

## **Chikungunya encephalitis**

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### **What is chikungunya encephalitis?**

Encephalitis is an inflammation of the brain caused by an infection (virus, bacteria) or by the autoimmune system in error.

Chikungunya encephalitis is caused by a virus called chikungunya virus (CHIKV) which is transmitted by mosquitoes. This virus was first discovered in 1952 in Tanzania. Later, it was reported in Africa and Asia. Initially, people infected with the virus only developed febrile illnesses which manifested with fever, headache, nausea, vomiting, myalgia (muscle pain), rash and marked arthralgia (joint pain) that would last between one to ten days. Sometimes, people had persistent painful arthralgia causing difficulties to walk, when they would eventually walk in a bent fashion. That is why the virus is named chikungunya, a Swahili word for “the bent walker”.

In 2005-2006 there was a massive epidemic of CHIKV infection in La Reunion Island, a famous tourist destination in the Indian Ocean. By that time about a third of the island population was infected with more than two hundred people developing encephalitis. CHIKV later spread to India where again many cases of encephalitis were reported, especially among children and elderly. In 2015-2016, the same happened in the northeast region of Brazil.

As it is the case with all encephalitis types, irrespective of the cause, it is unknown as to why only some people develop chikungunya encephalitis after having chikungunya febrile illness. It is assumed that genetic and immunologic factors are involved.

### **What symptoms are there?**

Prior to symptoms of encephalitis, most patients have the febrile illness as described above (fever, headache, nausea, myalgia, rash and arthralgia). By day three to seven some patients develop confusion, behaviour disturbances, seizure and lethargy which are common symptoms for all types of encephalitis. Specific to chikungunya encephalitis is that patients develop acute renal failure needing to go on dialysis.

### **How is it diagnosed?**

Firstly, a thorough clinical evaluation of the patient is performed. If encephalitis is presumed, the cause needs to be investigated. The patient may be asked about the places visited in the last month (for example, has the patient been somewhere where is CHIKV circulating?).

If symptoms and history of the illness point to CHIKV, laboratory tests that look for the presence of CHIKV in the patient's blood and cerebrospinal fluid (CSF) are performed.

### **How is it treated?**

So far, there isn't a specific treatment for chikungunya encephalitis, except for general clinical support and symptomatic treatment for associated symptoms as fever, headaches and seizures.

### **Outcomes and impact**

Patients can have a good outcome and recover completely, but unfortunately this is not always the case. About a third of patients die and a third are left with cognitive sequelae. This can have a huge impact on family members who either may suffer the loss of their relative or have to deal with someone who may not be able to perform their regular activities anymore.

### **Prevention**

While there isn't currently a vaccine deployed against CHIKV, in 2023 the FDA approved the world's first vaccine against CHIKV. However, work remains to ensure the vaccine is widely accessible and affordable in developing countries most impacted by CHIKV outbreaks. If you live in or visit an area where the virus circulates, please take effective measures against mosquito bites.

Preventing mosquito bites:

- The most effective way of preventing the virus is to avoid the mosquito (vector) reproduction. **Avoid keeping items around the home that store water** e.g. plant pots and tyres.
- Using N,N-Diethyl-m-toluamide (DEET) mosquito repellent during the day and at dusk. It is recommended to use concentrations up to 50% (the higher the concentration, the longer the length of protection). It is safe to use in pregnancy and breastfeeding and in children older than two months.
- Wear long-sleeved clothing which may be treated with mosquito-repellent (permethrin).
- Sleep in rooms with air-conditioning and houses with mosquito screens on the windows and doors.
- Avoid keeping items around the home that store water e.g. plant pots and tyres.

### **The future**

Researchers are currently working on better understanding this illness. They are trying to identify risk factors to the illness and also to the bad outcomes. For instance, it is known that extremes of age and comorbidities (other illness such as diabetes) can be risk factors, but it is unknown as to why. Also researchers are looking for ways to understand who is at greater risk of developing serious consequences after the illness.

The advances in the diagnosis of infections using new diagnostic methods (such as metagenomics) have improved the management of these conditions. There are already great collaborations among researchers. However, fighting against this disease requires a great team effort.

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**Thank you!**

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