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Oral Session

Emerging infectious diseases

WEST NILE VIRUS EXCRETED IN URINE DURING ACUTE INFECTION IS INFECTIOUS

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Objective: Diagnosis of West Nile virus (WNV) infection is challenging because of cross-reactivity of serological assays and low viraemia at the time of symptom onset. We recently demonstrated the utility of WNV RNA testing in urine for the diagnosis of acute infection. Aim of this study was to demonstrate if the virus excreted with urine is infectious.

Methods: Three different cell culture conditions with two cell lines were set up for WNV isolation. Virus isolation was attempted with urine samples which had a positive WNV RNA test. Samples were collected during the surveillance activity performed Veneto Region, Italy, in 2013. To confirm WNV isolation, the presence of cytopathic effect (CPE) was monitored daily and quantitative real-time RT-PCR (qRT-PCR) was done in the supernatant of CPE-positive cell cultures to detect increased WNV RNA load. WNV isolates were then propagated in cell culture.

Results: Out of a total of 16 WNV RNA-positive urine specimens evaluated for viral isolation, WNV was isolated 6 cases, including 2 with WNV lineage 1 infection and 4 with WNV lineage 2. Of these 6 patients, 3 had a diagnosis of West Nile neuroinvasive disease, 1 had West Nile fever, and 2 were asymptomatic blood donors. The use of fresh vs. frozen samples and cell culture conditions were relevant for the success of WNV isolation. In positive cell cultures, CPE appeared from 3 to 5 days post-infection, depending on the cell type used. WNV RNA load determined by qRT-PCR in positive cell cultures ranged from 10⁴ to 10⁹ copies/mL, depending on the initial viral inoculum and the cell type used for isolation. Most of the patients from whom WNV was isolated were already WNV IgM and IgG-positive and the time since symptom onset ranged from 2 to 8 days, while WNV RNA could be detected in urine up to one month after symptom onset.

Conclusions: WNV is excreted in urine of patients during acute infection up to one month after symptom onset. WNV excreted in urine is infectious and can be isolated in cell culture, especially in the first week after symptom onset.