PLATELET-TO-LYMPHOCYTE RATIO PRIOR TO LYMPHODEPLETION PREDICTS SEVERE CHIMERIC ANTIGEN RECEPTOR T-CELL-RELATED TOXICITIES IN DIFFUSE LARGE B-CELL LYMPHOMA PATIENTS

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Background: Anti-CD19 chimeric antigen receptor (CAR) T-cell therapy has significantly improved outcomes in patients with relapsed or refractory diffuse large B-cell lymphoma (DLBCL), but immune effector cell–associated adverse events (IEC-AEs), such as cytokine release syndrome (CRS) and neurotoxicity (ICANS), remain major challenges. Severe IEC-AEs (Grade >=3) often require intensive care and can be fatal. Identifying patients at risk before therapy is a critical unmet need. The platelet-to-lymphocyte ratio (PLR), a readily available inflammatory biomarker, has shown prognostic value in hyperinflammatory states like COVID-19. Given shared mechanisms between cytokine storms and CRS, we hypothesized that baseline PLR could predict severe IEC-AEs in CAR T-cell recipients.
Methods: In this single-center retrospective study, we analyzed 15 relapsed/refractory DLBCL patients treated with tisagenlecleucel (Nov 2023–Apr 2025). Baseline blood counts, C-reactive protein (CRP), and ferritin were collected before lymphodepletion. PLR was calculated as platelet count divided by lymphocyte count. IEC-AEs were graded per American Society for Transplantation and Cellular Therapy (ASTCT) criteria. The primary endpoint was Grade >=3 CRS or ICANS. Receiver operating characteristic (ROC) analysis identified the optimal PLR cutoff for predicting severe IEC-AEs. Correlation between baseline PLR and ferritin fold change post-infusion was also assessed.
Results: Six patients (40%) developed severe IEC-AEs. Median PLR was higher in these patients (342 vs. 156, p=0.0401). ROC analysis showed PLR had an area under the curve (AUC) of 0.82, with a cutoff of 198 (sensitivity 85.7%, specificity 87.5%). Severe IEC-AEs occurred in 85.7% of PLR-high patients versus 12.5% of PLR-low patients (p=0.01). Baseline PLR correlated strongly with ferritin fold change (r=0.7, p=0.0046), suggesting a pre-existing pro-inflammatory state.
Conclusions: Baseline PLR is a simple, effective predictor of severe IEC-AEs in CAR T-cell recipients. Prospective studies are needed to validate these findings and integrate PLR into pre-infusion risk stratification.