Cognitive dysfunction in type 2 diabetes mellitus: course of development and relation to vascular disease

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Type 2 diabetes (DM2) is associated with moderate cognitive impairments, particularly in verbal memory and information-processing speed. In addition, an increased risk of dementia is bserved. The course of development and the important vascular and metabolic determinants are still unclear. We hypothesise that (1)Cognitive impairments develop in pre-diabetic stages, before the actual onset of hyperglycaemia, and progress gradually thereafter; (2)Vascular and metabolic factors related to the "metabolic syndrome" are the prime determinants of these early pairments; (3)Hyperglycaemia accelerates cognitive decline in more advanced stages of DM2. We will examine the course of development of cognitive impairments in pre-diabetic conditions (the metabolic syndrome), early DM2 and advanced DM2. The neuropsychological examination covers memory, information processing speed, abstract reasoning, language, visuoconstruction, attention and executive functions. The severity of cognitive impairments will be related to past and present exposure to hyperglycaemia and other metabolic and vascular indices. The first study population will be recruited through the "Hoorn study". Detailed information on glucose metabolism, cardiovascular risk factors, and vascular function has been collected from 1989 onwards. Participants will be grouped into controls, metabolic syndrome, and recent onset DM2; approximately 100 participants per group. A neuropsychological and vascular examination will be performed. Of the second study population, recruited through the "Vascular risk factors for cognitive dysfunction in type 2 diabetes mellitus study", detailed baseline data on cognition, brain MRI, glucose metabolism, and vascular function have been documented. For the present project a follow-up neuropsychological examination and brain MR will be performed, in approximately 100 patients and 50 controls. The examinations will be performed from 2005 until 2009. An interim-analyses will be presented of the first 150 participants from the Hoorn study that were included between July 2005 and May 2006. Cognitive functioning will be (1)compared among the groups and (2)related to metabolic and vascular indices.