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| Name | **Heart-Brain Connection – crossroads (HBCx)**By: Astrid Hooghiemstra, a.hooghiemstra@amsterdamumc.nl, 2 November 2021 |
| Description | The Heart-Brain Connection – crossroads (HBCx) consortium focuses on the central hypothesis that hemodynamic changes are an important and potentially reversible cause of vascular cognitive impairment. We take a multidimensional (i.e. crossroads) approach to hemodynamics, also addressing flow regulation and variability and factors that modulate the impact of hemodynamic disturbances in VCI. We will evaluate the role of hemodynamics in vascular cognitive impairment in: * Key cardiac conditions, i.e. atrial fibrillation, valvular disease, heart failure/venous congestion.
* Vascular factors, i.e. blood pressure variability, vascular reactivity, endothelial (dys)function.
* The primary cerebral co-morbidity of VCI, amyloid pathology, i.e. assess interplay hemodynamics and amyloid.
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| Location | Netherlands  |
| Lead Institute | LUMC |
| Cohort size | 566 participants* Carotid occlusive disease:
* Heart failure:
* Vascular cognitive impairment (VCI):
* Reference participants:
 | *n* = 109 *n* = 162 *n* = 166 *n* = 129 |
| Start Cohort | 2013 |
| Follow-up | * Baseline (BA)
* Follow-up after one year (FU1 VCI): only for patients with vascular cognitive impairment, focused on cognitive functioning
* Follow-up after 2 years (FU2)
* Follow-up after > 50 months (FU 50M): telephone interview focused on clinical outcomes
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| Variables and Measurement methods | Codebooks and standard operating procedures are available upon request. General demographics and clinical assessment (BA, FU2)* Demography
* Anthropometry
* Smoking, alcohol status

History (structured questionnaire) (BA, FU2)* Medical history
* Family history regarding risk factors
* Neurological history all participants
* Cardiological history all participants
* Additional history for patients with heart failure
* Additional history for patients with carotid occlusive disease
* Physical functioning
* Medication use

Clinical assessment (BA, FU2)* Blood pressure
* Orthostatic hypotension
* ECG
* Physical examination

Other (BA, FU2)* Information on MRI (dates, software)
* Accidental findings

Neuropsychological assessment (BA, FU1 VCI, FU2)* Cognitive functioning, including memory, attention-psychomotor speed, and executive functioning

Cardiac MRI (BA)* Aorta qflow: pulse wave velocity
* Short axis multi slice cine SSFP: systolic function, cardiac output, LV mass, LV volume.
* Phase contrast mitral flow: diastolic function

Brain MRI (BA, FU2)* Neuroradiological ratings of vascular pathologies
* T1-weighted: Structural status: atrophy (brain volumes)
* FLAIR: white matter hyperintensities and infarcts
* SWI: microbleeds
* ASL: whole brain and regional perfusion at rest
* Phase contrast flow measurement: total cerebral blood flow

Biomarkers from blood (BA)* Routine measurements
* OLINK panel focused on …
* T0\_NTproBNP
* T0\_hsTroponinepgmL

Biomarkers from cerebrospinal fluid (BA)>> for a subset of VCI patients* Alzheimer biomarkers

24-hour blood pressure (baseline) >> data not available yetEchocardiography (baseline)>> data not available yetTelephone interview focused on clinical outcomes (FU 50M)* Course of cognitive symptoms
* Interference symptoms in daily life
* Clinically relevant events: dementia, cerebrovascular, cardiovascular, hospital
* Mobility and falling
* Telephonized screening cognitive status (TICS-M)
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| Availability and Type of -omic data |  n.a. |
| Design paper | Hooghiemstra AM, Bertens AS, Leeuwis AE, Bron EE, Bots ML, Brunner-La Rocca HP, de Craen AJM, van der Geest RJ, Greving JP, Kappelle LJ, Niessen WJ, van Oostenbrugge RJ, van Osch MJP, de Roos A, van Rossum AC, Biessels GJ, van Buchem MA, Daemen MJAP, van der Flier WM; Heart-Brain Connection Consortium. The Missing Link in the Pathophysiology of Vascular Cognitive Impairment: Design of the Heart-Brain Study. Cerebrovasc Dis Extra. 2017;7(3):140-152. doi: 10.1159/000480738. Epub 2017 Oct 10. PMID: 29017156; PMCID: PMC5730112. |
| Website  | <https://hart-brein.nl/>  |