Conclusion: Aging appears to decrease both CBF and CMRO2, which in turn might lead to impairment in cognitive functions, an important hallmark of dementia and AD. Although it remains a matter of controversy as to whether cerebral perfusion and metabolism declines with healthy aging, however the current study confirms that indeed CBF and CMRO2 decline with age in healthy individuals.

30 CEREBRAL BLOOD FLOW AND CEREBRAL OXYGEN METABOLISM IN NORMAL AGING: A PRECURSOR FOR STUDY OF DEMENTIA AND ALZHEIMER'S DISEASE

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10.1136/bmjopen-2016-015415.30

Background and aims: Aging brain has been demonstrated to be the main risk factor for dementia and Alzheimer's disease (AD). Recent findings provide clear evidence that the structural and functional integrity of the brain depends on the delicate balance between substrate delivery through blood flow and energy demands imposed by neural activity. Imaging studies of aging have in general shown reductions of cerebral blood flow (CBF) and the cerebral metabolic rates of oxygen (CMRO2) in healthy elderly adults. Based on the existing evidence, we hypothesized the CBF and CMRO2 in healthy young subjects will be higher than CBF and CMRO2 in elderly adults which itself should be higher than AD patients. Therefore, we designed the present studies specifically to reveal the role of defective cerebral oxygen metabolism and cerebral blood flow in normal aging.

Methods: To test the predictions, we acquired PET scans of CBF and CMRO2 at baseline from 12 young and 12 healthy elderly subjects. The subjects underwent 2 sessions of 3-min PET scans of CBF, and CMRO2. During the CBF scans, 500 MBq of 15O-labelled water (15O-H215O) were injected intravenously at the start of each scan while they inhaled 500 MBq of 15O-[O2] in one breathe at the start of each CMRO2 scan. Quantitative CBF and CMRO2 measures were computed as parametric maps. Each subject also underwent MRI scan for structural-functional (MRI-PET) correlation.

Results: The resulting global values of CBF and CMRO2 were not significantly different from each other in each age group implying that whole brain cerebral blood flow and oxygen metabolism globally do not differ from each other as one ages. However, ROI (region of interest) analysis of average CBF scans of young versus elderly revealed significant CBF and CMRO2 differences as shown in Figure 1.