Clinical and MRI based predictors of prolonged dysphagia in ischemic stroke

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Background
With an incidence of approximately 55% swallowing disorders after ischemic stroke are a regular issue and can lead to complications like pneumonia, malnutrition and dehydration. The presence of dysphagia in stroke patients may be associated with poor outcome and prolonged stay at hospital. Thus, early assessment for the risk of prolonged dysphagia is essential when planning therapeutic strategies, e.g. enteral tube feeding for appropriate nutrition. Nevertheless, the mechanisms underlying recovery of dysphagia are unclear to a large extent as well as the factors associated with the persistence of swallowing difficulties. There are no reliable tests or scores predicting prolonged dysphagia.

Aim
To analyse the critical lesion site interfering with the neuronal network underlying the recovery of swallowing function and to identify clinical and MRI based predictors of prolonged dysphagia in supratentorial ischemic stroke patients.

- We will utilize sophisticated voxel based lesion mapping of MRI scans to provide a detailed neuroanatomical description of areas, which influence the recovery of swallowing functions and thus lead to prolonged dysphagia.
- We will assess common clinical signs (e.g. facial paresis, dysarthria, aphasia) and clinical predictors (e.g. stroke and dysphagia severity at admission), which are associated with poor outcome of dysphagia.

Patients and Methods
Patients with MRI-proven first-ever acute supratentorial ischemic stroke will be included. Prospective logopedic and neurologic evaluation of these patients and a standardized swallowing assessment will be carried out within (i) 48 hours and (ii) 8 to 10 days after hospitalization. Cases will be classified as prolonged dysphagia if their duration exceeds seven days; age matched controls will be subdivided into stroke patients with transient dysphagia (duration between 48 hours to 7 days) and those without dysphagia.

MRI scans of will be processed using statistical parametric mapping (SPM). Ischemic lesions patterns of the three groups, i.e. patients with prolonged, transient and without dysphagia, will be compared using voxel-based subtraction analysis of lesions. Clinical factors and common clinical signs will be
analysed and their odds of prolonged dysphagia will be calculated in a
multivariate model. A clinical score based on the obtained predictor variables
will be devised to predict the risk of prolonged dysphagia.

Potential significance
The identified supratentorial cerebral regions may determine the dynamics of
recovery of dysphagia after ischemic stroke. These areas may represent critical
nodes in the neuronal network underlying swallowing and, thus, shed new
insights on the development and persistence of dysphagia.

A better understanding of these clinical and MRI based predictors can improve
the identification of patients at risk of prolonged dysphagia and, consequently,
facilitate early decision making (e.g. placement of nasogastric tubes) in clinical
routine.

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