FRIEDRICH-LOEFFLER-INSTITUT
FLI
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Federal Research Institute for Animal Health

Arenaviruses

Susceptible species

The natural reservoir of mammalian arenaviruses are rodents, where infections are largely without consequences. They can be transmitted from these animals to humans, where they cause sometimes pronounced disease. They can also cause disease in various animal models (in particular mice, guinea pigs, hamsters, and non-human primates).

Distribution area

Cases of infections with arenaviruses occur worldwide. The first arenavirus, lymphocytic choriomeningitis virus (LCMV), was isolated in North America in 1933 from a patient with aseptic meningitis and has since been detected worldwide. Other arenaviruses have been detected in South America, where they cause sporadic cases or local outbreaks of hemorrhagic fevers: Junín virus (Argentina), Machupo virus and Chapare virus (Bolivia), Guanarito virus (Venezuela) and Sabiá virus (Brazil). Arenaviruses are also found in Africa. Lassa virus in particular causes thousands of fatal cases of Lassa fever in West Africa every year, although only limited data are available to estimate the actual spread. Furthermore, Lujo virus was discovered in Sambia in 2008, but so far has caused only one natural infection.

Causative agent

All human pathogenic arenaviruses belong to the genus *Mammarenavirus* within the family of arenaviruses. Based on their geographical distribution and genetic relationship they are subdivided further into so-called Old World arenaviruses (LCMV, Lassa and Lujo virus) and New World arenaviruses (Junín, Machupo, Guanarito, Chapare and Sabiá virus).

Transmission

Mammalian arenaviruses are transmitted from rodents as the natural reservoir to humans. Transmission occurs through contact with feces, urine or blood of infected animals, mostly via the respiratory tract (through aerosols), through small skin lesions or contaminated food. Furthermore, human-to-human transmission can occur, especially as nosocomial infection.

Clinical picture

Arenaviruses often cause febrile illness, which in severe cases, depending on the type of virus, can also be accompanied by neurological or hemorrhagic symptoms. In LCMV, infections during pregnancy are of particular importance, as they can lead to miscarriage or malformations. The incubation period of infections with human pathogenic arenaviruses is usually 7-21 days.

Diagnostics

Virus detection is possible from blood, urine and other clinical samples during the acute phase of the disease by RT-PCR or antigen detection, culture and/or electron microscopy. Serological detection of specific antibodies is

also possible. Laboratory diagnostics should generally be performed at the Bernhard Nocht Institute for Tropical Medicine as the national reference laboratory. Within the framework of research-oriented investigations, other laboratories, e.g. at FLI, can also carry out such tests.

Similar clinical pictures

Similar symptoms may be caused by other hemorrhagic fever viruses, malaria or typhoid fever, or may indicate septicemia or fulminant viral hepatitis. The patient's medical history should especially take into account possible exposure during a stay in endemic areas.

Control

Currently, no vaccine against arenaviruses is available, except for a live vaccine licensed for Junín virus in Argentina. However, there are several vaccine candidates in development for Lassa virus. In some studies, the treatment of Lassa virus infections with ribavirin has been described as effective. Furthermore, supportive intensive care measures and symptomatic treatment are indicated. Patients with proven infection with a highly pathogenic arenavirus should be treated in one of the treatment centres for highly contagious diseases.

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