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SIGNIFICANCE OF GALECTIN-3 AND ECHOCARDIOGRAPHIC PARAMETERS IN PREDICTING LONG-COVID COMPLICATIONS IN THE OLDER POPULATION

Nana Egiashvili[1], Levan Ratiani[2], Nona Kakauridze[3]

[1]First University Clinic, Tbilisi State Medical University, Tbilisi, Georgia

[2]Anesthesiology, Reanimatology and Toxicology Department, First University Clinic, Tbilisi State Medical University

[3]Internal Medicine Department,Tbilisi State Medical University (TSMU), Tbilisi, Georgia

Background: The post-acute sequelae of COVID-19 (Long-COVID) present a critical clinical challenge in elderly individuals aged 60 years and older. In this vulnerable population, the convergence of persistent systemic inflammation and accelerated myocardial fibrosis acts as a primary substrate for high-risk cardiovascular events. Identifying reliable, non-invasive diagnostic strategies tailored for older adults is essential to anticipate urgent clinical deterioration and mitigate mortality risks.

Objective: To evaluate the combined prognostic utility of serum Galectin-3 (Gal-3)—a prominent pro-fibrotic and inflammatory biomarker—and specific echocardiographic parameters in predicting adverse outcomes, including heart failure exacerbation and cardiac death, secondary to post-COVID myocardial fibrosis in elderly patients.

Methods:A retrospective and observational review was conducted on hospitalized and post-discharge COVID-19 patients aged 60 and older treated at the First University Clinic of TSMU. Serum Galectin-3 concentrations were quantified alongside comprehensive transthoracic echocardiographic (TTE) and electrocardiographic (ECG) assessments during the acute and post-acute phases.

Results: Fibrosis-Driven Arrhythmogenesis & Cardiac Death: In the +60 cohort, persistently elevated Galectin-3 served as a direct surrogate marker for progressive myocardial fibrosis. This fibrotic remodeling creates an unstable electrical substrate, driving severe ventricular arrhythmias and escalating the long-term risk of cardiac death.

Urgent Heart Failure & Mortality Risks: High Gal-3 levels during the post-COVID phase strongly predicted urgent hospital readmissions for new-onset or worsening heart failure. The biomarker

successfully stratified patients at the highest risk for cardiovascular mortality and acute hemodynamic collapse.Left-Heart Remodeling: Elevated Gal-3 demonstrated a strong, statistically significant correlation with structural left-heart alterations in the +60 cohort, most notably left atrial (LA) enlargement and markers of left ventricular diastolic dysfunction, worsening the mechanical burden.Right-Heart Strain: Higher biomarker concentrations were closely linked to adverse changes in the right side of the heart, reflecting right ventricular strain and adaptive remodeling secondary to elevated pulmonary artery pressures.

Conclusion: Serum Galectin-3 is a highly sensitive prognostic biomarker for post-COVID myocardial fibrosis in the +60 population. Integrating Gal-3 tracking with targeted echocardiographic profiling provides a powerful clinical instrument to predict life-threatening complications, such as heart failure and cardiac death, allowing for timely, life-saving interventions in vulnerable older patients.

Keywords: Galectin-3, Echocardiography, Myocardial Fibrosis, Heart Failure, Aged Population, Cardiac Death.