Posterior circulation ischemic stroke – MRI based phenotypic and genetic perspectives

Half-time review seminar, June 10, 2020, 1.00 pm
Location: Seminar room, EA 4, SUS, Lund

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Title: Posterior circulation ischemic stroke – MRI based phenotypic and genetic perspectives

BACKGROUND
Posterior circulation ischemic stroke (PCiS) constitutes 25–30% of ischemic strokes. A lack of detailed knowledge of this stroke phenotype persists, including possible differences from anterior circulation ischemic stroke (ACiS). Previous studies are small and suffer from heterogeneity. Magnetic resonance imaging (MRI) has improved the accuracy of PCiS diagnosis, making data on risk factors and disease mechanisms for this phenotype more reliable. The posterior vasculature is also specifically implicated in other conditions than stroke, raising the possibility that there are genetic factors associated with an increased risk for PCiS.

AIM/METHODS
Advancing knowledge of PCiS by phenotyping ischemic stroke patients with MRI and to capitalize on this enriched phenotype for genetic analyses.

Study I: We included 2,381 cases with MRI-DWI lesions. Lesions were defined as ACiS or PCiS and compared regarding baseline characteristics, vascular risk factor prevalence and ischemic stroke subtype using logistic regression analyses.

Study II: A systematic review characterizing the MRIs in the above multicenter cohort regarding vascular pathology, ischemic lesion location, lateralization, and multiplicity.

Study III: A polygenic risk score (PRS) analysis exploring shared genetic underpinnings in migraine and PCiS vs. ACiS. Migraine PRS were compared between the two stroke phenotypes using a regression model.

PLANNED
Study IV: Study of the lateralized prevalence of a fetal-type posterior cerebral artery in MRI verified ischemic stroke vs. controls investigated with computed tomography angiography (CTA).

Study V (if required): Endovascular treatment in vertebrobasilar artery occlusion.

RESULTS
Study I: PCiS occurred in 30% of patients. Diabetes mellitus and male sex were each independently associated with PCiS in multivariable analysis.

Study II: Analysis of vascular pathology on intracranial MRA showed moderate to severe vessel stenosis to be most common in the basilar artery. Vessel occlusion was most common in the middle cerebral arteries (MCA) (14%) and the vertebral arteries (12%).

Study III: PRS for migraine showed a significantly stronger association with PCiS vs. ACiS. Further analyses are pending.

SIGNIFICANCE
This large sample of MRI verified PCiS adds new data on etiology, risk factor prevalence and stroke mechanisms, and insights into specific characteristics of this phenotype. Genetic factors associated with PCiS have not previously been explored.

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