Adamantinomatous Craniopharyngioma

A craniopharyngioma with epithelium that forms stellate reticulum, wet keratin, and basal palisades. Up to 95% of cases of this variant shows CTNNB1 mutations and aberrant nuclear expression of beta-catenin [1].

Bimodal age distribution: childhood peak age 5–15 years, adult peak age 45–60 years [2].

It comprises 6–8% of pediatric brain tumors [3] [4]

Adamantinomatous craniopharyngioma (ACP) is a neurologically devastating chronic disease with morbidity that far outweighs the mortality risk.

The mechanism by which adamantinomatous craniopharyngioma (ACP) damages the hypothalamus is still unclear. Cyst fluid rich in lipids and inflammatory factors is a characteristic pathological manifestation of ACP and may play a very important role in hypothalamic injury caused by tumors.

Objective: The objective of this study was to construct a reliable animal model of ACP cyst fluid-induced hypothalamic injury and explore the specific mechanism of hypothalamic injury caused by cyst fluid.

Methods: An animal model was established by injecting human ACP cyst fluid into the bilateral hypothalamus of mice. ScRNA-seq was performed on the mice hypothalamus and on an ACP sample to obtain a complete gene expression profile for analysis. Data verification was performed through pathological means.

Results: ACP cystic fluid caused growth retardation and an increased obesity index in mice, affected the expression of the Npy, Fgfr2, Rnpc3, Sst, and Pcsk1n genes that regulate growth and energy metabolism in hypothalamic neurons, and enhanced the cellular interaction of Agrp-Mc3r. ACP cystic fluid significantly caused inflammatory activation of hypothalamic microglia. The cellular interaction of CD74-APP is significantly strengthened between inflammatory activated microglia and hypothalamic neurons. Beta-amyloid, a marker of neurodegenerative diseases, was deposited in the ACP tumor tissues and in the hypothalamus of mice injected with ACP cyst fluid.

Conclusion: In this study, a novel animal model of ACP cystic fluid-hypothalamic injury was established. For the first time, it was found that ACP cystic fluid can trigger inflammatory activation of microglia to damage the hypothalamus, which may be related to the upregulation of the CD74-APP interaction and deposition of β-amyloid, implying that there may be a similar mechanism between ACP cystic fluid damage to the hypothalamus and neurodegenerative diseases [5].

Diagnosis

Adamantinomatous Craniopharyngioma Diagnosis.

Adamantinomatous Craniopharyngioma Treatment

Adamantinomatous Craniopharyngioma Treatment.

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