Lesion Location Predicts Transient and Extended Risk of Aspiration After Supratentorial Ischemic Stroke

Marian Galovic, MD*; Natascha Leisi, MSc*; Marlise Müller, BA; Johannes Weber, MD; Eugenio Abela, MD; Georg Kägi, MD; Bruno Weder, MD

Background and Purpose—To assess the association of lesion location and risk of aspiration and to establish predictors of transient versus extended risk of aspiration after supratentorial ischemic stroke.

Methods—Atlas-based localization analysis was performed in consecutive patients with MRI-proven first-time acute supratentorial ischemic stroke. Standardized swallowing assessment was carried out within 8±18 hours and 7.8±1.2 days after admission.

Results—In a prospective, longitudinal analysis, 34 of 94 patients (36%) were classified as having acute risk of aspiration, which was extended (≥7 days) or transient (<7 days) in 17 cases. There were no between-group differences in age, sex, cause of stroke, risk factors, prestroke disability, lesion side, or the degree of age-related white-matter changes. Correcting for stroke volume and National Institutes of Health Stroke Scale with a multiple logistic regression model, significant adjusted odds ratios in favor of acute risk of aspiration were demonstrated for the internal capsule (adjusted odds ratio, 6.2; $P<0.002$) and the insular cortex (adjusted odds ratio, 4.8; $P<0.003$). In a multivariate model of extended versus transient risk of aspiration, combined lesions of the frontal operculum and insular cortex was the only significant independent predictor of poor recovery (adjusted odds ratio, 33.8; $P<0.008$).

Conclusions—Lesions of the insular cortex and the internal capsule are significantly associated with acute risk of aspiration after stroke. Combined ischemic infarctions of the frontal operculum and the insular cortex are likely to cause extended risk of aspiration in stroke patients, whereas risk of aspiration tends to be transient in subcortical stroke. (***Stroke.*** **2013;44:2760-2767.)**

Table 1. Outcome and Swallowing Characteristics of Patient Subgroups

	No Risk of Aspiration (n=60)	Transient Risk of Aspiration (n=17)	Extended Risk of Aspiration (n=17)	*P* Value
Results of swallowing assessments, 2 of 6 scale[17]				
Assessment 1†	1 (1)	3 (1)	3 (1.5)	<0.001*
Assessment 2†	…	1 (0)	3 (2)	<0.001*
Abnormal 50 mL water swallow				
Assessment 1‡	5 (8)	10 (59)	14 (82)	<0.001*
Assessment 2‡	…	7 (41)	9 (53)	0.73
Functional oral intake (BODS-2)[27]				
Assessment 1†	2 (1)	3 (1.5)	5 (2)	<0.001*
Assessment 2†	…	1 (1)	3 (2.5)	<0.001*
Time between assessment 1 to MRI, days†	1 (2)	1 (1.5)	1 (3)	0.41
Outcome during hospital stay				
No return to prestroke diet at discharge‡	1 (2)	4 (24)	15 (88)	<0.001*
Chest infection‡	1 (2)	0 (0)	4 (24)	0.01*
Nasogastral tube feeding‡	1 (2)	1 (6)	11 (65)	<0.001*
PEG feeding‡	0 (0)	0 (0)	3 (18)	0.01*
Duration of hospital stay, days†	9 (6)	11 (4)	14 (4)	<0.001*
Institutionalization‡	30 (50)	14 (82)	17 (100)	<0.001*

Chest infection during hospital stay was defined as ≥3 of the following: fever >38°C; productive cough; abnormal respiratory examination (tachypnoea >22 bpm, tachycardia, inspiratory crackles, bronchial breathing); culture of relevant pathogen; positive chest radiograph; and elevated CRP in a patient with suspected chest infection. BODS-2 indicates Bogenhausener dysphagia score[27] (higher score signifies worse functional oral intake); CRP, C-reactive protein; and PEG, percutaneous endoscopic gastrostomy.

*P value considered significant after Holm–Bonferroni correction for multiple comparisons.

Data presented either as †median (interquartile range) or as ‡n (%) and analyzed using Fisher exact test and analyzed using Kruskal–Wallis test or Mann–Whitney *U* test for independent samples.