Brief Original Article

Serological evidence of West Nile virus infection in the horse population of northern Serbia

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Abstract

Introduction: This study was conducted to evaluate the seroprevalence of West Nile virus (WNV) in the horse population of northern Serbia. Furthermore, it aimed to provide insight and an updated overview on the circulation of this re-emerging pathogen in this part of southeastern Europe. At the time of manuscript preparation, no clinical cases of WNV infection in horses were reported in this area.
Methodology: Between 2007 and 2011, a total of 252 equine serum samples were collected from seven different locations in northern Serbia. The presence of WNV-reactive IgG antibodies was examined by using commercial and in-house ELISAs. Selected ELISA-positive samples were re-tested by a WNV lineage 2 plaque reduction neutralization test 90% (PRNT-90).
Results: In 28.6% of the 252 tested equine serum samples antibodies against WNV were detected. The results obtained with the in-house ELISA corresponded to the outcome of the commercial kit in 90% of the samples. All selected WNV antibody ELISA-positive samples were confirmed by PRNT-90 with neutralizing antibody titers of 1:23 to > 1:512.
Conclusion: This study confirms the circulation of WNV in northern Serbia. No striking regional differences in seroprevalences were identified suggesting WNV circulation also in other parts of Serbia. Distances between wetlands or forests and stud farms do not appear to have an influence on WNV seroprevalence.

Key words: West Nile virus; Seroprevalence; Serbia; Horse; ELISA; Plaque reduction neutralization test.

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Introduction

In the last decades West Nile virus (WNV) was, with a few exceptions, of limited importance in Europe. This changed dramatically in 2008 when widespread epidemics occurred in the entire federal territory of Hungary including the eastern part of Austria [1,2] and in northern Italy [3], respectively. While the Italian outbreak was caused by a "classical" lineage 1 WNV strain, the Hungarian/eastern Austrian outbreak was due to a novel lineage 2 WNV, which was introduced to Hungary in 2004 [4], most likely by migratory birds from Africa. This was the first time that a lineage 2 WNV emerged outside Africa. In 2010, the "Hungarian/Austrian" lineage 2 WNV caused an epidemic of West Nile neuroinvasive disease (WNND) in the human population in northern Greece with 262 laboratory confirmed infections, including 197 neuroinvasive cases and 33 deaths [5,6]). The question arose how this virus could emerge 600 km southeast of Hungary, and there is growing evidence that this WNV strain spread - initially unrecognized - from Hungary via Serbia and other Balkan states to Greece. In 2010 another WNND outbreak in humans was reported in Romania with 57 confirmed cases and 5 fatalities. Interestingly, the etiologic agent of this epidemic was identified as another lineage 2 virus, closely related to the Volgograd 2007 WNV [7].

Given the complex epidemiological situation of WNV in central and southeastern Europe since 2008, and the scarce data available for the Balkan states, the goal of this study was to investigate serologically the presence or absence and the incidence/prevalence of WNV in horses in the northern part of Serbia,