Development and Validation of a Prognostic Model of Swallowing Recovery and Enteral Tube Feeding After Ischemic Stroke

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Importance
Predicting the duration of poststroke dysphagia is important to guide therapeutic decisions. Guidelines recommend nasogastric tube (NGT) feeding if swallowing impairment persists for 7 days or longer and percutaneous endoscopic gastrostomy (PEG) placement if dysphagia does not recover within 30 days, but, to our knowledge, a systematic prediction method does not exist.

Objective
To develop and validate a prognostic model predicting swallowing recovery and the need for enteral tube feeding.

Design, Setting, and Participants
We enrolled participants with consecutive admissions for acute ischemic stroke and initially severe dysphagia in a prospective single-center derivation (2011-2014) and a multicenter validation (July 2015-March 2018) cohort study in 5 tertiary stroke referral centers in Switzerland.

Exposures
Severely impaired oral intake at admission (Functional Oral Intake Scale score <5).

Main Outcomes and Measures
Recovery of oral intake (primary end point, Functional Oral Intake Scale ≥5) or return to prestroke diet (secondary end point) measured 7 (indication for NGT feeding) and 30 (indication for PEG feeding) days after stroke.

Results
In total, 279 participants (131 women [47.0%]; median age, 77 years [interquartile range, 67-84 years]) were enrolled (153 [54.8%] in the derivation study; 126 [45.2%] in the validation cohort). Overall, 64% (95% CI, 59-71) participants failed to recover functional oral intake within 7 days and 30% (95% CI, 24-37) within 30 days. Prolonged swallowing recovery was independently associated with poor outcomes after stroke. The final prognostic model, the Predictive Swallowing Score, included 5 variables: age, stroke severity on admission, lesion location, initial risk of aspiration, and initial impairment of oral intake. Predictive Swallowing Score prediction estimates ranged from 5% (score, 0) to 96% (score, 10) for a persistent impairment of oral intake on day 7 and from 2% to 62% on day 30. Model performance in the validation cohort showed a discrimination (C statistic) of 0.84 (95% CI, 0.76-0.91; P < .001) for predicting the recovery of oral intake on day 7 and 0.77 (95% CI, 0.67-0.87; P < .001) on day 30, and a discrimination for a return to prestroke diet of 0.94 (day 7; 95% CI, 0.87-1.00; P < .001) and 0.71 (day 30; 95% CI, 0.61-0.82; P < .001). Calibration plots showed high agreement between the predicted and observed outcomes.

Conclusions and Relevance
The Predictive Swallowing Score, available as a smartphone application, is an easily applied prognostic instrument that reliably predicts swallowing recovery. It will support decision making for NGT or PEG insertion after ischemic stroke and is a step toward personalized medicine.

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