

Physician - Coronary Artery Diseases and Surgery

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The Biomarker Potential of Serum-Derived Exosomes Carrying Autophagic Regulators in Carotid Artery Stenosis Patients

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Objective: This study aimed to investigate the biomarker potential of exosomes as autophagic regulators for discriminating ulcerated from smooth ones by serum-derived exosome isolation and real-time quantitative polymerase chain reaction (RT-qPCR) analysis.

Methods: Eight carotid artery stenosis (CAS) patients (6 males, 2 females; mean age: 65.7±11 years) were included in the study conducted. Plaque ulceration was determined by Doppler ultrasonography. Afterward, the serum was separated and exosome/exosomal RNA isolation was performed using an exoRNeasy Midi Kit. Transmission electron microscopy and nanoparticle tracking analysis were performed for exosome characterization. Finally, the expression of autophagy-related genes (Atg5, Atg12, Beclin, and LC3) was analyzed by RT-qPCR.

Results: Five (62.5%) patients had ulcerated carotid plaques. The patients' stenosis degree was 70% or greater. Based on the RT-qPCR (120 nm), Atg12, Beclin, LC3, and Atg5 levels were downregulated by 3.79-, 5.28-, 2.40- (p>0.05), and 4.83-fold (p=0.02) in ulcerated plaques, respectively.

Conclusion: Although further validation is needed, data suggests that autophagy-related mRNA cargoes of serum-derived exosomes may be potential biomarkers for risk stratification based on plaque surface morphology in CAS patients.

Keywords: Autophagy, carotid artery stenosis, exosome, ulcerated plaques.