International Journal of Pediatrics and Adolescent Medicine (2016) 3, 89–90

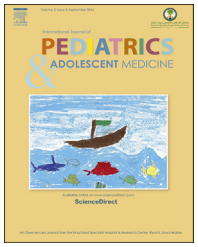
HOSTED BY

ELSEVIER

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: http://www.elsevier.com/locate/ijpam



Editorial

# Zika virus: The challenge of congenital infection

Zika virus (ZIKV), an emerging single-stranded RNA mosquito born flavivirus that has been recognized in sporadic outbreaks in Africa since its first isolation from rhesus monkeys in the Zika forest (the virus carries the name) near Uganda in 1947. The first infection in humans was documented in Tanzania and Uganda in 1952. Further outbreaks have been reported in Africa, Americas, Asia, and Pacific islands. In 2015, ZIKV wide epidemic in susceptible Brazilian population have clearly demonstrated the effectiveness of its mosquito vector, *Aedes* genus, especially *Aedes aegypti* [1,2].

The recent substation increase in the number of fetal cases, neonatal birth defects, and other neurological complications reported from Brazil have prompted the World Health Organization (WHO) to declare the Zika virus "A public health emergency of international concern" on February 1, 2016 [3].

The clinical manifestations of ZIKV during pregnancy are similar to those in nonpregnant women. Experimental laboratory-based and clinical studies have established a clear causal relation between maternal ZIKV infection and fetal defects [4].

The virus has a high efficiency to infect human neuronal progenitor cells and affect their development. ZIKV has the ability to cross the placenta, as demonstrated by the detection of the virus genome in the amniotic fluid infants who have confirmed microcephaly as well in fetal brain tissue in microcephalic fetus of an infected pregnant woman [4].

Although ZIKV has been linked to neonatal microcephaly, other abnormalities detected in prenatal sonography among ZIKV congenitally infected infant also included cerebral calcifications; fetal growth restriction and ocular abnormalities, which included bilateral macular and perimacular lesions as well as optic nerve abnormalities in most cases [5–9].

Prevalence and clinical spectrum of congenital ZIKV disease in newborns infected prenatally are unknown. Management of infants who have congenital ZIKV disease is primarily supportive, and there is neither available vaccine nor prophylactic medications [10]. However, the race is on to produce ZIKV vaccines. There are currently around 25 vaccine companies and organization groups are expediting vaccine research against ZIKV [11].

Healthcare providers should advice pregnant women to postpone their travel to endemic areas. If they have to travel, they should strictly follow steps to avoid mosquito bites [12]. Pediatricians should work closely with obstetricians to identify infant with maternal risk or diagnosed with ZIKV infection, and they have to standardize their approaches to diagnostic evaluation for congenital Zika virus infection [10,12,13].

The list pathogens related to intrauterine infections continues to grow with the identification of ZIKV. The pattern of neurological abnormalities seen with congenital ZIKV infection is similar to what is seen with cytomegalovirus.

The acronym for the common congenital infections that changed from TORCH to STORCH and CHEAPTORCHES need to be further expanding to ZiCHEAPTORCHES (Table 1) in order to include another important congenital infection, the Zika virus [14–16].

**Table 1** Congenital infection acronym: ZiCHEAPTORCHES

| Acronym | Pathogens |
|---|---|
| **Zi** | **Zi**ka virus |
| **C** | **C**hickenpox and shingles |
| **H** | **H**epatitis C, D, E |
| **E** | **E**nteroviruses |
| **A** | **A**IDS (HIV infection) |
| **P** | **P**arvovirus B19 |
| **T** | **T**oxoplasmosis |
| **O** | **O**ther (Group B streptococcus, Listeria, Streptococcus, Candida, Lyme disease) |
| **R** | **R**ubella |
| **C** | **C**ytomegalovirus |
| **H** | **H**erpes simplex |
| **E** | **E**verything else sexually transmitted (Gonorrhea, *Chlamydia* infection, Ureaplasma urealyticum, human papillomavirus |
| **S** | **S**yphilis |

Peer review under responsibility of King Faisal Specialist Hospital & Research Centre (General Organization), Saudi Arabia.

http://dx.doi.org/10.1016/j.ijpam.2016.08.001

## References


[1] Dick GW, Kitchen SF, Haddow AJ. Zika virus. I. Isolations and serological specificity. Trans R Soc Trop Med Hyg 1952;46:509—20.

[2] Haddow AJ, Smithburn KC, Mahaffy AF, Bugher JC. Monkeys in relation to yellow fever in Bwamba County, Uganda. Trans R Soc Trop Med Hyg 1947;40:677—700.

[3] Peterson Lyle R, Jamieson Denise J, Powers Ann M, Honein Margaret A. Zika virus. N Engl J Med 2016:1—4.

[4] Tang H, Hammack C, Ogden CO, Wen Z, Qian X, Li Y, et al. Zika virus infects human cortical neural progenitors and attenuates their growth. Cell Stem Cell 2016;18:1—4.

[5] Oliveira Melo AS, Malinger G, Ximenes R, Szejnfeld PO, Alves Sampaio S, Bispo de Filippis AM. Zika virus intrauterine infection causes fetal brain abnormality and microcephaly: tip of the iceberg? Ultrasound Obstet Gynecol 2016;47:6—7. 5.

[6] Ventura CV, Maia M, Bravo-Filho V, Góis AL, Belfort Jr R. Zika virus in Brazil and macular atrophy in a child with microcephaly. Lancet 2016;387(228):6.

[7] Possible association between Zika virus infection and microcephaly — Brazil. MMWR Morb Mortal Wkly Rep 2015;2016(65):59—62.

[8] Calvet G, Aguiar RS, Melo AS, Sampaio SA, de Filippis I, Fabri A, et al. Detection and sequencing of Zika virus from amniotic fluid of fetuses with microcephaly in Brazil: a case study. Lancet Infect Dis 2016;16:653—60.

[9] Mlakar J, Korva M, Tul N, Popović Mara, Poljšak-Prijatelj Mateja, Mraz Jerica, et al. Zika virus associated with microcephaly. N Engl J Med 2016;374:951—8. http://dx.doi.org/10.1056/NEJMoa1600651.

[10] Fleming-Dutra Katherine E, Nelson Jennifer M, Fischer Marc, Staples JE, Karwowski MP, Mead P, et al. Update: interim guidelines for health care providers caring for infants and children with possible Zika virus infection — United States. MMWR 2016;65(7):182—7.

[11] Hayden EC. The race is on to develop Zika vaccine. Nature 2016. http://dx.doi.org/10.138/nature.2016.19634.

[12] Petersen Emily E, Erin Staples J, Meaney-Delman Dana, Fischer M, Ellington SR, Callaghan WM, et al. Interim guidelines for pregnant women during a Zika virus outbreak — United States, 2016. MMWR 2016;65(2):30—3.

[13] WHO. Pregnancy management in the context of Zika virus-Interim guidance. March 2016. http://apps.who.int/iris/bitstream/10665/204520/1/WHO_ZIKV_MOC_16.2_eng.pdf.

[14] Ford-Jones EL, Kellner JD. "Cheap torches": an acronym for congenital and perinatal infections. Pediatr Infect Dis J 1995;14(7):638—40.

[15] Al Hajjar SH. Update on diagnosis of congenital infection. Saudi Med J 2000;21(5):424—8.

[16] Al Hajjar S. Congenital infection. Textbook of clinical pediatrics. 2nd ed. 2012. p. 799—803.



Sami Al-Hajjar

*King Faisal Specialist Hospital and Research Centre, Riyadh 11211, Saudi Arabia*

*E-mail address:* hajjar@kfshrc.edu.sa



6 April 2016

Available online 9 September 2016