

Neutrophil-Lymphocyte Ratios Predict Venous Thromboembolism Risk After Total Joint Arthroplasty

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INTRODUCTION: Inflammation is a proposed risk factor for venous thromboembolism (VTE) following total joint arthroplasty (TJA). The neutrophil-lymphocyte ratio (NLR) is a measure of systemic inflammation that is computed using complete blood count (CBC). This study sought to evaluate a NLR threshold above which the risk of VTE increases.

METHODS: The Premier Healthcare Database was utilized to identify all patients who underwent total knee arthroplasty (TKA) or total hip arthroplasty (THA) between 2016-2023 with a NLR value obtained 1-14 days preoperatively. Restricted cubic splines were generated using logistic regression to assess the relationship between NLR and 90-day risk of VTE. A threshold was identified using a Markov Chain Monte Carlo simulation. Multivariable regression including postoperative VTE chemoprophylaxis and history of VTE was used to assess differences between cohorts with NLR values above and below the predicted threshold.

RESULTS: 47,973 patients were identified with a preoperative NLR. A rounded threshold NLR of 4.0 was identified and used to create the study cohorts. The cohort above this threshold value was older (68.5 vs. 66.1 years, $p < 0.001$) and had a higher Charlson comorbidity index (3.4 vs. 2.9, $p < 0.001$). Significantly higher rates of postoperative VTE were observed in the cohort with an $NLR > 4.0$ (0.8% vs. 1.5%, $p < 0.001$; deep vein thrombosis: 0.6 vs. 1.06%, $p < 0.001$; pulmonary embolism 0.28 vs. 0.45%, $p = 0.005$). After adjusting for confounding, patients with a preoperative $NLR > 4.0$ were at 74% greater odds of having a VTE (odds ratio 1.74, 95% confidence interval=1.43-2.13, $p < 0.001$).

DISCUSSION AND CONCLUSION:

A preoperative $NLR > 4.0$ is predictive of VTE among patients undergoing TJA. These results provide actionable data for preoperative risk stratification by identifying high-risk patients.

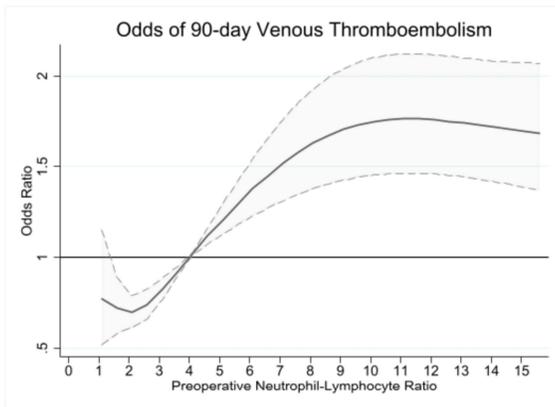


Figure 1. Restricted cubic spline depicting the relative odds of 90-day venous thromboembolism across preoperative neutrophil-lymphocyte ratio values.