Arboviruses

Arboviruses is a term used to describe a group of RNA viruses transmitted to humans by blood-sucking arthropods from one vertebrate host to another. There are many strains of arbovirus.

The viruses range in severity from no symptoms to mild flu-like symptoms to very severe symptoms. Avoiding insect bites is key to preventing these nasty viral infections.

Insects that can infect humans with arboviruses include fleas, ticks, gnats, and mosquitoes. There are over 130 different arboviruses that affect humans.

Common types of arbovirus

There are many types of arboviruses. The different types of arbovirus are broken down into specific genera.

The three main genera for arboviruses that cause infections in humans are as follows:

- flavivirus
- togavirus

- bunyavirus

Types of flavivirus include the following:

- yellow fever
- West Nile virus
- Zika virus
- dengue fever
- Japanese encephalitis

Types of togavirus include the following:

- Ross River virus
- Eastern equine virus
- Western equine virus

Types of bunyavirus include the following:

- California encephalitis
- La Crosse virus
- Jamestown Canyon virus

Transmission

The arboviruses spread mainly through insect bites. The most common insect that spreads arboviruses is the mosquito. However, other

arthropods such as ticks, fleas, and gnats can also spread these diseases if they bite a human.

While insect bites are the most common way arboviruses are transmitted, the viruses can also spread through:

- blood transfusion
- organ transplant
- sexual contact
- pregnancy and childbirth from mother to child

Human to human transmission of most arboviruses through casual, everyday contact has not been documented.

Symptoms

Most infections caused by arboviruses do not have symptoms. However, when they do, symptoms can range from a mild flu-like illness to encephalitis, a potentially life-threatening inflammation and swelling in the brain.

The clinical characteristics and symptoms are divided into two subgroups: neuroinvasive and non-neuroinvasive.

Neuroinvasive diseases cause symptoms indicating that the disease can infect the nervous system, while non-neuroinvasive diseases do not.

Neuroinvasive arboviruses often cause meningitis or encephalitis. Symptoms of neuroinvasive arboviruses include the sudden onset of fever accompanied by the following:

- headache
- stiff neck
- muscle pain
- confusion or disorientation
- weakness in the arms and legs
- seizures

Non-neuroinvasive arboviruses differ slightly in their symptoms. The nervous system is not affected, so they do not typically cause altered mental state, such as confusion or seizures.

However, non-neuroinvasive arboviruses can cause a fever in addition to the following symptoms:

- headache
- muscle aches
- joint pain
- upset stomach
- nausea, vomiting, or diarrhea
- rash

Laboratory Diagnosis of arbovirus

Diagnosis may be established by virus isolation or serology:-

- **Specimen:** Blood, CSF (Cerebrospinal fluid) and Brain may be used for isolation of virus. All Arboviruses are viremia – blood is collected during the acute phase of the disease. CSF is useful in encephalitis cases but the best specimen is the brain.
- **Isolation of the virus :**
    i. *Suckling mice* – specimens are inoculated intracerebrally into suckling mice. The animal may develop fatal encephalitis.
    ii. *Tissue culture* – Arboviruses may also be isolated in tissue cultures – Vero, BHK-21 and mosquito cell lines are inoculated with specimens. The growth of virus in cell cultures is identified by immunofluorescence, haemagglutination inhibition, complement fixation, ELISA or neutralization tests.
- **Serology:** Using ELISA, serotype-specific IgM antibody may be detected in patient serum within 1-3 days after the onset of illness.

Prevention

- While effective vaccines are available for some arboviruses, including Japanese encephalitis and yellow fever, there is not a vaccine for all arboviruses. Many other vaccines for arboviruses are currently being developed, however.
- The best way to prevent arboviral infections is by preventing insect bites, particularly in areas that have high incidences of arboviruses.

A person can help prevent insect bites by:

- using insect repellant
- wearing clothing that covers the limbs when outdoors
- tucking pants into socks
- wearing light colored clothing, so that insects are easy to spot

A person can also take steps to reduce the mosquito population in their home and yard.

- keeping pools and outdoor hot tubs clean and chlorinated
- putting away children's pools or wheelbarrows when not in use

Reducing the tick population will lessen the risk of tick borne arbovirus.