CELLULAR INDICES OF PE

Abhinav Paknikar, Aniket Talanki, Sonal Kapuria, Neha Thomas and Atul Laddu, Global Thrombosis Forum, Suwanee, GA
Keywords: PE, Cellular indices, Diagnosis of PE, Prognosis of PE

BACKGROUND

PE is a life-threatening condition accounting for over 100,000 deaths annually in the United States and is the third leading most common cause of cardiovascular death. PE is associated with complex inflammatory, hematological processes and hemostatic imbalances.

METHODS

We researched the literature on pathophysiology of PE. Current and most widely used risk stratification model (simplified pulmonary embolism severity index, sPESI) is a scoring system that uses 6 clinical variables to predict death and prognosis, but it suffers from a low positive predictive variable suggesting that these models have suboptimal accuracy in patients with high risk.

RESULTS

There has been growing interest in demonstrating some blood cellular indices obtained from a complete CBC and their correlation in predicting prognosis in patients with PE (Figure 1).
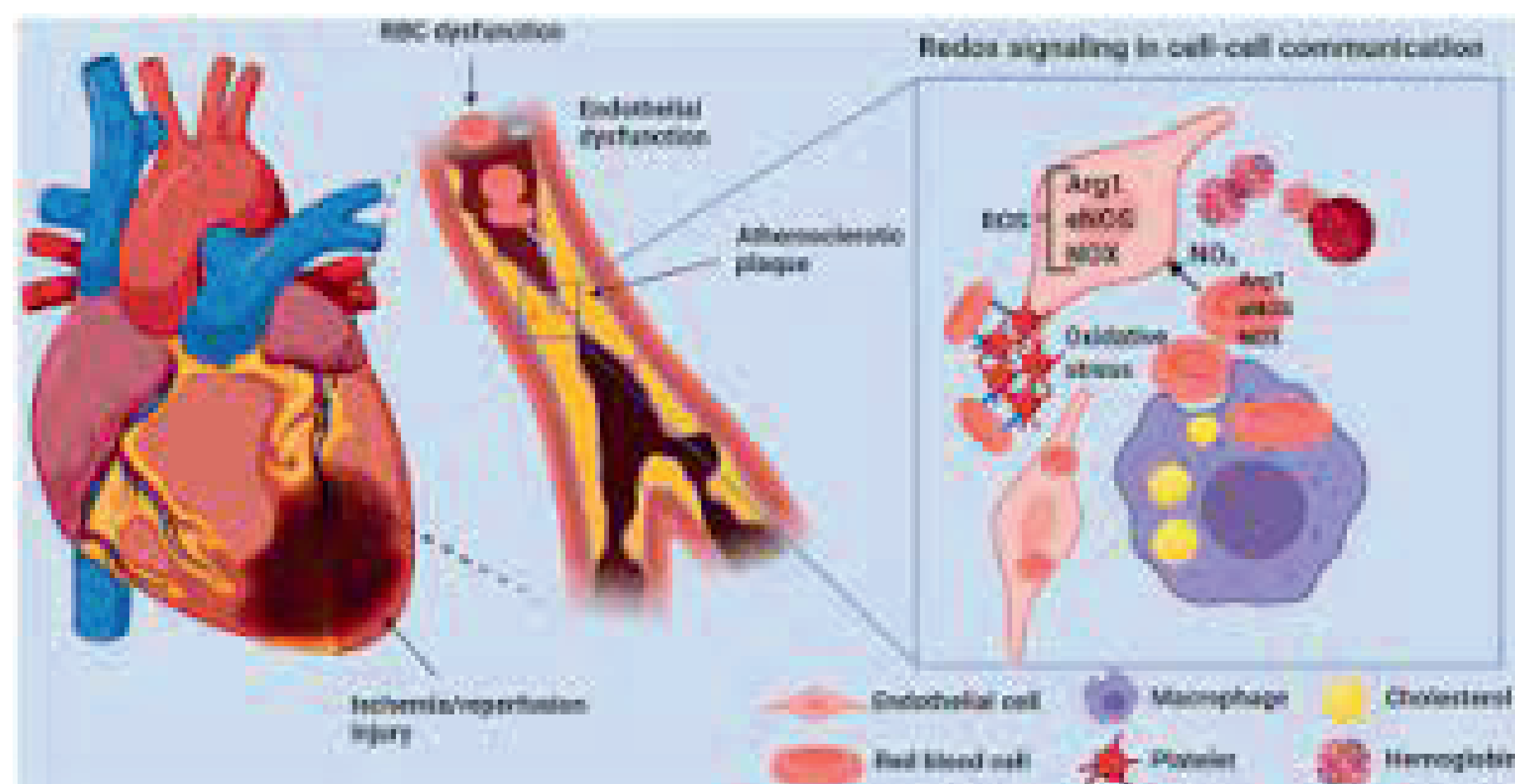

Figure 1: Interactions seen between red blood cells and vascular wall suggesting red cell dysfunction may lead to cardiovascular complications.

RESULTS, CONTD.

CBC with differential is a widely used, low-cost test that can augment current risk stratification tools for all-cause mortality in acute PE patients. Certain cellular indices such as platelet-lymphocyte ratio (PLR), neutrophil-lymphocyte ratio (NLR) and lymphocyte-monocyte ratio (LMR) have been identified as markers of systemic inflammation but are associated with poor prognosis in patients with acute PE and all-cause mortality in PE patients (Figure 2).
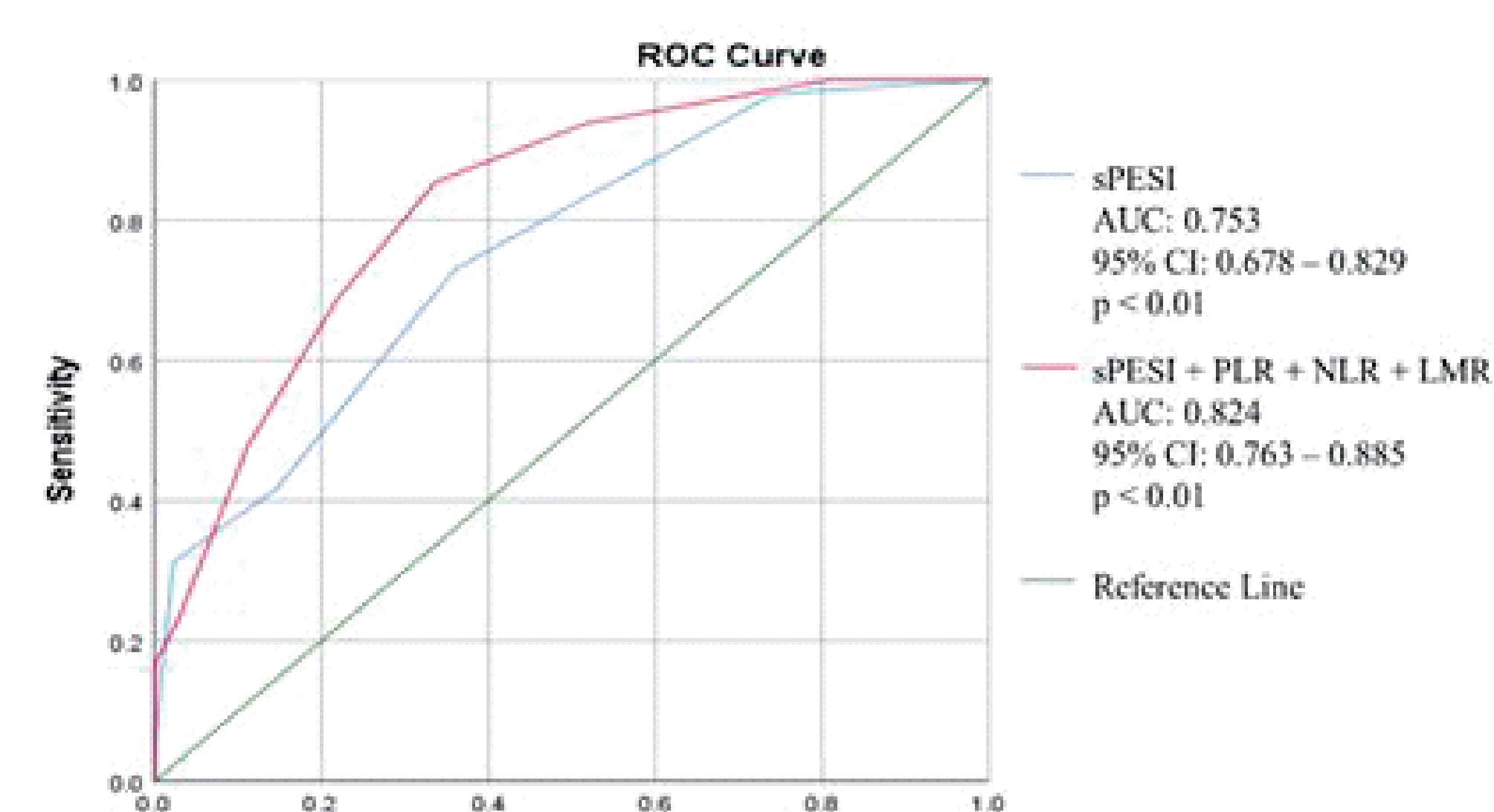

Figure 2: Characteristic curve assessing sPESI and blood cellular indices to predict all-cause mortality in acute PE cases.

sPESI including red cell distribution width, hematocrit and neutrophil-lymphocyte ratio had better predictive ability as compared to sPESI alone (AUC: 0.852 vs 0.754). Blood cellular indices contribute an inflammatory and hemodynamic perspective not currently included in sPESI. A clear and close association between PLR, NLR, and LMR and all-cause mortality in PE patients has been demonstrated. Lymphopenia as well as elevated neutrophil count are associated with pro-inflammatory states during cardiopulmonary events, which may increase risk for thrombotic events. Platelets, a key component of thrombosis, are significantly decreased immediately after a thrombotic event.

RESULTS, CONTD.

The composite sPESI model, including PLR, NLR, and LMR exhibits higher sensitivity which allows for improved detection of patients who are at high risk for death.

CONCLUSION

The composite sPESI model, including PLR, NLR, and LMR exhibits higher sensitivity, and of the various cellular indices for PE, PLR, NLR, and LMR appear to be the most associated with all cause mortality in PE patients.

IMPORTANCE OF OUR WORK

The cellular indices, such as PLR, NLR, and LMR exhibit a higher sensitivity which allows for improved detection of patients who are at high risk for death. Of the various cellular indices for PE, PLR, NLR, and LMR appear to be the most associated with all-cause mortality in PE patients.

The authors disclose no conflict of interest.

REFERENCES

1. Siddiqui, Fakiha; García-Ortega, Alberto; Kantarcioglu, Bulent, et al: Cellular Indices and Outcome in Patients with Acute Venous Thromboembolism, Clin Appl Thromb Hemost, 28, 2022.
3. Slajus, Brett; Brailovsky, Yevgeniy; Fareed, Jawed, et al: Utility of Blood Cellular Indices in the Risk Stratification of Patients Presenting with Acute Pulmonary Embolism, Clin Appl Thromb Hemost, 27, 2021