

The Outcome of an Ischemic Stroke in the Anterior Circulation Depends On a Variety of Influencing Factors That Should Be Considered in Any Analysis

Sounira Mehri¹, and Josef Finsterer²

¹PhD, Biochemistry Laboratory, LR12ES05 "Nutrition-Functional Foods and Vascular Health", Faculty of Medicine, Monastir, Tunisia, ORCID 0000-0002-2221-7193

²MD, PhD, Neurology Dpt., Neurology & Neurophysiology Center, Vienna, Austria, Orcid: 0000-0003-2839-7305

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LETTER TO THE EDITOR

We were interested to read the article by Wrona *et al.* on a retrospective study of the outcome, as determined by the National Institute of Health Stroke Scale (NIHSS) and the modified Rankin Scale, of 307 patients with acute ischemic stroke (AIS) in the anterior circulation treated with thrombectomy [Wrona, P. *et al.*, 2024]. It was found that delayed neurological improvement (DNI) on day 7 after thrombectomy increased the likelihood of a good functional outcome (GFO) on day 90 in half of the patients [Wrona, P. *et al.*, 2024]. Among patients without DNI, 41% achieved a GFO on day 90 [Wrona, P. *et al.*, 2024]. Predictors of GFO were young age, low baseline NIHSS score, thrombolysis prior to thrombectomy, absence of undetermined etiology, absence of pneumonia, and high hemoglobin on admission [Wrona, P. *et al.*, 2024]. The study is convincing, but some points need to be discussed.

The first point is that apart from arterial hypertension, diabetes, hyperlipidemia, myocardial infarction, previous stroke, smoking and atrial fibrillation, no other comorbidities were considered as factors influencing the NIHSS or mRS after the intervention. Similarly, comedication in addition to concomitant thrombolysis should have been included in the analysis. In particular, antihypertensives, antidiabetics, antithrombotics, anticoagulants and drugs with sedative effects such as antidepressants, neuroleptics, antiseptics and tranquilizers can influence the NIHSS and mRS [Bansal, S. *et al.*, 2013].

The second point is the retrospective design of the study [Wrona, P. *et al.*, 2024]. Retrospective designs have the disadvantage that missing data cannot simply be supplemented, that desirable new data can no longer be generated and that the reliability of the data collected cannot simply be

checked. We should know how many patients were excluded due to missing data and how the reliability of the collected data was checked.

The third point is that patients with symptom onset <6h before thrombectomy and stroke onset 6h to 24h after last well-being were included [Wrona, P. *et al.*, 2024]. Thus, since symptoms occurred at most 18 hours before thrombectomy, it is conceivable that patients with a long latency between symptom onset and thrombectomy had a worse outcome compared to patients with symptom onset <6 hours. We should know whether the 90-day outcome depended on the latency between symptom onset and thrombectomy.

The fourth point is the definition of smoking [Wrona, P. *et al.*, 2024]. Since those who smoked in the past were also classified as smokers, it is conceivable that those who smoked long before the current stroke were also wrongly classified as smokers. The risk of stroke, and therefore outcome, can differ greatly between those who smoked years ago and those who smoked until the thrombectomy.

The fifth point is that stroke volume or concomitant edema was not included in the assessment. Since patients with a large stroke volume or large edema may have a worse outcome compared to patients with a small stroke volume, or no edema it would have been imperative to analyse these influencing factors as well.

In summary, it can be said that the interesting study has limitations that relativize the results and their interpretation. Clarification of these weaknesses would strengthen the conclusions and could improve the study. Before drawing final conclusions about the 7-day DNI and 90-day GFO in patients with stroke after thrombectomy, not only a selected number of factors influencing the

outcome, but the whole spectrum of influencing factors must be included in the analysis.

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