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THE ROLE OF PCSK9 IN CARDIO-GERIATRIC PATIENTS

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Background: Proprotein convertase subtilisin/kexin type 9 (PCSK9) plays a pivotal role in the progression of atherosclerotic cardiovascular disease (ASCVD) by regulating low-density lipoprotein receptor (LDLR) degradation. In cardio-geriatric patient cohorts aged 60 and older, the association between circulating PCSK9, low-density lipoprotein cholesterol (LDL-C) elevation, and acute myocardial infarction (MI) phenotypes is highly pronounced. Emerging evidence indicates that PCSK9 actively promotes systemic vascular inflammation, macrophage foam cell formation, and necrotic core expansion independently of baseline lipid parameters. Diagnosing and managing hypercholesterolemia in this elderly population remains clinically challenging due to high rates of statin intolerance, age-related metabolic shifts, multi-morbidity, and advanced endothelial senescence.

Objective: this clinical study evaluates the specific relationship between plasma PCSK9 levels, LDL-C, and coronary atherosclerosis progression. It establishes the explicit biomarker profile of geriatric patients (60+) during the acute and subacute phases of MI within the Georgian population.

Methods: A rigorous clinical evaluation was performed on the patients with MI aged 60 to 85 years admitted to the TSMU First University Clinic. Fasting peripheral blood samples were systematically collected to quantify circulating PCSK9 concentrations and standard lipid fractions. Comprehensive correlation analyses tracked lipid-dependent and non-lipid dependent inflammatory trends. Detailed cardiovascular imaging and multi-variable regression protocols were deployed to assess the direct correlation between elevated PCSK9 expressions, plaque vulnerability, and ischemic recurrence risk across age-stratified geriatric brackets.

Results: The findings demonstrate a distinct, statistically significant positive correlation between elevated plasma PCSK9 expressions and circulating LDL-C fractions during both acute and subacute MI phases in patients over 60 years old. High PCSK9 titers strongly correlate with aggressive coronary artery disease (CAD) phenotypes and accelerated atherogenesis in older adults. Beyond standard receptor degradation, PCSK9 acts as an autonomous inflammatory mediator, accelerating vascular remodeling and plaque destabilization in aging vessels. Incorporating targeted PCSK9 inhibitors into geriatric triage protocols achieves a profound, sustained LDL-C reduction, drastically minimizing residual atherothrombotic risk and ischemic stroke occurrence in these elderly cohorts.

Conclusion: This study confirms that elevated plasma PCSK9 serves as a vital prognostic indicator for early myocardial infarction and advanced coronary atherosclerosis in cardio-geriatric patients aged 60+. Early screening of this biomarker matrix provides a powerful clinical mechanism for risk stratification. Implementing personalized PCSK9 targeting therapies offers an exceptionally effective, well-tolerated lipid-lowering strategy, optimizing therapeutic adherence and long-term functional survival rates within vulnerable geriatric populations.

Keywords: PCSK9, Myocardial Infarction, Cardio-Geriatrics, Elderly