2001 [cited 2019 Nov 11]; 90:21-34. DOI: https://doi.org/10.1016/S0163-7258(01)00122-X
12. Varojna J, Escribano E, Martin-Calderon JL. Fenobarbital: farmacocinética, toxicología y monitorización por el laboratorio. Rev. Diagn. Biol., Las Rozas. 2001 [cited 2019 Nov 11]; 50(1):13-6. Available from: http://scielo.isciii.es/scielo.php?script=sci_arttext&pid=S0034-79732001000100002&lng=es
13. Barkovich AJ, Raybaud C. Pediatric neuroimaging.5th ed. USA: Lippincott Williams & Wilkins; 2012.
14. Botelho ACG, NeriLV, Silva MQF, Lima TT, Santos KG, Cunha RMA, et al. Presumed congenital infection by Zika virus: findings on psychomotor development – a case report. Rev. Bras. Saude Mater. Infant [Internet]. 2016 [cited 2019 Aug 10]; 16(1):S39-44. DOI: http://dx.doi.org/10.1590/1806-9304201600s100004
15. Ministério da Saúde (Br). Secretaria de Atenção à Saúde. Diretrizes de estimulação precoce: crianças de zero a 3 anos com atraso no desenvolvimento neuropsicomotor [internet]. Brasília (DF): Ministério da Saúde; 2016 [cited 2019 Nov 11]. Available from: http://portalarquivos.saude.gov.br/images/pdf/2016/novembro/18/Diretrizes%20de%20estimulao.pdf