

Neutrophil Percentage-to-Albumin Ratio as a possible biomarker for Amyotrophic Lateral Sclerosis progression: insights from the PRO-ACT Database.

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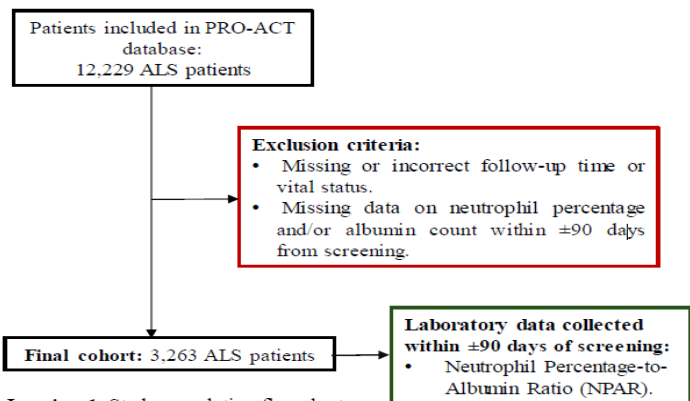
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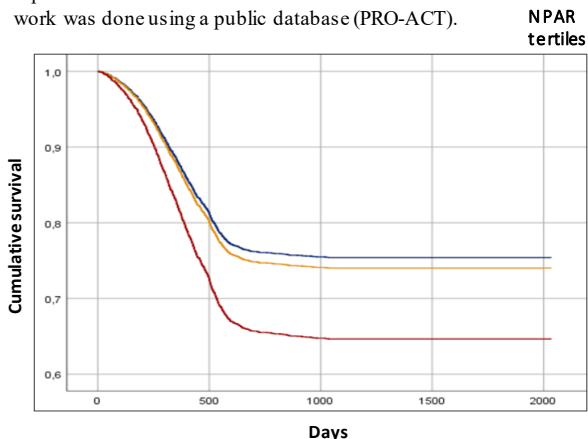
Objectives: recent studies have highlighted the role of systemic inflammation in the pathogenesis and progression of Amyotrophic Lateral Sclerosis (ALS). Among various inflammatory biomarkers, the neutrophil-to-lymphocyte ratio (NLR) has been proposed as a reliable marker. Recently, the neutrophil percentage-to-albumin ratio (NPAR), a novel marker of systemic inflammation, has recently demonstrated prognostic utility in other neurological conditions such as ischemic stroke, intracerebral hemorrhage, and cognitive decline. The aim of this study was to investigate the potential prognostic role of NPAR in ALS and its association with clinical features and outcomes.



Imagine 1. Study population flowchart.

Materials: we analyzed a cohort of 3,263 ALS patients from the PRO-ACT database. Eligible patients had recorded values for NPAR and NLR within ± 90 days from the date of study enrollment. The median age of the cohort was 57 years (interquartile range [IQR]: 49-75); 62.7% were male and 37.3% were female. During follow-up, 28.7% of patients either died or underwent tracheostomy.

Methods: patients were stratified into tertiles based on NPAR values. Statistical comparisons between groups were conducted with the Chi-square and the Kruskal-Wallis test as appropriate. Logistic regression analyses were conducted to explore associations between NPAR tertiles and clinical outcomes. Patient survival was assessed via Cox regression. The work was done using a public database (PRO-ACT).



Imagine 2. Kaplan-Meier curves showing cumulative survival across NPAR tertiles.

Results: NPAR showed significant differences across tertiles in age at symptom onset, ALSFRS-R score, disease progression rate (DPR) at recruitment, and follow-up days ($p < 0.001$). Higher NPAR values were associated with later diagnoses, lower ALSFRS-R scores, faster DPR, and shorter follow-up. Logistic regression revealed significant associations with clinical outcomes ($p < 0.001$). Cox regression showed reduced survival in group with higher NPAR (OR: 1.32; CI: 1.12- 1.54), even after adjusting for age, gender, ethnicity, and site of symptom onset.

Discussion: our findings support the hypothesis that NPAR reflects a systemic inflammatory state that negatively impacts ALS progression. Given its simplicity and accessibility, NPAR could be integrated into routine clinical evaluations to improve risk stratification.

Conclusions: in a large cohort of ALS patients, NPAR appears to be a potential accessible blood biomarker for predicting clinical outcomes, supporting the role of neuroinflammation in ALS.