

## Summary Key note lecture MJ Daemen ISNVD 2015

While both cardiac dysfunction and progressive loss of cognitive functioning are prominent features of an aging population, surprisingly few studies have addressed the link between heart and brain function. This is probably due to the monodisciplinary approach to these problems by cardiologists, neurologists and geriatricians. Recent data indicate that autoregulation of cerebral flow cannot always protect the brain from hypoperfusion when cardiac output is reduced or atherosclerosis is prominent. This suggests a close link between cardiac function and large vessel atherosclerosis on the one hand and brain perfusion and cognitive functioning on the other. In a national basic and clinical research program supported by the Dutch Heart Foundation, we are testing the hypothesis that impaired hemodynamic status of both heart and brain is an important and potentially reversible cause of vascular cognitive impairment (VCI) offering promising opportunities for treatment. Using a multidisciplinary approach we address the following questions. 1) To what extent do hemodynamic changes contribute to VCI? 2) What are the mechanisms involved? 3) Does improvement of the hemodynamic status lead to improvement of cognitive dysfunction? To this end we have started a clinical multicentre observational study in elderly patients with either clinically manifest VCI, carotid occlusive disease or heart failure and evaluate their cardiac and large vascular function, atherosclerotic load and cerebral perfusion with a comprehensive magnetic resonance imaging (MRI) protocol and thoroughly test their cognitive function. Furthermore epidemiological data from the Rotterdam Study will be gathered to assess the associations between the cardiovascular system and cognitive function in the aging population, while mechanistic studies are being performed in animal studies. With this approach we have started a national interdisciplinary collaborative network for the study of VCI that will lead to a true multidisciplinary and consensus based approach of the clinical management of VCI, the availability of a diagnostic protocol to assess the hemodynamic contribution to VCI and clarification of the contribution of hemodynamic changes to VCI. The data from our studies will help to define subcategories VCI patients that may benefit from treatment aimed at improving the hemodynamic status and provide recommendations for future randomized-controlled trials.

### References:

The heart-brain connection: a multidisciplinary approach targeting a missing link in the pathophysiology of vascular cognitive impairment. van Buchem MA, Biessels GJ, Brunner la Rocca HP, de Craen AJ, van der Flier WM, Ikram MA, Kappelle LJ, Koudstaal PJ, Mooijaart SP, Niessen W, van Oostenbrugge R, de Roos A, van Rossum AC, Daemen MJ. *J Alzheimers Dis.* 2014;42 Suppl 4:S443-51.

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