

Lassa virus

Lassa virus is an arenavirus. There are some subtypes, such as the Josiah, Nigeria, LP and AV strains. The disease “Lassa fever” takes its name from a small town in Nigeria. The disease occurs, endemically, in West Africa: Sierra Leone, Guinea, Liberia and Nigeria, but probably also outside these countries, based on case reports and serosurveys in humans and animals (Ghana, Ivory Coast, Burkina Faso, Senegal, Mali, Central African Republic). The total number of annual cases is estimated between 100.000 and 300.000 case with 5000 deaths.

Transmission is via ingestion of food infected with urine or faeces of infected peridomestic rats (*Mastomys natalensis* = *Praomys natalensis*). The rat itself exhibits no symptoms. There are many morphologically similar rodents, which differ in karyotype.

Transmission via aerosol has been demonstrated in the laboratory. Person-to-person transmission occurs, as does nosocomial transmission, including due to re-use of needles.

Transmission may also occur via sexual intercourse (Lassa virus has been isolated from semen up to 6 weeks after the acute stage).

Isolation and strict barrier nursing are sufficient to prevent transmission in the hospital.

Avoidance of contact with rodents is important (especially of food storage areas where these rodents are common). From time to time there are imported cases in Europe and North America.

Clinical aspects

In about 80% of patients, the disease has a mild course. After an incubation period of 7-18 days, infected persons gradually develop a sore throat with an inflammatory exudative pharyngitis, fever, malaise and myalgia, conjunctivitis and swollen eyelids, abdominal pain with or without nausea, vomiting and diarrhoea, cough, dyspnoea and tachypnoea, thoracic pain, pleural fluid and pain in the joints and loins. Oedema of the face may occur. Patients do not die with a clinical picture of DIC [diffuse intravascular coagulation], but with liver necrosis, haemorrhage, shock and pulmonary oedema. Icterus occurs rarely. Diffuse haemorrhages and swelling of the head and neck indicate increased vascular permeability and a poor prognosis. The cerebrospinal fluid is usually normal. After a few weeks pericarditis and/or cerebellar ataxia occur. There is moderate thrombocytopenia, but there is significant

and pronounced blood platelet and endothelium dysfunction. Proteinuria is common. Death results from multi-organ failure in about 20% of those hospitalized. In those surviving there is often sensorineural deafness (25%). ARDS is a frequent cause of death in Lassa fever. Spontaneous abortion is a possible complication in pregnancy.

Diagnosis

Diagnosis is suggested via clinical symptoms in West Africa (thoracic pain, fever, haemorrhage, pharyngitis). In Lassa fever, the white cell count tends to be normal. In severe cases, lymphopenia with neutrophilia as well as haemoconcentration can occur. Mild thrombocytopenia can be expected. Confirmation will be obtained via serology (ELISA IgM and/or seroconversion IgG), virus isolation or RT-PCR [reverse transcriptase polymerase chain reaction] for viral RNA in a high-containment laboratory (urine, blood, throat swab). IFA (indirect fluorescence assay) can be done on serum using a fluorescence microscope using anti-Lassa monoclonal antibodies. Immunoblotting with gel electrophoresis can detect Lassa proteins using specifically labelled antibodies.

Treatment

Patients should be isolated in an intensive care unit. Ribavirin (Virazole®, Rebetol® - caps. 200 mg), a guanosine analogue, administered during the first 6 days of the disease, is effective (30 mg/kg IV loading dose; then 16 mg/kg IV every 6 hours for 4 days, then 8 mg/kg IV every 8 hours for 6 days). Probably it is also beneficial as chemoprophylaxis (direct contacts PO 500 mg QID for 7 days). In practice ribavirin will often not be available. In the West this drug is used as an aerosol for the treatment of severe pulmonary infection with RSV (respiratory syncytial virus). In China it is used in hantavirus epidemics.

Prevention

Contact with rodents and their excreta (especially urine) should be limited as far as possible. Infected patients should be cared for and treated with the necessary caution (barrier nursing) to avoid nosocomial transmission. In experiments it has been possible to protect primates with a vaccinia virus-expressed Lassa virus vaccine. However, vaccines based upon vaccinia constructs might be dangerous in a population with a high seroprevalence of HIV infection. A recombinant vesicular stomatitis virus-based vaccine protected primates from lethal Lassa

virus infection. There is no commercial vaccine for humans available.