Infectious Schmallenberg Virus from Bovine Semen, Germany

To the Editor: The teratogenic Schmallenberg virus (SBV) (genus Orthobunyavirus) was detected in bovine semen in a recent German field study (1). Vector-borne transmission by Culicoides spp. biting midges is most common (2), but vernal transmission of SBV might contribute to the spread of this virus to previously unaffected regions. We investigated the infectivity of SBV RNA–positive semen by experimental subcutaneous injection of cattle and interferon α/β receptor–deficient (IFNAR−/) mice (3).

Commercially produced semen straws with egg yolk–based diluent were used for the injection of 6- to 9-month-old heifers. The straws originated from 6 semen batches (quantitative cycle \( C_q \) values 26.4–36.4) collected from 6 bulls (designated A–C and E–G) during August and September 2012 (1). To increase the probability of SBV infection of injected cattle, 5 straws of semen (≈220 µL each) from 1 batch from an individual bull were pooled and diluted in minimal essential medium with antibiotics immediately after euthanasia at 22 days postinjection (dpi). The on-set of SBV infection in the 3 animals injected with single semen straws ranged from 3 to 5 dpi, and not every straw was infectious, although biologic and technical replicates of straws from 1 semen batch showed similar PCR results (data not shown) (1). Possible explanations for differences in the infectivity of individual straws are that the viral RNA load of an SBV-containing straw does not necessarily correlate with infectivity or that the infectivity of 1 straw is lower than the minimal cattle

References


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infectious dose for SBV. Cattle might be more susceptible than IFNAR−/− mice to infection, particularly when SBV titers are low or borderline (7, 8). Therefore, we cannot exclude the possibility that the semen batches tested only in IFNAR−/− mice might be infectious for cattle or that semen samples with higher SBV titers might be infectious in the mice.

We used subcutaneous injection of SBV RNA–positive semen to demonstrate infectivity because this transmission route has a high sensitivity for proving infectivity of SBV-containing samples (7). However, the possibility of intrauterine SBV infection of dams is unknown. Oro-nasal inoculation of 2 calves did not result in SBV infection of the animals (5), which suggests that mucosal in utero infection with SBV-containing semen is unlikely. In contrast, viremia was detected in most cows that were artificially inseminated and simultaneously inoculated in the uterus with cell culture–passaged Akabane virus, a teratogenic orthobunyavirus closely related to SBV (9). Intrauterine lesions caused by insemination or breeding might therefore increase the risk for SBV infection.

In conclusion, we demonstrated that SBV RNA–positive bovine semen could contain infectious SBV. However, the actual risk for transmission of SBV by insemination of dams with SBV-containing semen remains to be evaluated. Although SBV infection of the developing embryo is unlikely, venereal transmission would lead at worst to viremia of the dam, facilitating vector transmission. To prevent venereal SBV transmission, sensitive PCR testing of semen batches from SBV-infected bulls is the method of choice (1, 10).

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LETTERS

**NDM-1–producing Strains, Family Enterobacteriaceae, in Hospital, Beijing, China**

To the Editor: The prevalence of New Delhi metallo-b-lactamase-1 (NDM-1)–producing strains (family Enterobacteriaceae) in China remains unclear. Recently, to clarify the prevalence of blaNDM-1 in Enterobacteriaceae strains, we carried out retrospective surveillance for blaNDM-1 among carbapenem-resistant enterobacterial strains isolated from patients at the Chinese PLA General Hospital in Beijing. This tertiary teaching hospital has 4,000 beds and 12,000 daily outpatient visits. More than 50% of patients admitted to the hospital are from areas outside Beijing. During January 2009–June 2013, a total of 8,586 enterobacterial isolates were obtained from routine clinical samples that had been passively sent to the microbiology department. Of these, 242 (2.8%) strains exhibited resistance to carbapenems.

In this study, we used PCR amplification to screen the carbapenem-resistant strains for the blaNDM-1 gene and other common resistance determinants. The MICs of various antimicrobial drugs were measured by E-test (AB bioMérieux, Solna, Sweden). S1 nuclease pulsed-field gel electrophoresis and Southern blot analysis showed that the blaNDM-1 gene was located on plasmids of various sizes belonging to different Inc groups. The K. pneumoniae isolate was defined as a novel ST1240 with the allelic profile 2–1–1–1–3–24, and the E. coli isolate was identified as ST167.

In China, various blaNDM-1–carrying strains of the Enterobacteriaceae have been sporadically identified, including K. pneumoniae, K. oxytoca, Escherichia coli, Enterobacter cloacae, Enterobacter aerogenes, and Citrobacter freundii (1–4). We identified a P. rettgeri isolate and an R. ornithinolytica isolate that produced NDM-1. The blaNDM-1–Positive P. rettgeri isolates have also been identified in Pakistan, India, Canada, and Mexico, whereas the NDM-1–producing strains of Enterobacteriaceae has been found. Two strains (K. pneumoniae and Enterobacter cloacae) were isolated within 48 hours of the patient’s hospital admission.