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Original Article

Evaluation of miRNA-133a-3p and miRNA-124-3p expression in atherosclerosis using real-time PCR and immunohistochemical methods

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Background and objectives: Atherosclerosis is a chronic disease marked by the build up of lipids and inflammatory cells in arterial walls, leading to vessel narrowing and increasing the risk of serious complications like heart attack and stroke. Recent findings suggest that microRNAs (miRNAs) serve as key regulators in the mechanisms driving atherosclerotic disease. However, the expression levels and functional roles of miRNA-133a-3p and miRNA-124-3p in atherosclerosis remain incompletely understood. The aim of this study was to determine the relationship between the expression levels of miR-124-3p and miR-133a-3p, and the phenotypic changes of S100A4-positive vascular smooth muscle cells in atherosclerosis.

Methods: We collected tissue samples from 25 patients with atherosclerosis who underwent coronary artery bypass graft surgery. IMA tissues were used as controls, atherosclerotic aortic tissues as cases. Expression levels of miRNAs were assessed using reverse transcription polymerase chain reaction (RT-PCR). Tissue samples underwent immunohistochemical staining with S100A4 protein to evaluate cellular and structural characteristics.

Results: A marked decrease in the expression of miR-133a-3p and miR-124-3p was observed in the atherosclerosis group compared to the control group, and both differences were statistically significant (P=0). Additionally, an increase in S100A4 protein immunoreactivity was detected in the atherosclerosis group.

Interpretations and conclusions: The downregulation of miRNA-133a-3p and miRNA-124-3p in atherosclerotic tissues, along with the observed increase in S100A4 protein immunoreactivity, suggests that these two miRNAs may play a role in the regulation of inflammatory endothelial phenotypes. Therefore, the interaction between miRNA-133a-3p, miRNA-124-3p, and S100A4 protein may help elucidate a potential mechanism underlying the prevention of atherosclerosis.

Keywords Atherosclerosis; miRNA-133a-3p; miR-124-3p; S100A4; Vascular smooth muscle cells