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# CSF-based liquid biopsy pointing to a diagnosis of diffuse glioma in a patient with supposed neurodegenerative disorder

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## Abstract

**Introduction:** The differential diagnosis of brain diseases becomes challenging in cases where imaging is not sufficiently informative, and surgical biopsy is impossible or unacceptable to the patient.

**Methods:** An elderly patient with progressive short-term memory loss and cognitive impairment presented with a normal brain CT scan, a brain FDG-PET that indicated symmetrical deterioration of the white matter in the frontal lobes, and inconclusive results of a molecular marker analysis of suspected dementia in cerebrospinal fluid (CSF). Brain MRI suggested the diagnosis of lower grade glioma. The patient refused surgical biopsy. In order to investigate whether somatic mutations associated with gliomas existed, we performed a "liquid biopsy" by the targeted sequencing of cell-free DNA (cfDNA) from his CSF.

**Results:** Deep sequencing of the cfDNA from CSF revealed somatic mutations characteristically found in gliomas, including mutations of the TP53 (Arg282Trp), BRAF (Val600Glu), and IDH1 (Arg132His) genes. The patient is currently treated with temozolomide, and his clinical and MRI findings suggest the stabilization of his disease.

**Conclusion:** Neurological patients may benefit from liquid biopsy diagnostic work-up as it can reveal therapeutically targetable mutations.

**Keywords:** CSF; Dementia; Diffuse glioma; Liquid biopsy; MRI.

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