Marked Increase of CSF GFAP in neuromyelitis optica: An astrocytic damage marker

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Background: Neuromyelitis optica (NMO) is a neurologic inflammatory disease associated with autoimmunity to aquaporin-4 (AQP4)[1], predominantly localized in astrocytic foot processes. In immunopathological studies of autopsied cases of NMO, AQP4 and glial fibrillary acidic protein (GFAP) immunoreactivity was definitely lost in the perivascular areas in the acute inflammatory lesions of NMO, but not in MS lesions.[2] We also showed that the staining of GFAP was lost in the NMO lesions lacking AQP4 immunoreactivity.[2] These findings suggest that a dysfunction or damage of astrocytes probably related to AQP4 may be involved in the pathomechanism of NMO. However, there have been no studies of a clinically useful biomarker for astrocytic damage in NMO.

Methods: We performed enzyme-linked immunosorbent assays of astrocytic markers GFAP and S100B in CSFs, obtained from the patients with NMO (n=10) and multiple sclerosis (MS) (n=10) manifesting acute myelitis, acute disseminated encephalomyelitis (ADEM) (n=3), spinal infarction (n=3), and other neurologic diseases (n=5).

Results: The CSF-GFAP levels during relapse in NMO (7,666.0 ± 15,266.5 ng/ml) were significantly and over several thousand times higher than those in MS (0.7 ± 1.5) or other neurologic diseases (0.6 ± 0.3), and much higher than those in spinal infarction (354.7 ± 459.0) and ADEM (0.4 ± 0.2). The CSF-S100B levels during relapse had the same trends with CSF-GFAP. They returned to close to normal level along with clinical improvement soon after corticosteroid therapy in NMO. There were strong correlations between the CSF-GFAP or S100B levels and expanded disability status scales or spinal lesion length in NMO ($r > 0.9$).

Conclusions: Thus, measuring astrocytic markers, especially CSF-GFAP, would be useful in assessing astrocytopathy and clinical severity of NMO. Larger-scale studies will be needed to clarify the unique astrocytopathy in NMO.

References

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