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Introduction

Intensive speech and language therapy (SLT) has been shown to be effective (Brady et al., 2016; Breitenstein et al., 2017). However, a better understanding of who benefits most is necessary to make efficient decisions about restricted therapeutic resources (Persad, et al., 2013). A recent meta-analysis has shown greatest improvements for younger age and earlier treatment enrollment (Ali et al., 2021). Some potentially important factors, e.g., handedness and education, were excluded in the meta-analysis due to heterogenous data. We present preliminary statistical analyses based on a more homogenous dataset including these variables.

Methods

This retrospective study investigates potential predictors of the outcome of an intensive SLT at RWTH Aachen University hospital. The Aachen Aphasia Test (AAT) was used as primary outcome measure at the end of each treatment cycle of 6-8 weeks. Between 2003-2020, data of the first treatment cycle of inpatients after an ischemic or hemorrhagic stroke in the post-acute (>6 weeks post-onset, n=278) or chronic stage (>12 months post-onset, n=456) of aphasia were included. Each individual was classified as a responder to treatment if at least one of the AAT subscales, subtests or the profile level showed significant improvement between the latest pre-treatment and the outcome assessment (Poeck et al.,1989). We separately investigated the influence of Age, Sex, Handedness, Education, Time post-onset, Aphasia syndrome, Aphasia severity and Hours of SLT with univariate and subsequent multivariate logistic regression analyses for the overall group and for the two subgroups based on chronicity.

Results

Of the 734 included patients 56% were classified as responders (63% of the post-acute and 52% of the chronic group). Univariate binary logistic regression analyses showed Age, Time post-onset, Aphasia syndrome, Aphasia severity and Hours of SLT as potential predictors for the overall group. The multivariate logistic regression analysis with these predictor variables was significant ($p<.001$) and R^2 was .062. Significant variables in this model were Time post-onset ($p=.006$), Age ($p=.012$; both negatively associated with good response) and Hours of SLT ($p=.047$; positively associated with good response, Figure 1). Handedness and Education were not predictive. The multivariate logistic regression analyses within the subgroups showed only Time post-onset for the post-acute group ($p=.013$) and Age for the chronic group ($p=.007$) as significant predictors.

Conclusions

This study confirms and extends the findings of Ali et al. (2021) with a more homogenous but comparatively large single-center dataset including additional variables. The results of the overall group support the assumption that younger age and earlier enrollment seem to be beneficial for good treatment response. Furthermore, our findings imply that Hours of SLT could be a predictor for language improvements. This needs to be investigated more systematically in future studies because the treatment program of our study aims to provide a comparable amount and frequency of SLT for each patient. The results of the subgroups indicate that different predictors might influence the therapy outcome depending on the chronicity of aphasia. The large amount of unexplained variability in this study shows that further examinations also need to consider other potential predictors (e.g., from brain imaging).

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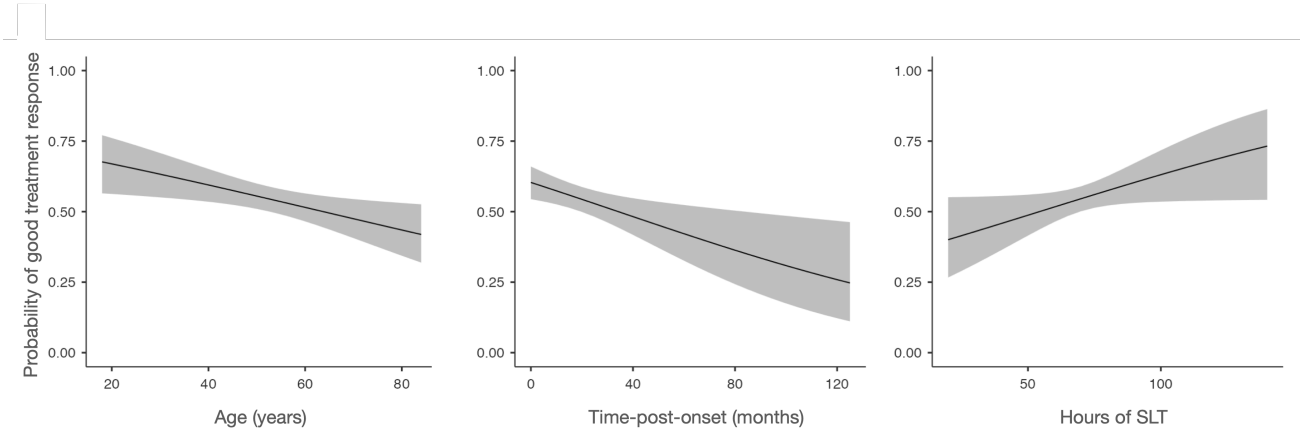

Figure 1: Probability of good treatment response depending on (a) Age, (b) Time-post-onset and (c) Hours of SLT with 95% Confidence Interval