Neutrophil–Lymphocyte Ratio is Associated with Poor Clinical Outcome after Mechanical Thrombectomy in Stroke in Patients with COVID-19

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ABSTRACT

Introduction. The neutrophil–lymphocyte ratio (NLR) is an important biomarker and has been confirmed as a poor prognostic indicator in patients with COVID-19. We sought to describe the role of NLR in predicting poor outcome in COVID-19 patients undergoing mechanical thrombectomy for acute ischemic stroke.

Methods. We evaluated COVID-19 patients with LVO strokes enrolled into an international 12-center retrospective study of COVID-19, consecutively admitted between March 1, 2020 and May 1, 2020. Admission white blood cell differentials were analyzed; an increased NLR was defined using cutoff of ≥7.2.

Results. Out of a total of 6,698 patients admitted for COVID-19 to 12 stroke centers during the study period, the incidence of large vessel occlusion (LVO) stroke was 38/6,698 (0.57%). Mean age of our patients was 62 years (range 27-87), and the mortality rate was 30%. Age, gender and ethnicity were not predictive of mortality. Elevated NLR and poor vessel recanalization (Thrombolysis in Cerebral Infarction (TICI) score of 1 or 2a) were synergistically predictive of poor outcome (likelihood ratio 11.65, p=0.003). Patients with a NLR >7.2 were 6.8 times more likely to die (OR 6.8, CI95% 1.2-38.6, p=0.03) and almost 6 times more likely to have a poor outcome (OR 5.9, CI95% 1.3-27.3 , p=0.02). Patients with a NLR > 7.2 were almost 8 times more likely to require prolonged invasive mechanical ventilation (OR 7.8, CI95% 1.2-52.4,

p=0.03). In a multivariate analysis, NLR > 7.2 remained a predictor of poor outcome even when controlling for the effect of low TICI score on poor outcome (NLR p=0.043, TICI p=0.070).

Conclusions. This study shows that an elevated NLR in LVO patients with COVID-19 portends significantly worse outcomes and increased mortality regardless of recanalization status. Severe neuro-inflammatory stress response related to COVID-19 may negate the potential benefits of a successful thrombectomy.