Short Communication

Seroepidemiological Study of West Nile Virus and Rift Valley Fever Virus in Some of Mammalian Species (Herbivores) in Northern Turkey

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(Received 23 Nov 2011; accepted 24 Oct 2012)

Abstract

Background: West Nile virus (WNV) and Rift Valley fever virus (RVFV) are mosquito-borne viral diseases. The objective of this study was to investigate the RVFV and WNV infections as serologically in different mammalian species (cattle, horse, goat, sheep and water buffalo) in the northern Turkey.

Methods: Blood samples randomly collected from 70 each cattle, horse, sheep, goat and water buffalo were analyzed for the presence of antibodies to RVFV and WNV using an competitive enzyme-linked immunosorbent assay (C-ELISA) in northern Turkey.

Results: None of the animals were positive for antibodies to RVFV. In contrast, WNV antibodies were found in two of 350 samples (0.57%).

Conclusion: This may suggest that the RVFV disease is not present in northern Turkey.This is the first serological study on RVFV in Turkey.

Keywords: ELISA**,** Herbivore, RVFV, Turkey, WNV

Introduction

West Nile virus (WNV) is a member of the Japanese encephalitis virus complex of the family Flaviviridae, genus *Flavivirus*, which also includes Japanese encephalitis virus, St. Louis encephalitis virus (SLEV), Murray Valley encephalitis virus (MVEV), and others. These viruses are mosquito borne, primarily transmitted by *Culex* spp, and have wide, overlapping distributions throughout the world (Mackenzie et al. 2002). The diagnosis of WNV infection is commonly achieved using serological assays (Castillo-Olivares and Wood 2004). While plaque reduction neutralization tests are still considered the gold standard for specific diagnosis, ELISA is now routinely used (Dauphin and Zientara 2007), as it is less laborious and more suited to high- throughput screening.

Rift valley fever virus (RVFV), family Bunyaviridae is an emerging epidemic disease of humans and livestock, as well as an important endemic problem in sub-Saharan Africa. The virus is transmitted to livestock and humans by the bite of infected mosquitoes or exposure to tissues or blood of infected animals. Massive epizootics are typically observed in livestock during times of unusually high and sustained rainfall because of the presence of breeding sites and overabundance of adult competent mosquito vectors. Infections caused by RVFV are characterized by severe disease and abortion in livestock, particularly sheep and cattle (Linthicum et al. 1999). The recent RVF outbreaks in the Arabian Peninsula (Shoemaker et al. 2002), the first outbreaks outside Af-

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Published Online: April 10, 2013

rica, have the implication that it is likely that RVFV will now spread further into non-endemic RVF areas since it is capable of utilizing a wide range of mosquito vectors (Turrel et al. 1998).

The objective of this study was to investigate the RVFV and WNV infections as serologically in different mammalian species (cattle, horse, goat, sheep and water buffalo) in the northern Turkey.

Materials and Methods

Blood samples were collected from seventy each cattle, horse, sheep, goat and water buffalo, without clinical signs of the diseases in the northern part of Turkey between May and October 2010 (Fig. 1). The age of the animals varied from 2 to 17 years. Blood samples were taken from the jugular veins of the animals. Blood tubes were centrifuged at 3, 000×g for 10 min, and the samples were transferred to sterile tubes and stored in -20 °C until used. The commercial C-ELISA kits were obtained from ID.VET, Montpellier, France, and the test was performed according to the producer's description. Plates were read with an ELISA reader at 450 nm and results were calculated. Suspected samples were retested by C-ELISA.

Results

A total of 350 animals (70 each cattle, horses, sheep, goats and water buffaloes) were tested by C-ELISA. All animals were negative for antibodies against RVFV. Although no WNV antibodies were detected from cattle, horse, sheep and water buffalo samples, out of 70 goats, 2 (2.85%) were found to be seropositive for WNV (Table 1).

Table 1. Seroepidemiology of West Nile fever and Rift Valley fever in north of Turkey

Animals	Number of samples	Positivity (%) for WNV	Positivity (%) for RVFV
Buffalo	70	0 (-)	0 (-)
Cattle	70	0 (-)	0 (-)
Goat	70	2 (2.85)	0 (-)
Horse	70	0 (-)	0 (-)
Sheep	70	0 (-)	0 (-)
Total	350	2 (0.57)	0 (-)

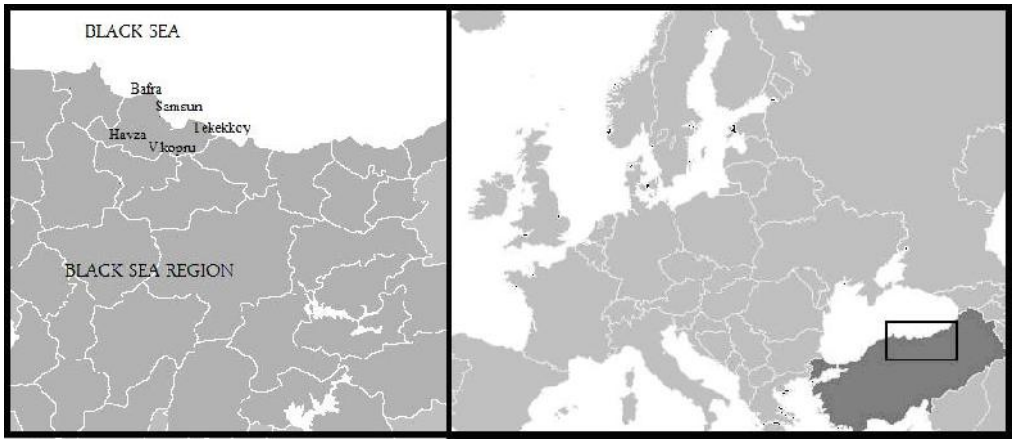

Fig. 1. Areas of sample collection

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Discussion

West Nile virus has a wide geographical range that includes portions of Europe, Asia, Africa, Australia and America (Fauquet et al. 2005). Many serological test methods were used in the diagnosis of WNV such as plaque reduction neutralization test (PRNT) and ELISA. While PRNT is still considered the gold standard for specific diagnosis, ELISA is now routinely used (Dauphin and Zientara 2007). The C-ELISA has a higher specificity (99.4%) and sensitivity (84.9%) for WNV infection (Padilla et al. 2009).

West Nile virus antibodies have been detected in humans and animals in Turkey (Ozkul et al. 2006, Ergunay et al. 2007a, 2007b) and antibodies and viruses have been detected among mammals and vectors in the neighbouring countries of Balkan Peninsula (Hubalek and Halouzka 1999). In addition, mosquito species know to transmit mosquito-borne diseases have been observed in Tur-key (Dik et al. 2006). However, except three human West Nile cases in 2010, there has been no report of acutely infected humans and animals in Turkey. All human cases were detected in Aegean region of western border of Turkey. This region is also border bet-ween Turkey and Greece where West Nile hu-man cases were observed in 2010 and eigh-teen people died in Greece. Only one sero-logic study has been performed in the cent-ral, southern and western parts of Turkey for WNV. Ozkul et al. (2005) were carried out a serosurvey in mammalian species. Positivity rates for the animals varied and were as fol-lows: Ass-mules 2.5%, cattle 4%, dogs 37.7%, horses 13.5%; sheep 1% and humans 20.4%. There is no study on the seroprevalence of WNV infection in buffaloes and goats in Tur-key. The determined positivity in goats in this study (2.85%) was found to be very low comparing to the reported value in dogs, hu-mans and horses. Albayrak and Ozan (2010) performed a molecular study about presence of WNV in wild bird samples in the same re-gion, but they did not detect any WNV nuc-leic acid from these samples. Reservoir-vec-tor-climate trio was very im-portant at the ep-idemiology for the all mosquito-borne virus-es. Given are average annual values of heat, humidity, and rainfall of Aegean region (west-ern) [16.3 °C (6.4–26.8 °C), 63.2%, 725.9 mm^3] and Black Sea region (northern) [13.0 (4.2–22.1), 71%, 842.6 mm^3]; additionally, an-nual heat changes are more dramatic in Black Sea region (TSMS 2010). Higher vector acti-vity cause to increase in vector-dependent di-seases. Climate conditions of western, cent-ral and southern parts of Turkey were more suitable for mosquitoes than northern part of Turkey. It is commonplace knowledge that the result of the seroprevalance studies are influ-enced by many factors such as the number of sampled animals, the age of the animals, the time of sampling, the conditions of care and feeding, individual differences and so on.

There has been no report of presence of RVFV in Turkey. No antibody response was detected against RVFV in northern Turkey. Although mosquito species known to transmit RVFV have been observed (Dik et al. 2006), there has been no report of acutely infected humans and animals in Turkey. This may suggest that the disease is not present in northern Turkey. In addition, the vectors in this area may not carry RVFV. The present study indicated that RVFV might not become a risk potential for animals in northern Turkey. To beter understand RVFV transmission in Turkey, additional studies focusing on major vectors (eg mosquitoes) are needed. The existent data in Turkey is not enough to determine regional based profile of the WNV and RVFV infections. Beside, further studies are necessary to understanding of vector dynamics, interactions among different sensitive species and risk factors of exposure.

Acknowledgements

The authors declare that there is no conflict of interest.

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