Neutrophil to Lymphocyte Ratio and Risk of Atrial Fibrillation

We wish to commend the investigators of the article entitled "Relation of Neutrophil to Lymphocyte Ratio to Risk of Incident Atrial Fibrillation" by Berkovitch et al.[1] Neutrophils are known to play a role in the inflammatory response to injury[2] and the negative prognostic implications of elevated neutrophil values have been documented.[3] The ratio of neutrophils to lymphocytes however has been found to be a more sensitive predictor of outcomes in various clinical settings. The investigators examined the relation between neutrophil to lymphocyte ratio (NLR) and risk of atrial fibrillation (AF).

We have reported on the impact of elevated NLR on outcomes in 3,027 patients who underwent cardiac surgery.[4] Although AF was not one of our end points, we did find a higher incidence of AF at baseline (18% vs 12%, $p < 0.0001$) as well as a higher incidence of new AF after surgery (25% vs 21%, $p = 0.01$) in patients with elevated NLR. Elevated NLR was an independent predictor of adverse outcomes with over a twofold risk of operative mortality ($p < 0.001$). High NLR remained an independent predictor of reduced survival also in patients surviving surgery ($p = 0.0003$). We also examined the impact of elevated NLR in subgroups according to absolute neutrophil values: 81% were within normal range, 19% were above normal range. NLR was predictive of mortality in all these subgroups.

In this manuscript, patients with elevated NLR comprised 17% of the study population, not different from the incidence in our study. It is of interest in this present study, did the investigators analyze within the subgroups of neutrophils?

Despite rigorous preprocedural evaluation, we do not succeed in identifying all risk factors. NLR seems to unmask an increased risk of adverse outcomes, however, does not identify the underlying cause. Whether anti-inflammatory treatment will reduce risk is uncertain and remains a topic for further investigation.

Shuli Silberman, MD
Daniel Fink, MD

Shaare Zedek Medical Center, Department of Cardiothoracic Surgery, Jerusalem, Israel

12 March 2019
14 March 2019

1. Berkovitch A, Younis A, Grossman Y, Segev S, Kivity S, Sidi Y, Beinart R, Goldenberg I, Maor E. Relation of neutrophil to lymphocyte ratio to risk of incident atrial fibrillation. *Am J Cardiol* 2019;123:396–401.
2. Horne BD, Anderson JL, John JM, et al. Which white blood cell types predict increased cardiovascular risk? *J Am Coll Cardiol* 2005;45:1638–1643.
3. Guasti L, Dentali F, Castiglioni L, et al. Neutrophils and clinical outcomes in patients with acute coronary syndrome and/or cardiac revascularization. A systematic review on more than 34,000 subjects. *Thromb haemost* 2011;106:591–599.
4. Silberman S, Abu-Yunis U, Tauber R, Shavit L, Grenader T, Fink D, Bitran D, Merin O. Neutrophil-lymphocyte ratio: prognostic impact in heart surgery. Early outcomes and late survival. *Ann Thorac Surg* 2018;105:581–586.

https://doi.org/10.1016/j.amjcard.2019.03.033

Outcomes and Resource Utilization for Nonelective Versus Elective Transcatheter Mitral Valve Repair

Transcatheter mitral valve repair (TMVr) has emerged as an effective treatment for severe mitral regurgitation (MR) in patients who are not suitable for surgical interventions.[1] Although the majority of patients undergo TMVr on an elective basis, many are referred for the procedure nonelectively due to decompensated heart failure. In the German TRAMI registry, 15% of patients underwent TMVr during nonelective hospitalizations.[2] Data from the early commercial experience with TMVr in the United States showed excellent short-term outcomes for patients who underwent TMVr overall, but did not assess the impact of presentation acuity on post-procedural outcomes.[1] We sought to investigate the incidence of nonelective TMVr and to compare in-hospital morbidity, mortality, resource utilization, and cost of elective versus nonelective TMVr using a nationally representative database.

Patients who underwent TMVr between January 1, 2011 and December 30, 2016 were identified in the National Inpatient Sample (NIS) using ICD-9-CM code (35.97) and ICD-10-CM code (02UG3JZ). The NIS is the largest public all-payer administrative database and contains information about discharges from 1,000 hospitals in 45 states representing 20% of all US hospitalizations. National estimates were calculated using the Agency for Healthcare Research and Quality weighting method, and those were used in all analyses. The procedure was classified as elective if the admission was assigned "elective" status in the NIS and TMVr occurred on day 0 or 1 of the admission. Patients with unknown procedure day or admission status were excluded. The primary outcome was in-hospital death. Secondary outcomes were postoperative complications, length of stay, rates of nonhome discharges, and cost. Outcomes were compared using chi-square test for categorical variables and independent samples t test for continuous variables. A type 1 error rate of <0.05 was considered statistically significant. Statistical analyses were performed using SPSS-version-24 (IBM corporation, Armonk, New York).

A total of 7,915 patients were included in the analysis of whom 6,329 (20%) were performed electively and 1,586 (20%) were performed during nonelective admissions. Patients who underwent nonelective TMVr were younger (72 ± 14 vs 77 ± 12 years), were less often of white race (72.1% vs 81.1%) and had higher prevalence of diabetes (30% vs 25%), chronic kidney disease (49.4% vs 25.9%), chronic lung disease (28.3% vs 23.5%), anemia (36.2% vs 22.8%), and atrial fibrillation (61% vs 56%), $p < 0.001$ for all. In-hospital mortality was higher in the nonelective group (6.9% vs 1.4%, $p < 0.001$). Rates of stroke, acute kidney injury, new dialysis, permanent pacemaker implantation, and blood transfusion were all significantly higher in the nonelective group which also experiences prolonged hospitalizations and a higher rate of nonhome discharge (Table 1). The mean cost of hospitalization in patients who underwent TMVr during nonelective admission was $\$77{,}861 \pm 69{,}118$, which was ~80% higher than the cost of hospitalization for elective TMVr.

The advent of TMVr has revolutionized the treatment of high-risk patients with severe MR. However, a significant percentage of those patients present acutely with decompensated heart failure.[1,2] Acute presentation has been