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Zika Virus
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Introduction

The Zika virus (Zika) was first discovered in 1947 in Uganda, with only 14 cases reported before 2007 (Centers for Disease Control and Prevention, 2016). Over the last two years, however, this virus, formerly confined to the tropical regions of Africa and South East Asia, has been reported in South and Central America, Mexico, parts of the Caribbean, Polynesia, with the reports continuing to grow. In February, 2016, the World Health Organization reported that Zika has been elevated to a Public Health Emergency of International Concern. The spread of Zika is alarming because it has been associated with severe fetal brain defects, Guillain-Barré syndrome (GBS) and encephalitis. Transmission primarily through the Aedes aegypti and Aedes albopictus mosquitoes and is also spread by sexual contact. Further, many of those infected show no signs or symptoms, making accidental spread possible. As of this date, there is no vaccine or treatment (CDC, 2016).

This topic is significant because it underlines the importance of awareness and prevention for those that may be at risk of contracting or spreading Zika. It is very important that health care workers are educated on the disease process and nursing implications of this potentially devastating virus.

Underlying Pathophysiology

Viruses are intracellular parasites that depend on host cells. The structure is a ribonucleic acid (RNA) or deoxyribonucleic acid (DNA), with a protective coating. To fight viral infections, the body will release interferons that block viral intracellular replication. It does this by recognizing the antigen change on an infected cell’s surface. However, enveloped viruses release through budding, in which viral particles are coated with the healthy cell’s original plasma membrane, making recognition much more difficult.

When a mosquito with Zika bites a human, it infects the virus, thus its saliva, before the epidermis. Dermal keratinocytes, keratinocytes and immature dendritic cells are all presumed targets of the virus and support their replication (Lazar, Stringer & de Ikaa, 2016). Zika appears to multiply in the mosquito midgut to form a positive strand RNA genome, multiplying or replicating before it is transmitted to another host, making accidental spread possible. As of this date, there is no vaccine or treatment (CDC, 2016).

Signs and Symptoms

According to the Centers for Disease Control, only an estimated 20% of people infected with the Zika virus will ever show symptoms (2016). The most frequently reported symptoms are:

- Fever
- Rash
- Conjunctivitis
- Myalgia and arthralgia pain
- Headache

The illness usually persists as a mild cold or flu which can last up to a week. For this reason, many people do not realize they have been infected and do not seek medical treatment. This makes tracking nearly impossible.

Significance of Pathophysiology

The spread of Zika has been elevated over the past few years.

- Between 1947 and 2007 – 14 cases, with 0 deaths, hospitalizations or neurological complications reported.
- 2007, 5 cases were confirmed on the island of Yap.
- 2014, 403 cases were reported in French Polynesia with outbreaks in Easter Island, the Cook Islands and New Caledonia.
- Reports now indicate an association with congenital malformations, severe neurological and autoimmune complications and microcephaly and GBS (Procop & Rezaien, 2016).

Experts speculate that the rise in communicability and virulence could be due to antigenic drift, extreme weather patterns, travel and/or urbanization, however, the definitive cause of the emergence remains uncertain. In April, 2016, the CDC announced its position that Zika causes microcephaly and other birth defects. While there is no “smoking gun,” the link between Zika and birth defects is partially due to timing; dramatic increases in infants born with microcephaly appeared along with dramatically increased cases in confirmed Zika infections. In addition, Zika has been detected in a fluid and a few newborns born with microcephaly and a significant proportion of Zika infected women had fetuses that developed birth defects including microcephaly (Wong et al., 2016). The CDC defines microcephaly as a condition where “…a baby’s brain has grown. In February, 2016, the World Health Organization reported that Zika has been elevated to a Public Health Emergency of International Concern. The virus and support their replication (Lazar, Stringer & de Ikaa, 2016). Zika appears to multiply in the mosquito midgut to form a positive strand RNA genome, multiplying or replicating before it is transmitted to another host, making accidental spread possible. As of this date, there is no vaccine or treatment (CDC, 2016).

The virus is:

- Enveloped, isosahedral positive strand RNA virus
- Related to yellow fever, dengue, West Nile, and Japanese encephalitis viruses
- Found mainly in the saliva of the Aedes mosquitoes
- Is transmitted from mosquito to human, mother to child, through sexual contact, blood transfusion and laboratory exposure (CDC, 2016)

Zika has also been identified in human saliva, urine and breast milk (Malone et al., 2016).

Significance of Pathophysiology

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Infection

Zika is transmitted from mosquito to human, mother to child, through sexual contact, blood transfusion and laboratory exposure (CDC, 2016). Zika has also been identified in human saliva, urine and breast milk (Malone et al., 2016).

Implications for Nursing Care

Because there is no treatment or vaccine for Zika, health care providers should focus their attention on education and prevention. It is important to understand the risks of traveling to Zika affected areas, how to protect yourself and your family, and what to do if you suspect you are infected.

- Prevent mosquito bites by wearing long sleeve shirts, use effective insect repellent, when outside use barriers such as nets and screens. Stay in air conditioned places when possible – mosquitoes hate the cold.
- Involve the community by organizing clean-up campaigns. Remove standing water, use control measures to reduce vector populations.
- Consult pregnant women or women of child bearing years on the risks and precautions of traveling to areas affected by Zika or warm areas where mosquito borne transmission may occur.
- Educate the public on the risks of contracting Zika, GBS and possibility of Transmitting the virus through sexual contact. Sexually contact that results in a pregnancy, or transmission to an already pregnant partner, could impact the health of the fetus.
- Provide information to those already infected with Zika on how to prevent transmission to others, prenatal care, infant monitoring for developmental milestones and signs of birth defects, and signs and symptoms of GBS.
- Ethical considerations include limiting travel, contraception, delayed family planning, and other issues that may be very difficult to confront.

Conclusion

Zika has been in existence for decades, however, the recent epidemic and recent links to delinkating neuropathological disorders and devastating birth defects has the scientific community racing to control its spread and harm. Though experts now agree that Zika causes microcephaly and GBS, the causal link has not been determined.

In the absence of facts, the public may “fill in the blanks” on the present and future implications of this virus.

References Cited


Additional Sources


Figure 2. Zika summary timeline by T. Unwin, 2016.

Figure 3. Ludwilla Haddiza Osu de Vazconcelos was born November, 2016 with microcephaly in Recife, Brazil. Getty Images, 2016.