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## A study on experimental cerebral alveolar echinococcosis in rats

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Alveolar echinococcosis (AE) caused by the metacestode of *Echinococcus multilocularis*, is one of the most serious parasitic zoonoses. The most common location of hydatid cyst in humans is the liver, with a 60% incidence. Cerebral hydatid cysts are rare. The incidence of the cerebral form is only 1 - 6 %.

However, when the brain is involved, *Echinococcus multilocularis*, especially, produces neurological and sometimes life-threatening disorders in the host. For cerebral echinococcosis, there are no reports on practical animal models using rats. The purposes of this study were to establish an animal model of cerebral AE and to examine its usefulness.

Thirty-three female Wistar rats (six to eight weeks old) were used in this experiment.

Each rat was injected intracranially with a 10%-homogenated hydatid cyst mass. MRI examinations were performed from 1 to 91 days post infection (PI). In addition, histopathological examinations and serodiagnostic tests were also carried out.

Under the MRI examinations, the gross appearance of the cysts corresponded well with the MR images, especially T2-weighted images. Small cysts appeared black on T1-weighted images, and white on T2-weighted images. Granulation tissue and fibrosis had an iso or low signal intensity on T2-weighted

images. Calcification could be detected as a signal void on T2- and proton-weighted images.

Macroscopically, parasitic cysts were observed at 10 days PI and developed in all of the rats examined. Histopathologically, the wall of the parasitic cyst consisted of inner germinal and outer laminated cuticular layers. A thin fibrous capsule was seen surrounding the cyst. Protoscoleces were first observed at 35 days PI. Calcification of the wall of the cyst was observed at 91 days PI.

The antibody (Ab) responses against metacestodes were assessed by Western blotting. At 49 days PI, slight Ab-responses against Em 16 and Em 18, which are specific antigens of the protoscolex, were detected.

However the response at 91 days PI was almost the same as that of 49 days PI.

In this study, it was demonstrated that the rat was useful as an animal model for experimental cerebral AE. Sequential findings of MRI, histopathology and serodiagnostic tests after experimentally induced cerebral AE, are reported. MRI, especially T2-weighted images, is useful for the diagnosis of cerebral AE, because it can depict the early stages of noncalcified cysts. Further improvement of this experimental method should contribute to the applicability of this model.