



Short Note on Diagnostic Test for Dengue Fever

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DESCRIPTION

Dengue fever is a mosquito-borne tropical disease caused by the dengue virus. Symptoms typically begin three to fourteen days after infection. These may include a high fever, headache, vomiting, muscle and joint pains, and a characteristic skin rash. Recovery generally takes two to seven days. In a small proportion of cases, the disease develops into a more severe dengue hemorrhagic fever, resulting in bleeding, low levels of blood platelets and blood plasma leakage, or into dengue shock syndrome, where dangerously low blood pressure occurs. The vaccine is only recommended in individuals who have been previously infected, or in populations with a high rate of prior infection by age nine. Other methods of prevention include reducing mosquito habitat and limiting exposure to bites. This may be done by getting rid of or covering standing water and wearing clothing that covers much of the body. Treatment of acute dengue is supportive and includes giving fluid either by mouth or intravenously for mild or moderate disease. For more severe cases, blood transfusion may be required. Paracetamol (acetaminophen) is recommended instead of nonsteroidal anti-inflammatory drugs (NSAIDs) for fever reduction and pain relief in dengue due to an increased risk of bleeding from NSAID use.

Dengue is spread by several species of female mosquitoes of the *Aedes* genus, principally *Aedes aegypti*. The virus has five serotypes; infection with one type usually gives lifelong immunity to that type, but only short-term immunity to the others. Subsequent infection with a different type increases the risk of severe complications. A number of tests are available to confirm the diagnosis including detecting antibodies to the virus or its RNA.

When a mosquito carrying dengue virus bites a person, the virus enters the skin together with the mosquito's saliva. It binds to and enters white blood cells, and reproduces inside the cells while they move throughout the body. The white blood cells respond by producing several proteins, such as cytokines and interferons, which are responsible for many of the symptoms, such as the fever, the flu-like symptoms, and the severe pains. In severe infection, the virus production inside the body is greatly increased, and

many more organs (such as the liver and the bone marrow) can be affected. Fluid from the bloodstream leaks through the wall of small blood vessels into body cavities due to capillary permeability. As a result, less blood circulates in the blood vessels, and the blood pressure becomes so low that it cannot supply sufficient blood to vital organs. Furthermore, dysfunction of the bone marrow due to infection of the stromal cells leads to reduced numbers of platelets, which are necessary for effective blood clotting; this increases the risk of bleeding, the other major complication of dengue fever.

Diagnostic Testing

The diagnosis of dengue is typically made clinically, on the basis of reported symptoms and physical examination; this applies especially in endemic areas. However, early disease can be difficult to differentiate from other viral infections. A probable diagnosis is based on the findings of fever plus two of the following are nausea and vomiting, rash, generalized pains, low white blood cell count, positive tourniquet test, or any warning sign in someone who lives in an endemic area. Warning signs typically occur before the onset of severe dengue.

IgG antibody testing

IgG detection by ELISA in a single serum sample is not useful for diagnostic testing because it remains detectable for life after a dengue virus infection.

Nucleic Acid Amplification Tests (NAATs)

For patients with suspected dengue virus disease, NAATs are the preferred method of laboratory diagnosis. NAATs should be performed on serum specimens collected 7 days or less after symptom onset. Laboratory confirmation can be made from a single acute-phase serum specimen obtained early (≤ 7 days after fever onset) in the illness by detecting viral genomic sequences with rRT-PCR or dengue Non-Structural (NS1) antigen by immunoassay. Presence of virus by rRT-PCR or NS1 antigen in a single diagnostic specimen is considered laboratory confirmation of dengue in patients with a compatible clinical and travel history.

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Received: 3-Jan-2022, Manuscript No. jtd-22-308; **Editor assigned:** 7-Jan-2022, Pre QC No. jtd-22-308 (PQ); **Reviewed:** 21-Jan-2022, QC No. jtd-22-308; **Revised:** 25-Jan-2022, Manuscript No. jtd-22-308 (R); **Published:** 1-Feb-2022, DOI: 10.35841/2329-891X-22.10.308.

Citation: Gordon D (2022) Short Note on Diagnostic Test for Dengue Fever. J Trop Dis. 10:308.

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