Serosurvey to assess zoonotic transmission of Schmallenberg virus in farmers and veterinarians in The Netherlands

Summary:

In total, 301 persons were tested for antibodies to Schmallenberg virus by virus neutralization test. All sera tested negative, whereas high levels of antibody were found in serum from an infected animal that was used as a control. The study population consisted of 234 persons working or living on SBV-infected farms, and 67 veterinarians – all with known exposure to SBV-infected herds. Of these, 229 persons had direct exposure to newborn calves, lambs and/or birthing materials from SBV-infected herds, and 150 persons reported exposure to biting insects. We conclude that there is no evidence for zoonotic infection.

Schmallenberg virus (SBV) was detected in blood from febrile cattle in Germany, and subsequently identified as the cause of severe malformations in lambs and calves following intra-uterine infection in The Netherlands and 7 other countries. These teratogenic effects in ruminants reflect virus circulation in late summer/ autumn. The virus was identified as a vector-borne *Orthobunyavirus* belonging to the Simbu serogroup, that contains similar viruses affecting ruminants (cattle, sheep, goats). As the family of the *Bunyaviridae* contains several medically important zoonoses, the emergence of SBV in the Netherlands triggered a joint veterinary and public health response to address the potential human health issues. An initial risk assessment concluded that human infections were unlikely but could not be excluded. Therefore, a serosurvey was done in persons with highest probability of exposure to SBV.

The study

Exposure was defined as presence on farms during the late summer/fall period or direct contact with affected animals, and birthing materials. Farmers, employees and other residents from farms where the presence of SBV infected animals was confirmed or strongly suspected (based on typical lesions in newborn calves or lambs) were asked to participate. In addition,

veterinarians involved in treatment of ruminants were recruited to the study. Serum was drawn by staff from the municipal health service, who also administered a short questionnaire. Based on a literature review of seroprevalence studies in regions with known orthobunyavirus outbreaks, a seroprevalence of 2% was taken as the lower bound in an affected human population. In this scenario with 2% seroprevalence, testing of e.g. 200 exposed individuals would give a probability of 98% to detect one or more seropositives. Sera were tested by virus neutralisation test, using a virus isolated from an affected lamb by the Central Veterinary institute, and positive control serum from an ewe collected by the Animal Health Service. In total, 301 persons were tested (99.8% to detect one or more cases, assuming a lowest seroprevalence boundary of 2%). No antibodies were found in any of the serum samples, whereas a high titer of neutralizing antibodies was found in the control animal serum.

Results

All sera tested negative for antibodies to SBV. The groups tested include 150 persons that reported exposure to biting insects during the vector season, and 229 persons exposed by direct contact with newborn lambs or calves from SBV-infected herds of which 50 confirmed direct contact with malformed lambs or calves and/or birth products.

Conclusion

Based on this survey, there is no evidence for infection with SBV in these highly exposed study participants. These results suggest that the risk of infection of individuals exposed to SBV is absent or extremely low.

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