Medical Xpress

Researchers develop early detection method for rare Borna virus

March 20 2024, by Corina Härning

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Researchers at Augsburg University Medicine have discovered a possible early detection method of the rare Borna virus. Their results have been published in *The Lancet*. In humans the virus triggers inflammation in the brain which is almost always deadly and is transmitted to humans by shrews.

Borna disease virus 1 (BoDV-1) has long been recognized as a pathogen that causes Borna's disease in horses, sheep, and other mammals in Central Europe. In 2018, the virus was first identified as the cause of severe brain inflammation in humans. The disease affects 2 to 6 people each year in Germany. The virus is endemic to Bavaria, meaning it permanently exists there.

"Only recently, we were able to make the difficult diagnosis of Borna encephalitis in a 71-year-old female patient. She had continuously deteriorated neurologically over several weeks from full health and ultimately died as a result of the severe brain inflammation," explains Prof. Dr. Markus Naumann, Director of the Clinic of Neurology at Augsburg University Hospital. At fist all examinations such as MRI scans of the brain and extensive laboratory and cerebrospinal fluid tests were completely normal.

Early detection of encephalitis successful

The doctors then used a nuclear medical procedure that is normally used to diagnose tumor diseases and inflammation: 18Fluorodeoxyglucose positron emission tomography/computer tomography (18F-FDG PET/CT). Via this procedure, they were able to determine a pathologically altered glucose metabolism in the patient's brain.

"This is remarkable because it was conspicuously visible long before we

could detect the Borna virus with repeated MRI scans and antibody tests," explains Prof. Dr. Antonios Bayas. He is Head of the Clinical Neuroimmunology Section at the Clinic of Neurology.

With a detailed description of the case in the journal *The Lancet*, Naumann, Bayas, and other participating researchers want to inform other doctors worldwide that with severe cases of brain inflammation with an unclear cause an infection caused by Borna virus should be tested for. "This applies above all else if the patient is in a risk area. The 18F-FDG PET/CT can provide a very early diagnostic lead here," says Bayas.

What is the Borna virus?

According to information from the Robert Koch Institute, infected patients initially present with headaches, fever, and a general feeling of being ill. All known cases of the disease to date have been followed by neurological symptoms, e.g., behavioral abnormalities and speech and gait disorders. As the disease progresses, people fall into a coma within a few days or weeks. The infection is almost always deadly. There is currently no specific therapy for treating Borna virus infections.

The disease is contracted through shrews, either by direct contact with an animal or their droppings. The shrews live on fallow land, such as road embankments, stone walls, or under hedges, and are very shy and nocturnal so that humans only rarely encounter them. Other animals, for example, infected horses, sheep, and other mammals, are currently considered non-infectious for humans.

More information: Antonios Bayas et al, 18fluorodeoxyglucose PET/CT as possible early diagnostic tool preceding MRI changes in Borna disease virus 1 encephalitis, *The Lancet* (2024). DOI: 10.1016/S0140-6736(24)00049-7

Provided by University of Augsburg