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A REVIEW ON ZIKA VIRUS

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ABSTRACT

In this review article, we try to mention all information regarding Zika virus. The Zika virus was virus discovered in 1947 in Uganda in mosquitos in the genus *Aedes*. From the 1960s to 1980s, human infections were found across Africa and Asia typically accompanied by mild illness The virus was first isolated from a rhesus macaque monkey had been placed in a cage in the Zika Forest of Uganda, near lake Victoria in April 1947. The virus was identified almost 70 years ago. The pregnant women who become infected with Zika virus could able to transmit the disease to their unborn babies, with serious complications. Zika virus disease outbreaks were reported for the first time from the Pacific in 2007 and 2013 (French Polynesia, respectively) and in 2015 from the Americas (Brazil and Colombia) and Africa (Cape Verde). Approximately one person in five who becomes infected with Zika is likely to have symptoms like a clinical illness arthralgia, notably of small joints of hands and feet, with possible swollen joints, conjunctivitis, post-infection fatigue. No specific antiviral treatment is available for Zika virus infection. Treatment is generally supportive and can include rest, fluids and use of analgesics and antipyretics. But as the Prevention Concern, all travelers are advised to take the mosquito bite prevention measures when travelling to areas currently affected by Zika virus or wherever mosquito borne diseases are present. These precautions are necessary in the daytime as well as night time.

KEYWORD: Zika virus, Arthralgia, Aedes, Conjunctivitis, mosquito etc.

1) INTRODUCTION

Zika a flavi virus transmitted mainly by mosquitos in the genus *Aedes*, was discovered in 1947 in Uganda. From the 1960s to 1980s, human infections were found across Africa and Asia typically accompanied by mild illness. The first large outbreak of disease caused by Zika infection was reported from the Island of Yap (Federated States of Micronesia) in 2007,

as the virus moved from south-east Asia across the Pacific.[1] During 2013-14 outbreak in French Polynesia, the neurological disorder Guillain Barré syndrome was linked to Zika infection. In South America, the first reports of locally transmitted infection came from Brazil in May 2015. In July 2015 Brazil reported an association between Zika virus infection and GBS. In October 2015 Brazil reported an association between Zika virus infection and microcephaly forrn either event was a causal link proven.[2]

In February 2016, as infection moved rapidly through the range occupied by *Aedes* mosquitos in the Americas, WHO declared that Zika infection associated with microcephaly and other neurological disorders constitutes a Public Health Emergency of International Concern (PHEIC). By the start of February 2016, local transmission of Zika infection had been reported from more than 20 countries and territories in the Americas and an outbreak numbering thousands of cases was under way in Cabo Verde, western Africa. Beyond the range of mosquito vectors, Zika virus infections are expected to be carried worldwide by international travelers.[3]

- **Description of virus**
- Zika virus (ZIKV) is a member of the Flaviviridae virus family and the Flavivirus genus, transmitted by daytime-active Aedes mosquitoes, such as A. aegypti.[4]
- The virus was first isolated in April 1947 from a rhesus macaque monkey that had been placed in a cage in the Zika Forest of Uganda, near Lake Victoria, by the scientists of the Yellow Fever Research Institute. A second isolation from the mosquito A. africanus followed at the same site in January 1948. When the monkey developed a fever, researchers isolated from its serum a transmissible agent that was first described as Zika virus in 1952.
- ZIKV is an RNA virus containing 10,794 nucleotides encoding 3,419 amino acids. It is closely related to Spondweni virus; the 2 viruses are the only members of their clade within the mosquito-borne cluster of flaviviruses. Studies in the Zika Forest suggested that ZIKV infection blunted the viremia caused by yellow fever virus in monkeys but did not block transmission of yellow fever virus.[4]

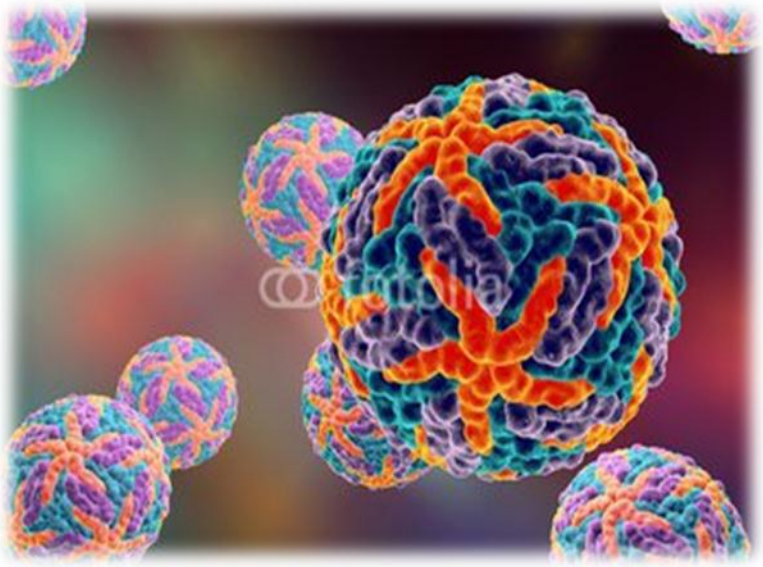

Fig.1. Zika Virus

2) Route of Transmission

Transmission of Zika virus is through the bite of an infected mosquito, most commonly *Aedes aegypti*.

There are no reports at this time of infants becoming infected through breast feeding. Initially, two instances of likely sexual transmission were reported internationally, one in 2008 and the other in 2016 Error! Bookmark not defined. To date, all reports of suspected or confirmed sexual transmission of Zika virus infection have involved a symptomatic man transmitting the virus to a woman. Zika virus has also been found in the semen of cases.[5]

➢ **Zika virus and pregnancy**

There are concerns that pregnant women who become infected with Zika virus could transmit the disease to their unborn babies, with potentially serious consequences, although no causal link has yet been established. Reports from several countries, most notably Brazil, where Zika virus outbreaks are occurring and published studies, indicate that there has been a concurrent increase in severe congenital abnormalities such as microcephaly. Additional research is necessary and ongoing to determine whether there is a causal link between Zika virus and adverse fetal outcomes.

Until more is known about Zika virus and taking a cautious approach, we advise women who are pregnant (in any trimester) or who plan to become pregnant to consider postponing travel to any area where Zika virus transmission is ongoing (refer to the Department of Health

webpage). If women do decide to travel, they are advised to talk to their doctor first and strictly follow mosquito bite prevention measures.

Women who are pregnant and travelled to areas where there was ongoing Zika virus transmission at the time of travel are advised speak with their health care provider. Testing for Zika virus is recommended. Follow up with an obstetric specialist is recommended if a positive test is returned. It is not possible at the current time to quantify the risk to the unborn baby of a person infected with Zika virus and a positive test in the mother gives no information on whether the fetus is infected or harmed. For guidance on assessing pregnant women returning from areas with ongoing Zika transmission please refer to the Interim recommendations for assessment of pregnant women returning from Zika virus-affected areas.

Further information on management of a pregnant woman who has had a positive Zika test is available in the RANZCOG guideline *Care of women with confirmed Zika virus infection during pregnancy in Australia*. Non-pregnant women who have travelled to an area with ongoing Zika virus transmission should defer pregnancy for 28 days following the last potential exposure. If her partner has also been exposed, please see the recommendations on sexual transmission.[6]

- Zika virus is transmitted to people through the bite of an infected mosquito from the Aedes genus, mainly Aedes aegypti in tropical regions. This is the same mosquito that transmits dengue, chikungunya and yellow fever.

Fig.2 Zika Viral Infection is arbovirus infection

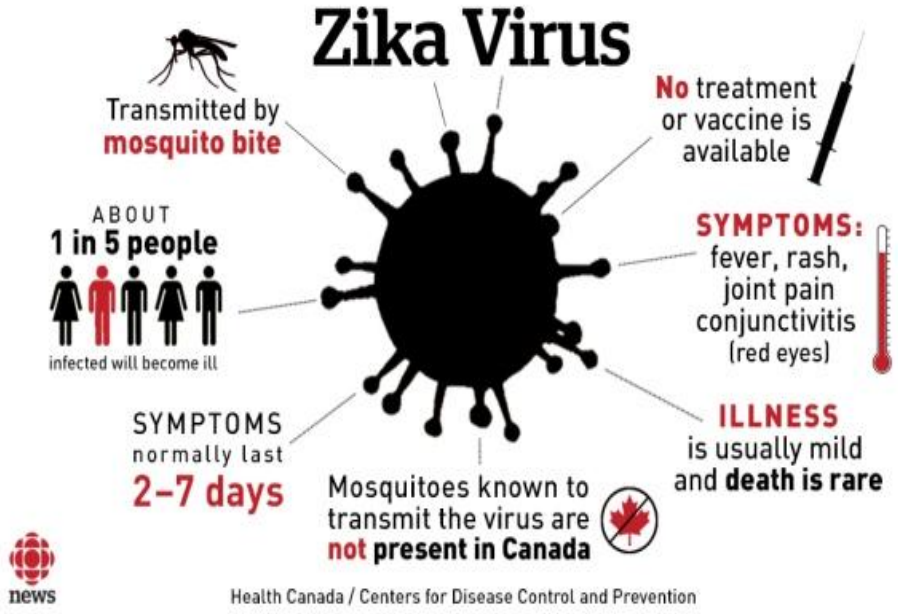

Fig.3 Transmission of Zika Virus

- The virus was identified almost 70 years ago and so why did it suddenly begin to affect so many humans and why has it spread so fast? Well, scientists believe that these types of viruses can evolve very fast and so Zika presumably evolved so that it could be transmitted by the mosquito.[7]
- Spread of the virus through blood transfusion and sexual contact has been reported.

Fig. 4 Through infected blood

- Zika virus is transmitted by daytime-active mosquitoes and has been isolated from a number of species in the genus Aedes, such as A. aegypti and arboreal mosquitoes such as A. africanus, A. apicoargenteus, A. furcifer, A. hensilli, A. luteocephalus and A. vitattus. Studies show that the extrinsic incubation period in mosquitoes is about 10 days.[8]

Fig.5 Many Types of Mosquitoes spread Zika viral infections

- Zika virus disease outbreaks were reported for the first time from the Pacific in 2007 and 2013 (Yap and French Polynesia, respectively) and in 2015 from the Americas (Brazil and Colombia) and Africa (Cape Verde). In addition, more than 13 countries in the Americas have reported sporadic Zika virus infections indicating rapid geographic expansion of Zika virus.[9]

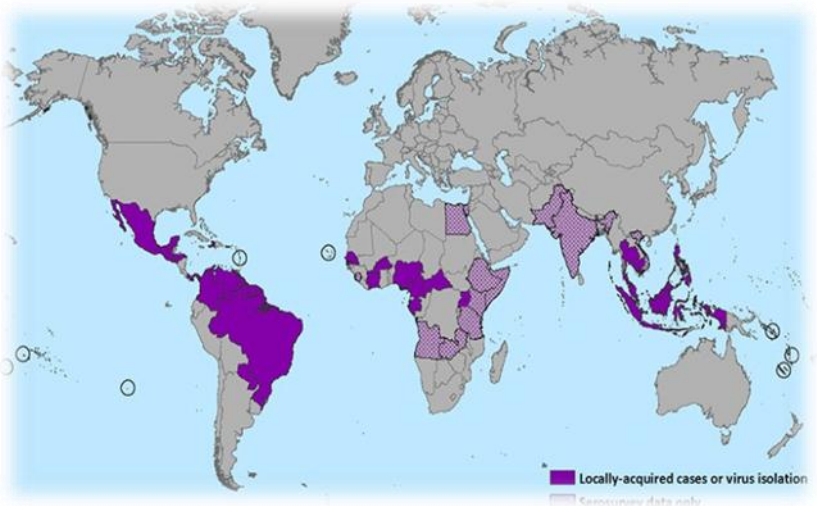

Fig.6 Zika Virus reported in Many Countries

- A mother already infected with Zika virus near the time of delivery can pass on the virus to her new-born around the time of birth, but this is rare.
- It is possible that Zika virus could be passed from mother to foetus during pregnancy. This mode of transmission is being investigated.
- To date, there are no reports of infants getting Zika virus through breastfeeding. Because of the benefits of breastfeeding, mothers are encouraged to breastfeed even in areas where Zika virus is found.[10]

3) Symptoms

Approximately one person in five who becomes infected with Zika is likely to have symptoms. For cases with a clinical illness, symptoms may include:

• Low-grade fever
• Arthralgia, notably of small joints of hands and feet, with possible swollen joints
• Myalgia
• Headache, retro-ocular headaches
• Conjunctivitis
• Coetaneous macula popular rash
• Post-infection fatigue

More rarely observed symptoms include digestive problems (abdominal pain, diarrhoea, constipation), mucous membrane ulcerations (aphthae) and pruritus. Zika virus infection generally causes a non-severe disease (with the possible exception of the effects to the fetus in pregnant women and the possibility of Guillain-Barré Syndrome (GBS), which are discussed below). As Zika infection may cause a rash that could be confused with other diseases such as measles or dengue, these more serious diseases need to be ruled out. Diagnosis of Zika virus infection will firstly be by exclusion, based on symptoms, travel history and exclusion of other diseases including measles and dengue.

The incubation period is typically 3–12 days. There is no specific therapy for Zika virus infection and acute symptoms typically resolve within 4-7 days.

➢ **Association with Guillain-Barré Syndrome (GBS)**

In French Polynesia, after a local Zika virus outbreak in 2013 and 2014, an increase in autoimmune and neurological diseases (including GBS) was observed1. Further reports and studies have also noted this temporal association and there is strengthening evidence of a

causative link. The simultaneous circulation of dengue serotype 1 and 3 viruses may also play a role2,3. Increased numbers of cases of GBS are also being reported from Colombia, Venezuela, Brazil, El Salvador and Suriname4. Some of these cases have a history of symptoms consistent with Zika virus infection (with or without laboratory confirmation), while others do not. In French Polynesia, all 42 GBS cases identified during the 2013 – 2014 Zika virus outbreak tested positive for Zika virus infection5, and 56% of controls were infected with Zika virus6. The cause of the increase in GBS incidence observed in Brazil, Colombia, El Salvador, Venezuela and Suriname is not fully explained and dengue, chikungunya and Zika virus have all been circulating simultaneously in the Americas. In some countries, there have been confirmed Zika virus infections in some of the GBS cases, but not in others. It is to be noted that GBS is a known complication of a number of different diseases, including infections with campylobacter, influenza, Epstein - Barr virus, HIV and Mycoplasma pneumonia. In addition, GBS can occur following surgery or in those with Hodgkin's lymphoma. In rare cases it can be life-threatening in the absence of appropriate care.[11]

4) Diagnosis

Based on the typical clinical features, the differential diagnosis for Zika virus infection is broad. In addition to dengue, other considerations include leptospirosis, malaria, Rickettsia, group A Streptococcus, rubella, measles and Parvovirus, Enterovirus, Adenovirus and Alphavirus infections (e.g., Chikungunya, Mayaro, Ross River, Barmah Forest, O'nyong-nyong and Sindbis viruses). Preliminary diagnosis is based on the patient's clinical features, places and dates of travel and activities. Laboratory diagnosis is generally accomplished by testing serum or plasma to detect virus, viral nucleic acid, or virus-specific immunoglobulin M and neutralizing antibodies.

5) Treatment

No specific antiviral treatment is available for Zika virus infection. Treatment is generally supportive and can include rest, fluids and use of analgesics and antipyretics. Because of similar geographic distribution and symptoms, patients with suspected Zika virus infections also should be evaluated and managed for possible dengue or chikungunya virus infection. Aspirin and other nonsteroidal anti-inflammatory drugs (NSAIDs) should be avoided until dengue can be ruled out to reduce the risk of haemorrhage.[12]

There is a risk of transmission of Zika virus from infected returning travellers in areas of North Queensland where a suitable vector, *Aedes aegypti*, occurs and which are currently considered dengue receptive. In these areas, public health authorities follow up on notified cases to mitigate the risk of local transmission. Cases in areas where transmission could occur will be advised to take additional measures to avoid being bitten by mosquitoes until fever subsides.[12]

6) Prevention

➢ **Mosquito bites**

All travelers are advised to take the following mosquito bite prevention measures when travelling to areas currently affected by Zika virus or wherever mosquito borne diseases are present. These precautions are necessary in the daytime as well as night time.

• Wear long-sleeved shirts and long pants.
• Use insect repellents containing DEET or picaridin. Always use as directed.
• Insect repellents containing DEET or picaridin, are safe for pregnant and breastfeeding women and children older than 2 months when used according to the product label.
• If you use both sunscreen and insect repellent, apply the sunscreen first and then the repellent.
• Use permethrin-treated clothing and gear (such as boots, pants, socks and tents).
• Use bed nets as necessary.
• Stay and sleep in screened-in or air-conditioned rooms.[13]

➢ **Sexual transmission**

Given the current uncertainty and the potentially serious implications of sexual transmission of the virus to a pregnant woman, recommendations to reduce the risk have been developed. Further details can be found at Interim recommendations for reducing the risk of sexual transmission of Zika virus.

• Men who have travelled to an area with ongoing Zika virus transmission, whose partner is pregnant should abstain from sexual activity (vaginal, anal, or oral) or consistently use condoms for the duration of the pregnancy, whether symptomatic or asymptomatic.
• Men who have had a confirmed Zika virus infection, whose partner is not pregnant should abstain from sexual activity (vaginal, anal, or oral) or consistently use condoms for 3 months following the resolution of symptoms.

This cautious advice is directed toward the population of most concern: pregnant women and those planning pregnancy; however partners of men with a confirmed Zika virus infection would also be protected from potential sexual transmission by this advice.

This is of most relevance to people in North Queensland where the vector is present and the potential for further spread of the virus is present.[14]

- **Blood transfusion**
- **Case Deferral**

A person diagnosed with Zika virus infection should be advised that they cannot donate blood for a minimum of 4 weeks after recovery of all symptoms.

- **Sexual Contact Deferral**

A sexual contact of a person diagnosed with Zika virus infection should be advised that donation is not possible for four weeks after sexual contact with someone who;

• Has recovered from Zika virus infection in the preceding three months.[15]

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