

Vascular Risk Factors Are the Most Important Modifiable Factors Which Changes the Size of the Hippocampus with Aging

Majid fotuhi et al. (Nat Rev Neurol 2012;8:189-202) showed that vascular risk factors such as obesity, diabetes mellitus and obstructive sleep apnea are related associated with a reduction in hippocampal size and early development of cognitive impairment. Hippocampal size is closely linked with cognitive impairment. Severe atrophy of the hippocampus should be shown as a clinical dementia. Mild decreased hippocampal size may show mild cognitive impairment (MCI) which could be developed as a clinical dementia at a 50% possibility during 5-years. Thus hippocampal size is very important factor in maintaining healthy cognitive function of the aged people. Recently vascular cognitive impairment (VCI) has been important diagnosis and medical terminology because Alzheimer disease (AD) also frequently shows vascular lesions in autopsy findings. Until now MCI is not definitely defined and VCI is also not clearly defined yet. For vascular neurologist, VCI means MCI. VCI will become clinical dementia which is vascular dementia. Thus diagnosis criteria is confused and not fixed for vascular caused dementia. In the past, vascular dementia should be recognized as a post stroke dementia and may be subcortical dementia. However, any vascular risk factor may develop decrease function of brain and then develop MCI and dementia. Also dementia with definite vascular risk factors cannot be differentiated between pure AD and VD. Thus VD may be defined as a dementia developed after initial MCI with vascular risk factors (VCI). AD cannot be prevented with any medication or medical tools. But VD which is originated by vascular risk factors could be prevented in the stage of MCI (VCI). VCI should stop progression of cognitive impairment or reversed as normal cognitive function by intensive treatment of vascular risk factors. Furthermore aged hippocampal size reduction could be stopped by early diagnosis of VCI and treatment of vascular risk factors. This means many developments of dementia may be prevented by early diagnosis of VCI.

The mechanisms through which different vascular risk factors affect the hippocampus, both directly and indirectly, remain an active area of intense research, and most probably involve a combination of the followings; microvascular ischemia; inflammation; abnormal glycosylation of proteins in the brain; alterations to glucose transportation in the brain; impaired amyloid clearance; and high levels of cortisol, insulin, leptin and ghrelin. The neurochemical consequences of obstructive sleep apnea and clinical depression, which are comorbid conditions in patients with obesity and diabetes mellitus, might also be important mediators of hippocampal atrophy. Metabolic syndrome and type 2 diabetes mellitus have both been linked with substantial brain injury over time. The microvascular ischemia and inflammation associated with both conditions cause damage (both directly and indirectly, via hypertension) to axons throughout the brain and contribute to diffuse white matter disease that, in turn, can lead to hippocampal atrophy. Although type I diabetes mellitus has not been associated with the hippocampus, patients with a long history of this condition are at high risk of developing coronary.

With an aging worldwide demographic, the socioeconomic and health-care burden of neurodegenerative diseases is set to rise dramatically. A promising approach to address this challenge could be to slow down the pathological processes underlying such conditions. This clinical collection from Nature Reviews Neurology draws together recent articles that could help to inform such efforts.

Therefore Vascular Neurology introduces in particular AD and hippocampal decrease in aging, which may be related with vascular risk factors. We can have a hope to prevent and furthermore rescue early possible-dementia such as be MCI. We insist MCI may be equivalent to VCI. We (clinical neurologist, scientist, and patients) have to recognize the importance of early vascular dementia as a VCI (so call MCI).