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REVIEW

Zika: Management by health workers

Zika: Manejo por parte del personal de Salud

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ABSTRACT

Viruses are among the smallest infectious agents (20-300 nm) known to date. Their genome consists of a single type of nucleic acid (DNA or RNA), covered by a capsid and some also by a lipoprotein envelope. They are obligate intracellular parasites. By consulting 11 bibliographic references, with the aim of describing the characteristics of Zika virus infection and its management in healthcare workers. The Zika virus, transmitted by the Aedes Aegypti mosquito present in several territories of our country, produces symptoms very similar to dengue and Chikungunya, therefore the most important measure to prevent transmission is the control of this biological vector. The main clinical manifestations are fever, skin lesions and joint pain; complications are infrequent, such as Guillain-Barré syndrome and microcephaly in newborns. Although treatment is symptomatic, health workers must also act as an epidemiological watchdog to prevent the emergence of new cases. The explosive spread of the virus to new geographical areas in the Americas is a cause for concern for our country.

Keywords: Zika; Emerging Diseases; Infectious Diseases; Infectious Diseases.

RESUMEN

Los virus se encuentran entre los agentes infecciosos más pequeños (20-300 nm) conocidos hasta el momento. Su genoma se compone por un solo tipo de ácido nucleico (ADN o ARN), recubiertos por una cápside y algunos, además, por una envoltura lipoproteica. Constituyen parásitos intracelulares obligados. Al consultar 11 referencias bibliográficas, con el objetivo de describir las características de la infección por el virus Zika así como su manejo en el personal de salud. El virus Zika, transmitido por el mosquito Aedes Aegypti presente en varios territorios de nuestro país, produce síntomas muy parecidos al dengue y al Chikungunya, por lo tanto la medida más importante para evitar la transmisión es el control sobre dicho vector biológico. Las manifestaciones clínicas principales son la fiebre, lesiones en la piel y dolor articular, las complicaciones son infrecuentes como el síndrome Guillain-Barré y microcefalia en recién nacidos. A pesar que el tratamiento es sintomático el personal de salud debe comportase además como un vigilante epidemiológico en función de evitar la aparición de nuevos casos. La propagación explosiva del virus a nuevas áreas geográficas en el continente americano es motivo de preocupación para nuestro país.

Palabras clave: Zika; Enfermedades Emergentes; Enfermedades Infecciosas.

INTRODUCTION

Viruses are among the smallest infectious agents (20-300 nm). Their genome consists of a single type of nucleic acid (DNA or RNA), covered by a capsid and some also by a lipoprotein envelope. They are obligate intracellular parasites.[(1)]

They are classified according to several aspects:

- virion morphology
- Physico-chemical properties of the virion
- Genomic properties
- Protein Properties
- Antigenic properties.
- Biological properties
- Clinical aspects and symptoms produced by the infection

There are many families of viruses, including flaviviruses, which have the general characteristics of an enveloped, symmetrical icosahedral nucleocapsid, whose genetic material is composed of a single strand of positively polar RNA. This family of more than 67 types of viruses recognized as important human pathogens are transmitted by vectors.[2]

Zika is a flavivirus first isolated in 1947 in the Zika forest in Uganda, Africa. Since then, it has been found mainly in Africa, generating small and sporadic outbreaks in Asia. In 2007, a large epidemic was described on Yap Island (Micronesia), where about 75 % of the population was infected.[3]

Viral pathogenesis begins with infection of dendritic cells near the site of inoculation, followed by dissemination to the lymph nodes and bloodstream. Flaviviruses generally replicate in the cytoplasm, but Zika virus antigens have been found within the cell nucleus.

There are two Zika virus lineages: African and Asian. Some phylogenetic studies indicate that the strains spreading in the Americas are most closely related to viruses from French Polynesia. The complete genome sequences of the virus have been published. Preliminary studies of these findings show a possible change in the function of the non-structural protein codon 1, which could increase the rate of viral replication in humans.[4]

The bite of infected Aedes mosquitoes causes Zika virus infection and typically causes mild fever, rash, conjunctivitis, and muscle aches.

Given the epidemiological alert this virus represents for our nation, this literature review was conducted to describe the characteristics of Zika virus infection and its management by health personnel.

DEVELOPMENT

Clinical features and complications

The most common symptoms of Zika are mild fever and rash. They are often accompanied by conjunctivitis, muscle or joint pain, and general malaise beginning 2-7 days after the bite of an infected mosquito.[5]

Other symptoms include:

- Non-purulent conjunctivitis.
- headache
- Retrorbicular pain.
- Vomiting.
- Oedema in the lower limbs may also be seen in the hands.
- weakness
- abdominal pain
- diarrhoea
- lack of appetite

One in four infected people develop symptoms of the disease, and in those who do, the illness is usually mild and can last between 2 and 7 days. Symptoms are similar to those of Dengue or Chikungunya, which are also transmitted by the same type of biological vector. Complications (neurological, autoimmune) are rare but have been described in outbreaks in Polynesia and, more recently, in Brazil. The spread of the virus in the Americas will allow for a better characterization of this disease, with more experience in its symptoms and complications.

In areas where a Zika epidemic has been documented (such as French Polynesia and Brazil), an increase in people with Guillain-Barre syndrome (GBS) has been observed. However, a direct causal relationship between Zika virus infection and GBS has not yet been established. Other factors, such as previous dengue infection or genetic factors, may contribute to or influence the increase in GBS cases. Several studies are underway to establish better the relationship between Zika and GBS.[6]

Guillain-Barré syndrome occurs when a person's immune system attacks itself, particularly affecting nervous system cells. This process can be initiated by infection with various viruses or bacteria. The main symptoms include muscle weakness, tingling/tingling (paraesthesias) in the arms and legs, and can lead to serious complications if the respiratory muscles are affected. More severe patients require care in intensive care units.[4]

Under investigation: What effect might this virus have on fetuses? On 28 November 2015, the Brazilian Ministry of Health established the link between the increase of microcephaly in the northeast of the country and Zika infection. According to the preliminary analysis of the research conducted by the Brazilian authorities, the increased risk of microcephaly and malformations is probably associated with disease in the first trimester of pregnancy. With the support of the Pan American Health Organization (PAHO) and other agencies, health authorities are conducting several investigations that are expected to shed light on the cause, risk factors, and consequences of microcephaly.[7]

In some Brazilian states where Zika has been circulating for several months, a much larger increase in cases of newborns with microcephaly than in previous years has been reported. According to a preliminary analysis of the investigation by Brazilian authorities, the risk of microcephaly and malformations is likely to be associated with infection in the first trimester of pregnancy. Health authorities, with the support of PAHO and other agencies, are conducting several investigations that are expected to clarify the cause, risk factors, and consequences of microcephaly.

PAHO/WHO recommends that countries continue to promote access to antenatal care for pregnant women. Pregnant women and women of childbearing age are advised to avoid exposure to mosquito bites.[7]

Mode of transmission

This virus is transmitted to humans by the bite of infected Aedes mosquitoes, the same mosquito that transmits Dengue and Chikungunya.[4]

Despite the need for a vector as a means of transport for Zika, the virus has been isolated in semen, and human-to-human transmission through sexual transmission has been documented. The public health impact of this type of transmission has not yet been assessed, and based on available evidence, it is a rare mechanism of disease spread.[6,7]

Zika could be transmitted by blood, but this is an infrequent mechanism. The usual recommendations for safe transfusion (with healthy volunteer donors) should be followed in this regard.

Information regarding transmission from mother to fetus during pregnancy or at delivery is minimal. Perinatal transmission has been reported with other vector-borne viruses, such as Dengue and Chikungunya. Studies on possible mother-to-fetus transmission of the virus and its possible effects on the latter are currently underway.[7]

Epidemiology in the Americas

On 3 March 2014, Chile notified PAHO/WHO of the confirmation of a case of autochthonous transmission of Zika virus fever on Easter Island. The presence of the virus was detected until June of that year in that area. In May 2015, Brazilian public health authorities confirmed Zika transmission in the north-east of the country. From October 2015 to date, other countries and territories in the Americas have reported the presence of the virus, including Barbados, Bolivia, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Puerto Rico and Venezuela [8] (Annex 1).

Countries start reporting when they detect virus circulation in their territories. However, counting cases is difficult because the symptoms of the disease are often mild, and not all those affected seek health services. What is important is the detection of virus circulation to strengthen the health services' response and intensify surveillance for severe cases or complications.

Two factors for rapid transmission have been documented in other countries as well:

- This is a new virus in the Americas, and the entire population is susceptible to acquiring the Zika virus because they have not been previously exposed.
- The Aedes mosquito is widely distributed locally because of tropical countries' climate, temperature, and humidity conditions.

The World Health Organization (WHO) does not recommend travel or international trade restrictions related to Zika outbreaks. Travelers are advised to take appropriate precautions to prevent mosquito bites.

Diagnosis

In most people, diagnosis is based on clinical symptoms and epidemiological circumstances (Zika outbreak where you live, travel to areas where the virus is circulating).

Blood tests can help confirm the diagnosis. Some are useful in the first 3-5 days after symptom onset (PCR-virological), and other tests detect the presence of antibodies but are useful only after 5 days (serological).[9]

Once the virus has been demonstrated in an area or territory, confirmation in all patients is unnecessary, and laboratory assays will be adjusted to routine virological surveillance of the disease.

The similarity of symptoms and signs of Dengue and Chikungunya virus infection with Dengue and Chikungunya should be considered. However, some of them allow suspicion of one or the other:[4] Dengue usually has a higher fever and stronger muscle aches and pains. It can become more complicated when the fever drops, and

attention should be paid to warning signs such as bleeding.[2]

In Chikungunya, joint pain is more intense in addition to a higher fever and affects the hands, feet, knees, and back. It can even disable (bend) people from walking and performing actions as simple as opening a water bottle.[5]

Zika does not have particularly characteristic features, but most patients have skin rashes, and some have conjunctivitis.[2]

Risk approach and prevention

All people with no previous exposure to the virus who live in areas where the mosquito is present and imported or where local cases have been reported are susceptible to infection. As the Aedes species of mosquitoes are dispersed throughout the region (except mainland Chile and Canada), outbreaks will likely spread to other countries where no cases are currently reported.[4]

Prevention involves reducing mosquito populations and avoiding mosquito bites, mainly during the daytime. By eliminating and controlling the breeding sites of the Aedes Aegypti mosquito, the chances of transmitting Zika, chikungunya, and dengue are reduced. It requires a comprehensive response involving several action areas, from health education to the environment.

To eliminate and control the mosquito, it is recommended:[4,5,10]

- Avoid keeping water in outdoor containers (flower pots, bottles, containers that can accumulate water) to prevent them from becoming mosquito breeding sites.
- Cover domestic water tanks or reservoirs to prevent mosquitoes from entering.
- Avoid accumulating rubbish, dispose of it in closed plastic bags, and keep it in closed containers.
- Unclog drains that can leave standing water.
- Using screens/mosquito nets on windows and doors also helps to reduce mosquito contact with people.
- To avoid mosquito bites, it is recommended that people living in areas where there are cases, travelers, and especially pregnant women should avoid mosquito bites.
- Cover exposed skin with long-sleeved shirts, trousers and hats.
- Use repellents recommended by health authorities and apply as directed on labels.
- Sleep in places that are protected by mosquito nets.

PAHO is actively working with countries in the Americas to develop or maintain the capacity to detect and confirm cases of Zika, training on how to care for people affected by the disease, and implementing effective strategies to reduce the presence of the mosquito and minimize the possibility of an outbreak. The support manifests itself:

- Strengthening the capacity of laboratories to detect the virus promptly (in collaboration with other collaborating centers and strategic partners).
- In advising on risk communication to respond to introducing the virus into the country.
- In vector control, i.e., how can we work actively with the population to eliminate mosquito populations?
- Developing recommendations for clinical care and follow-up of people with Zika in collaboration with professional associations and country experts.
- Monitoring the geographic spread of the virus and the emergence of complications and severe cases through event surveillance and country reporting through the International Health Regulations channel.
- Support is being given to initiatives by ministries of health to learn more about the characteristics of the virus, its impact on health, and the possible consequences of infection.

Cuba recently issued a report by the Ministry of Public Health: 'Informative note on Zika, Chikungunya and Dengue',[11] which states that our country is taking measures to prevent the introduction of the disease and, if a person enters the country with the disease, to act immediately to prevent transmission. No case has been detected with clinical manifestations compatible with Zika virus disease. However, all non-specific febrile syndromes are monitored and studied for early identification of the presence of these diseases.

In 2015, dengue transmission occurred in some provinces of the country, and 28 imported cases of Chikungunya were diagnosed. No new cases were diagnosed in 2016.

Treatment and management by health personnel

Treatment consists of relieving pain and fever or any other symptoms that cause discomfort to the patient. To avoid dehydration, it is recommended that the fever be controlled and that the patient rest and drink plenty of water. There is no specific vaccine or medication against this virus.[4]

This is a virus recently introduced in the region. Until now, it has had a very limited geographic and

demographic distribution, with no evidence of lethality. However, sporadic cases have been reported in patients with pre-existing diseases or conditions, where manifestations and complications could be more severe, leading to death.[6]

Healthcare providers should monitor patient symptoms and parameters, take timely action, report suspected complications such as bleeding, motor or sensory deficits, and vomiting, and adhere strictly to epidemiological control measures such as staying under a mosquito net and screening for febrile illness.

CONCLUSIONS

The Zika virus, transmitted by the Aedes Aegypti mosquito present in several territories of our country, produces symptoms very similar to dengue and Chikungunya. Therefore, the most important measure to prevent transmission is the control of this biological vector.

The main clinical manifestations are fever, skin lesions, and joint pain; complications are infrequent, such as Guillain-Barré syndrome and microcephaly in newborns.

Although treatment is symptomatic, health workers must also act as an epidemiological watchdog to prevent the emergence of new cases.

The explosive spread of the virus to new geographical areas in the Americas is a cause for concern for our country.

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FINANCING

None.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

AUTHORSHIP CONTRIBUTION

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