

Isolation of Dengue Virus Serotype 1 from the Blood of a Swiss Traveler Prior to Seroconversion

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Abstract

Dengue virus serotype 1 was isolated from the blood of a patient who had returned to Switzerland from Brazil with fever of unknown origin.

After 2 days of culture on *Aedes albopictus* (C6/36) cell line, the dengue virus was identified as serotype 1 using a type-specific indirect immunofluorescence assay. The diagnosis was confirmed by seroconversion of anti-dengue virus-specific IgM and IgG antibodies and by amplification of a serotype 1-specific region of the dengue virus genome.

This is the first description of dengue virus isolation from the blood of a traveler returning to Switzerland. We recommend detection of dengue viremia during the 1st week of illness, before serological tests usually yield conclusive results, as the most efficient means of early specific diagnosis.

Key Words

Dengue · Rapid diagnosis · Switzerland · Brazil · Cell culture

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Introduction

Dengue fever (DF) is an acute febrile illness caused by any of four different serotypes of the mosquito-borne dengue virus. Two more severe forms of DF, dengue hemorrhagic fever and dengue shock syndrome, can prove fatal. Dengue infection presently manifests as a global pandemic, with documented presence in more than 100 tropical and sub-tropical countries [1–4].

Dengue virus can infect travelers who visit tropical countries. As early symptoms of DF mimic other diseases, such as malaria, leptospirosis or influenza, rapid laboratory diagnosis is crucial for proper patient care [1–4].

Since serology alone, even with the measurement of anti-dengue virus IgM antibodies, is mainly of value more than 5 days after the onset of symptoms, viral culture plays an important role in the early diagnosis of dengue [3, 5–7].

We present the case of a traveler from whom dengue virus serotype 1 could be isolated in mosquito cell culture before serological tests became positive.

Case Report

A 41-year-old man became ill with fever, headache, conjunctivitis and arthralgia on his return flight from Brazil to Switzerland. During the preceding weeks he had stayed in an area near the Iguazu waterfalls, where there had been an epidemic of DF at the time. On the 3rd day of illness he presented at the Department of Medicine, Kantonsspital St. Gallen, with low-grade fever (38.8 °C), conjunctivitis of both eyes, reddening of the pharynx, as well as enlarged lymph nodes in the right axilla and the groin. Several puncture marks from mosquito bites were visible on his right buttock. He had been vaccinated against yellow fever. Repeated thick and thin blood malaria films and dengue serology were negative. Laboratory analysis revealed normochromic anemia (hemoglobin 12.7 g/dl), thrombocytopenia (132,000/μl), leukopenia (3,000/μl) with 27% bands and a shift to lymphocytopenia (19%) on the 4th day of illness. Further pathologic results were obtained for lactic dehydrogenase 475 U/l (normal < 450 U/l), α-amylase 61 U/l (normal < 53 U/l), aspartate aminotransferase 48 U/l (normal < 45 U/l) creatinine phosphokinase 943 U/l (normal < 170 U/l), an increased international normalized ratio of 1.3 and a prolonged partial thromboplastin time of 53 sec (range 28–41sec).

As his condition improved rapidly, he could be discharged on the 5th day of illness.

On the basis of all available evidence, DF was a highly likely diagnosis. Therefore, serum taken on the 3rd day of illness was inoculated into cell culture. Two days later the culture stained positive for flavivirus group antigen and dengue virus serotype 1, with a viral titer of 10^{4.5} TCD₅₀ after 5 days of incubation. Culture of a serum sample taken on day 21 after onset of symptoms was negative.

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