POST-GADOLINIUM CEREBROSPINAL FLUID ENHANCEMENT - A NEW MARKER FOR BLOOD-BRAIN BARRIER LEAKAGE IN DEMENTIA?

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Introduction Subtle blood-brain barrier (BBB) disruption may occur in dementia due to small vessel damage and can result in neuronal degeneration and subsequent cognitive decline. Fluid-attenuated inversion recovery (FLAIR) magnetic resonance imaging is very sensitive to relatively low concentrations of gadolinium contrast agent in the subarachnoid space (SAS). Accordingly, cerebrospinal fluid (CSF) enhancement due to leakage of gadolinium molecules into the SAS has been described in various disease conditions with BBB disruption. We assessed whether hyperintense CSF signal intensity appeared in the SAS on post-contrast FLAIR images in (prodromal) dementia.

Methods 29 individuals participated in this study, including 6 with Alzheimer’s disease (AD), 9 with mild cognitive impairment (MCI), and 14 control participants without objective cognitive problems. Participants underwent FLAIR imaging before and 16 minutes after intravenous administration of 0.1mmol/kg gadolinium chelate. The appearance of SAS enhancement on post-contrast and post-pre contrast subtraction images was assessed by visual inspection.

Results Pericortical post-contrast SAS enhancement was observed in 7 participants (24%), including 2 individuals with AD (33%), 4 with MCI (44%), and 1 control participant (7%). Enhancement was apparent as a single focal spot in all but 1 MCI and 1 AD patient, who displayed two spots bilaterally. Enhancement was not associated with age, sex or hypertension. No enhancement was detected on pre-contrast FLAIR images. Discussion SAS enhancement may serve as a new small vessel disease marker for subtle BBB leakage in various disease states and in normal aging. Future studies are needed to reveal its role in the onset and progression of dementia.