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Review Article

Zika Virus Disease: Emergence, Outbreak and Future Directions

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ABSTRACT

Zika virus (ZIKV) is an emerging virus around the planet. Recently, it has brought on flare-ups and pandemics, and has been related with extreme clinical appearances and inborn abnormalities. However, till date, pathogenicity of the virus and the results of ZIKV virus are unknown. Zika virus is a mosquito-borne flavivirus essentially transmitted by *Aedes aegypti* mosquitoes. Recent Evidence recommends a conceivable relationship between maternal Zika virus disease and adverse fetal results, for example, congenital microcephaly and Guillain-Barre disorder. Presently, no vaccination or drug exists to avoid or treat Zika virus disease. Persons dwelling in or going to territories of active Zika virus transmission ought to find a way to counteract Zika virus disease through aversion of mosquito nibbles. The objective of this article is to give an outline of ZKV to clinicians, with the accentuation on pathogenesis, clinical indications, diagnosis, treatment and preventive measures.

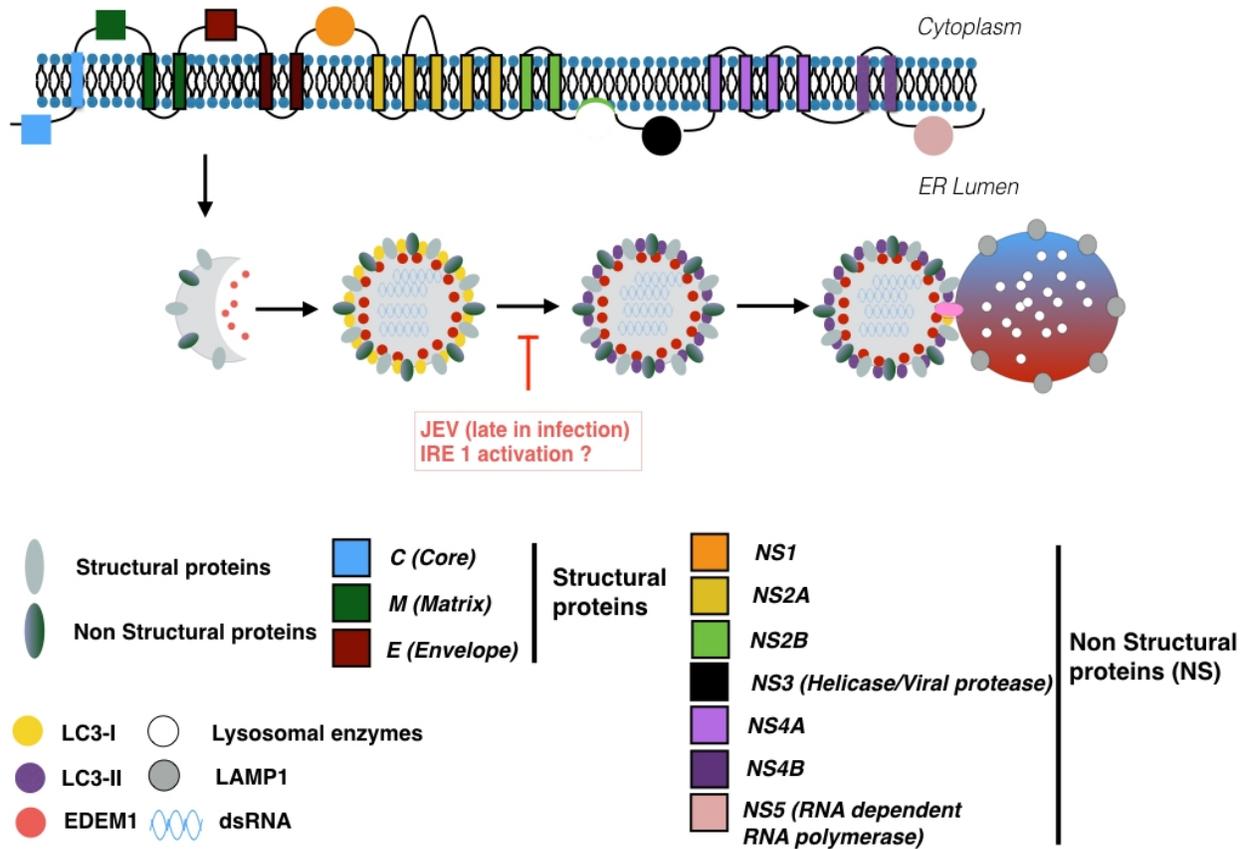
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INTRODUCTION:

ZIKV is an arbovirus of the Flaviviridae family, which incorporates West Nile, Dengue Fever, Chikungunya Virus, Yellow Fever, and Japanese encephalitis virus¹⁻². It is transferred by the Aedes genus of mosquitoes. Beyond ZIKV, the genus Flavivirus involves 52 other viral species, including the dengue, yellow fever, Saint Louis encephalitis and West Nile viruses.³ Flavivirus virions are small, circular particles having single stranded, non-segmented RNA of positive-sense and

roughly 11 kb long⁴. The genomic RNA has one ORF that is flanked by 5' and 3' non-coding region. (Figure: 1) The genome is deciphered into a single polyprotein that is consequently cleaved by both viral and host cell enzymes, instigating three structural proteins that frame the virion (capsid, pre-membrane and envelope) and seven non-structural proteins⁵⁻⁶ (NS1, NS2a, NS2b, NS3, NS4a, NS4b and NS5).

Figure: 1 Zika Virus (ZIKV): similarities to other arboviruses



Before 2015, ZIKV epidemics happened in region of Africa, the Pacific Islands and Southeast Asia. The present substantial outburst, which started in Brazil, has additionally risen in South/Central America, various islands in the Caribbean, including Puerto Rico, the Virgin Islands, and Mexico⁷. A sudden ascent in the number of babies reported born with

microcephaly in Brazil, and the identification of the single-stranded positive RNA virus in the amniotic fluid of pregnant women, has caught medical, media, and worldwide political consideration, bringing on extensive anxiety in a post-Ebola global community impressively more centered around the risk of internationally transmissible viruses⁸⁻⁹.

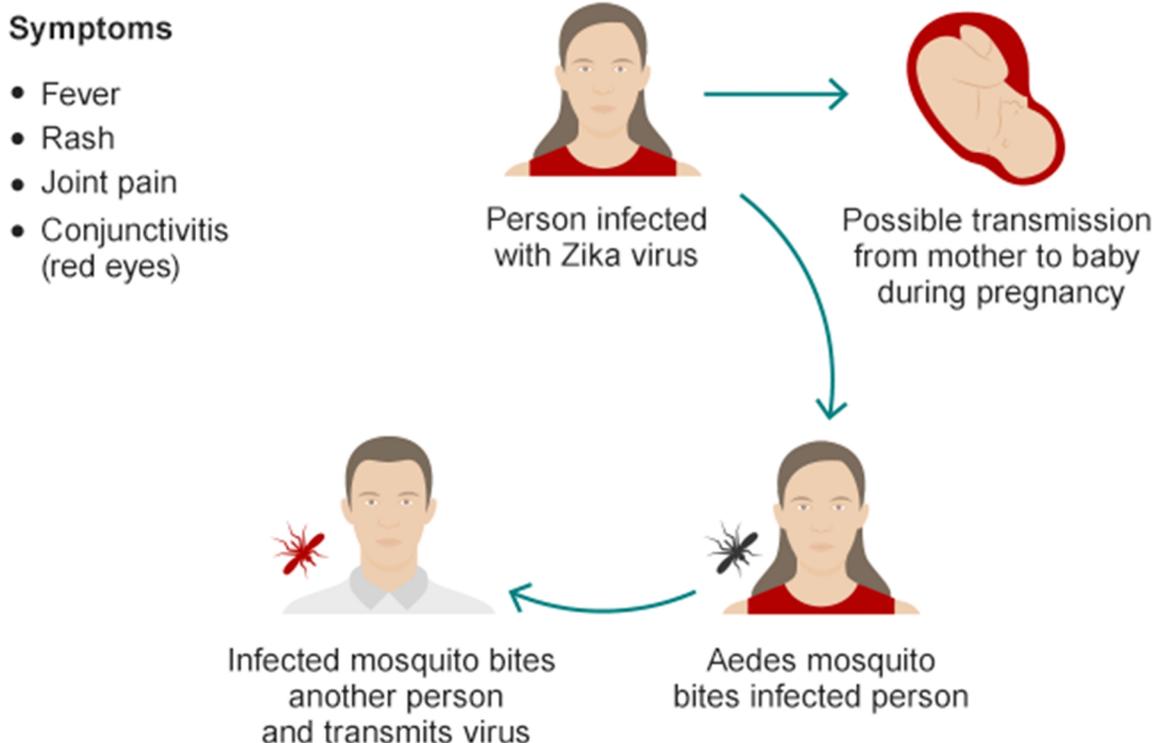
The high impending for the spreading of this virus is demonstrated by a few elements: the recent outburst, the mounting speed by which the virus is spreading in the Americas, the recognition of imported cases in various regions of the world, and the likely relationship of the virus with severe cases, death and fetal malformation¹⁰. On first February 2016, the WHO proclaimed a worldwide public health crisis because of the ZIKV threat.

Transmission: -

The transmission of ZIKV ordinarily happens through the nibble of a tainted female mosquito amid its blood feeding¹¹⁻¹². Notwithstanding the arthropod vector chomp, perinatal ZIKV transmission has been depicted, and viral RNA has been identified in breast milk in two cases. Attention should also be taken about the risk of contamination by blood transfusion for ZIKV and different arboviruses that co-flow in the American continent, for example, DENV and CHIKV¹³.

Sexual transmission of Zika virus is conceivable, even amid pregnancy. Current data about conceivable sexual transmission of Zika depends on reports of three cases. The first was likely sexual transmission of Zika virus from a man to a woman, in which sexual relations happened a couple of days before the man's symptoms onset. The second is an instance of sexual transmission as of now under scrutiny (unpublished information, 2016, Dallas County Health and Human Services¹⁴. The third is a solitary report of replicated Zika virus disengaged from semen at least 2 weeks and perhaps up to 10 weeks after ailment onset; reverse transcriptase-polymerase chain reaction testing of blood plasma sample gathered in the meantime as the semen sample did not recognize Zika virus (figure:2. The man had no sexual relations. Since no further testing was led, the span of perseverance of Zika virus in semen stays obscure¹⁵⁻¹⁶.

Figure: 2 Zika virus transmission cycle



Whether contaminated men who never generate indications can transmit Zika virus to their sex partners is obscure¹⁷. Sexual transmission of Zika

virus from tainted women to their sex partner has not been reported yet. Sexual transmission of several viruses, including those instigated by different viruses,

is decreased by steady and correct utilization of latex condoms¹⁸. ZIKV RNA and protein has likewise been identified in saliva, amniotic fluid, urine and placental tissues, highlighting the likelihood of different methods of transmission. Recently, infective viral particles have been identified in the saliva of two subjects who were tested positive for ZIKV, opening the likelihood of another method of individual to-individual transmission¹⁹.

GENETIC TESTING: -

The present gold standard test is RT-PCR however this remains inaccessible to most centers because of the related expense and a deficiency of trained staff. The critical requirement for new techniques for diagnostics that are accessible, precise and scalable were emphasized in the latest WHO report²⁰. While the WHO has baptized for fortifying of national competencies, most national research laboratories, don't have the equipment's or mastery to distinguish obscure pathogens in clinical specimens.

In the present ZIKV flare-up, it is difficult to completely understand how the virus could spread for over 10 years in Asia and the Pacific without being grabbed by various surveillance programs²¹. To sufficiently address the worldwide concern over vigilance to identify the emerging worldwide virus threat, nations require well equipped research laboratories for the identification of new or rising pathogens, and molecular investigation to permit the identification of antimicrobial resistance²².

CLINICAL MANIFESTATIONS: -

Recently, ZIKV disease was clinically reported to bring about a mild clinical symptom ranging from asymptomatic to a dengue like illness²³. The frequently reported side effects are a maculopapular rash (frequently pruritic), fever, joint pain or arthralgia, migraines and non-purulent conjunctivitis. Other side effects incorporate chills, asthenia, edema of the extremities, malaise, vertigo, myalgia, digestive disorder and cervical lymphadenopathy. Haematuria and haemospermia have likewise been reported²⁴.

In most symptomatic cases, ZIKV virus is self-limiting and usually last a couple of days, in spite of the fact that arthralgia might persevere for up to a month²⁵⁻²⁷. Haemorrhagic signs have not been perceived, but rather other serious manifestations have

been described, including neurological (Guillain-Barre disorder and meningoencephalitis) and immune system (thrombocytopenic purpura and leukopenia) intricacies and potentially microcephaly, other fetal mutations, and optical abrasions²⁸. Subject death was not reported until a year ago, when Brazilian health authorities confirmed two deaths, (35-year-old man and a 16-year-old women), notwithstanding the fetal and infant deaths in cases of suspected ZIKV-related microcephaly²⁹⁻³⁰.

TREATMENT AND PREVENTION: -

There is no individual treatment for ZIKV virus, but the utilization of fluids and acetaminophen (paracetamol) or dipyron is prescribed to control fever and body pain. In the instance of an itchy rash, antihistamines might be considered³¹. However, aspirin and other anti-inflammatory medications are not prescribed because of the increased risk of bleeding complications. There are no vaccination for ZIKV, and control measures depend on the disposal of mosquito vector reproducing foci³²⁻³³. Treatment of Zika virus disease is essentially supportive. Nonsteroidal anti inflammatory medications ought to be avoided unless dengue has been omitted. Creepy crawly repellents and mosquito chomp avoidance are suggested for health care specialist taking care of Zika patients³⁴.

It is reasonable to prescribe patients in the first two weeks after the onset of sickness to stick to chomp avoidance measures with a specific end goal to decrease the risk of secondary transmission³⁵. No antivirals are at present licensed for specific treatment against flaviviral viruses (excluding hepatitis C virus), in spite of the fact that in vitro studies with therapeutic antibodies, siRNA, and molecules against non-structural proteins (particularly NS3 and NS5 proteins) are in clinical trials. A couple of drugs are now available, for example, the tetracyclines, chloroquine, amodiaquine, and mefenamic acid have revealed in vitro inhibitory activities against flavivirus (for dengue virus), yet it is still too early to remark on their potential clinical benefits³⁶. On account of pregnant ladies, a few suggestions have been made: the assessment for manifestations of ZIKV virus; the laboratorial diagnosis amid the prenatal care; a fetal ultrasound for assessment of brain anomalies,

including microcephaly and intracranial calcifications is necessary³⁷.

CLOSING REMARKS: -

The topographical distribution of Zika virus has extended massively since 2007. The risk of ZIKA virus will further grow due to consistent increase in the volume of international travel, difficulties in controlling Aedes population, intrusion of Aedes species to more mild nations, and worldwide environmental change which might expand the topographical degrees favorable for the reproducing of mosquitoes. Nucleic acid amplification remains the fundamental diagnostic test for identification of Zika virus. Control measures currently depends on standard nibble avoidance measures by residents and travelers alike, and in addition incorporated vector management in the community. The sole contest of Zika virus disease doesn't lies on virus control, but then in potential sequelae of intrinsic virus and serious neurological complications. Further investigations might give bits of knowledge to the pathogenic mechanism, prior and more sensitive pointers of congenital abnormalities, and the potentials of emergency vaccination.

Molecular investigations of ZIKV are intensely anticipated to comprehend whether a mutation in the virus can explain the quick spread and the serious concerns of virus. Without a ZIKV vaccination, control endeavors so far lay completely on mosquito vector control both at community and family levels and aversion of mosquito chomps by people. Strong strategies for forestalling spread by blood transfusions, through sexual relationship (if confirmed), other tissue & organ transplantation are required. Travel limitations to ZIKV endemic zones for pregnant women, and postponing pregnancy for women living in zones encountering ZIKV outburst have been prescribed. The Development and accessibility of specific and quick investigative tests for ZIKV will permit upgraded surveillance and evaluating level of risk for microcephaly, Guillain-Barre. There is no specific treatment or vaccine available to treat ZIKV disease. Research into rapid investigation, medicines and vaccination are in early phases of clinical trials. The rise of ZIKV soon after the Ebola outburst, is yet another update for the dire

requirement for a coordinated Global effort to have sufficiently resourced Rapid Response Groups for proactive reconnaissance and conduct of priority investigation in emergency circumstances.

Conflicts of Interest Statement: -

The Authors declare no conflicts of interest.

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