

Lymphocytic Choriomeningitis

Disease Vectors

Lymphocytic choriomeningitis is a disease that develops after infection with the lymphocytic choriomeningitis virus (LCMV). The virus primarily spreads to people through contact with urine, feces, saliva or blood from the house mouse (*M. musculus*), wild or captive bred, which is the natural reservoir for this virus (Edling 2011). High densities of infected mice, which may be present during an outbreak in a breeding colony, may lead to aerosol transmission of the virus to humans. Syrian hamsters (*Mesocricetus auratus*) also carry LCMV, and in rare instances, rats, guinea pigs, or other rodents may become infected from contact with infected mice or hamsters. It is estimated that 5% of wild house mice in the U.S. carry LCMV (CDC 2013), although this can vary by location; locally, 9% of house mice in Baltimore, MD were found to have antibodies to the virus (Edling 2011), suggesting that they had previously been infected with the virus. Among house mice and hamsters, LCMV can spread from infected dams to their babies during pregnancy and after birth, perpetuating the prevalence of the virus in wild and captive populations. Infected mice and hamsters can shed the virus for several months or throughout their lives, and there is no vaccine or treatment.

Symptoms, Diagnosis & Treatment

Typically, human exposure to the virus results in an asymptomatic or mild illness (aseptic meningitis) without need for treatment. Some patients, however, may experience a variety of symptoms including fever, headache, muscle aches, loss of appetite, and nausea. After a few days of apparent recovery, the fever may return along with symptoms of meningitis such as headache and stiff neck. If symptoms reappear you should contact your doctor.

Infection during pregnancy has been associated with severe problems in the fetus, including hydrocephalus, chorioretinitis and mental retardation (CDC 2013). Although the disease in healthy adults is rarely fatal, three organ transplant recipients died after receiving infected tissues; the organ donor had been exposed to an infected pet hamster (Amman 2007).

Currently, blood tests are commercially available that can detect the virus or antibodies to LCMV in mice. Post-mortem sampling of tissues (kidney, liver, and spleen) is most effective for virus testing, while serum or whole blood is used to detect antibodies. Edling (2011) has investigated the feasibility of testing breedingstock in commercial facilities using environmental swabs for genetic analysis.

Prevention

Pet owners should wash their hands with soap and running water after handling pet rodents, live or frozen feeder rodents, their cages or bedding. Cages should be

cleaned in a well-ventilated area that is not used for food preparation. Pet rodents should not be nuzzled close to your face. Pregnant women and those with weakened immune systems should avoid contact with pet and wild rodents.

Staff training should include general information on LCMV including how the virus spreads to people. Appropriate personal protective equipment should be used, depending on the task performed. It is recommended that protective outerwear, gloves, and facial protection, including goggles and a NIOSH-certified and fit-tested N95 respirator be worn during power washing of rodent areas or equipment. Stress the importance of handwashing with soap and running water after handling animals. Staff should be encouraged to tell their healthcare provider that they work with rodents if they become ill with a febrile illness (marked or caused by a fever) or symptoms of meningitis.

Prevention and control of LCMV infection in rodents is the key to preventing occupationally-acquired LCMV at culture/distribution facilities. Barriers to the entry of wild mice (e.g., secure doors, windows, drains) are recommended, and facilities should maintain an active pest control program (e.g., rodent traps at the perimeter of the facility, in rodent rooms, and in areas where feed is stored). In the case of breeding and distribution facilities for feeder mice, secure confinement of stock is recommended to decrease the opportunity for contact with wild mice.

Noteworthy Cases

In 2012, CDC investigated a rodent breeding facility where a staff member developed aseptic meningitis that was caused by LCMV infection. Subsequent testing revealed that 13 of 52 employees had current or past infection. Five employees sought medical treatment and four of these were diagnosed with aseptic meningitis. LCMV antibodies were identified in 21% of frozen mice from the facility, leading to a quarantine of the facility including a hold on further shipments of rodents, depopulation of all live mice, and disposal of frozen mice. Live mice had been shipped to 21 states, but to date no further LCMV infections have been reported.

References

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