

Cell Count Ratios as Outcome Predictors in Acute Ischemic Stroke Patients Treated with Mechanical Thrombectomy

Carlos De la Garza¹, Gabriel Torrealba-Acosta¹, Ameer E. Hassan^{2,3}, Shawn Moore¹, Hayden Hall¹, Alexander Sellers¹, Aaron Desai¹, Mostafa Jafari¹, Mohammad Hirzallah¹, Eric Bershad¹, Chethan P. Rao¹, Rahul Damani¹

¹ Department of Neurology, Division of Vascular Neurology and Neurocritical Care, Baylor College of Medicine, Houston, Texas, USA;

² Department of Neuroscience, Valley Baptist Medical Center, Harlingen, Texas; ³ Department of Neurology and Radiology, University of Texas Rio Grande Valley, Harlingen, Texas



Baylor
College of
Medicine

Background

- Past studies have raised concerns regarding over-selection and underutilization of endovascular therapy in mechanical thrombectomy (MT), patient selection must be refined and simplified.
- Neuroinflammation may be a potential marker in the selection of intervention. Inflammatory mediators account for local and systemic changes that may determine outcomes post-MT.
- Platelet-to-Lymphocyte ratio (PLR), Neutrophil-to-Lymphocyte ratio (NLR) and Lymphocyte-to-Monocyte ratio (LMR) are suggested as indicators of neuroinflammation and outcome.

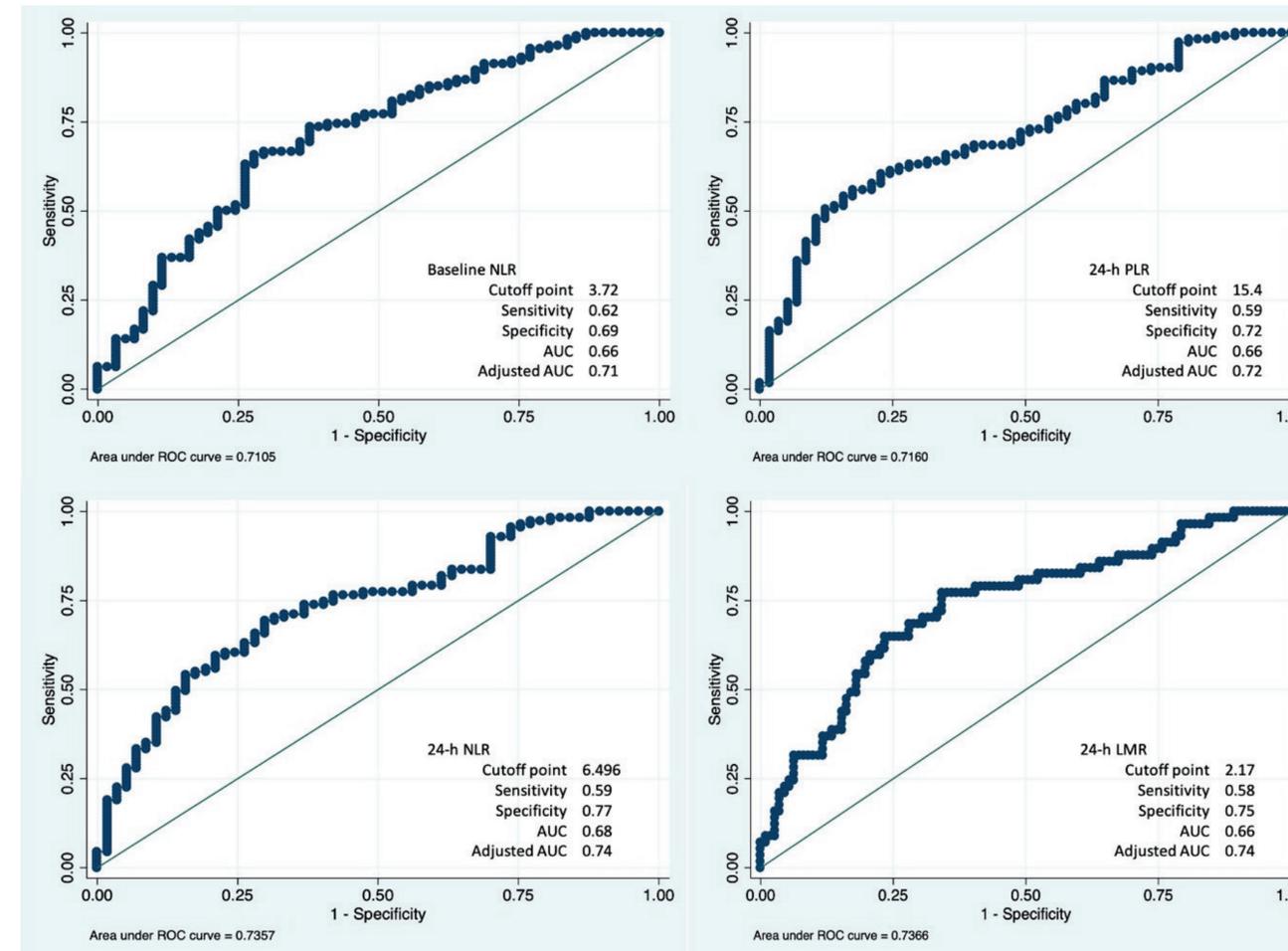
Methods

- Retrospective review of consecutive patients that underwent MT at Baylor St. Luke's Medical Center in Houston, Texas. Data from the January 2015 - April 2019 period was analyzed.
- Pre and post MT (where appropriate) demographics, clinical, laboratory, radiological, and functional outcomes (90-day mRS) were collected.
- NLR was calculated by dividing neutrophil count/lymphocyte count PLR and LMR were similarly calculated using their respective data points.
- Receiver operating characteristics (ROC) analysis were performed to determine the area under the curve (AUC), sensitivity and specificity of baseline and 24h post MT, NLR, PLR and LMR as predictors of functional outcome.
- Youden Index was utilized to identify best cutoff points for each marker.
- Adjusted Cox-proportional hazard survival analysis and multivariate logistic regression modeling was also utilized for prediction.
- Outcomes were dichotomized as poor (90-day mRS ≥ 3) or good (90-day mRS < 3).
- Statistical significance was set at $p < 0.05$.



Objectives

- Determine what role cell count ratios play in neuroinflammation and potential outcome prediction after MT.
- Establish if pre-procedural ratios predict outcomes and aid in patient selection.
- Establish the relationship between post-procedural ratios and outcomes at 90 days.



Results

- A total of 176 acute ischemic stroke patients that underwent mechanical thrombectomy were included: 52.3% male, average age 65.6 ± 14.9 years, and median baseline NIHSS of 16 (IQR 12-20).
- Patients with poor outcome had higher baseline PLR ($p = 0.0375$), NLR ($p = 0.0052$) in addition to higher 24 hour post-MT PLR ($p = 0.0189$) and NLR ($p = 0.0044$) and a lower 24 hour LMR ($p = 0.0168$).
- Baseline PLR, NLR, 24 hour post- MT PLR, NLR and LMR were established as predictors of functional outcome only in univariate analysis.
- Correlations lost significance when adjusted by sex, age and baseline NIHSS.
- Cox-proportional hazards regression analysis controlled by sex, age and baseline NIHSS suggested cutoff points of baseline NLR and 24 hour LMR as non-significant predictors of survival.

Conclusions

- Neuroinflammation plays role in stroke pathophysiology and may serve a role in patient selection as independent markers. However, once the described ratios were controlled by sex, age and baseline NIHSS they lost all significance.
- Further research is needed in order to adequately describe these markers as validated predictors of outcome and understand their role in patient selection for MT.

Baseline PRL, NLR and 24-h PLR, NLR and LMR were predictors of functional outcomes in univariate analysis. However, baseline NLR and 24-h LMR cutoff points showed a non-significant association with 90-day survival after controlling by age, sex and baseline NIHSS.