Circulating miRNAs associated with acute myocardial infarction treated with primary percutaneous coronary intervention

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BACKGROUND: Circulating microRNAs (miRNAs) have been suggested as potential diagnostic biomarkers for coronary artery disease (CAD) and heart failure. Nevertheless, little is known about their possible correlation with cardiac remodeling after acute myocardial infarction (AMI).

PURPOSE: We aimed to study the expression of circulating miRNAs in plasma of patients with an acute ST-elevation myocardial infarction (STEMI) undergoing primary percutaneous coronary intervention (PPCI). We sought to correlate the level of these miRNAs with the consequent adverse cardiac remodeling observed in some patients.

METHODS: Taqman-array was used to analyze the expression of 384 miRNAs in blood samples collected from 12 patients. The expression of miRNAs was further validated, using qRT-PCR, in blood samples of patients with STEMI, before PPCI (time 0) and after revascularization (at 3, 12 and 24 hours). As control we took blood samples from patients who, after a pain chest, underwent coronary angiogram and finally they did not present any coronary lesions.

RESULTS: The analysis of miRNAs’ expression shows a time-dependent release of miRNAs in the blood of patients with maximum expression at 12 hours after PPCI. We found significant changes in the expression of some miRNAs, previously related to different cardiovascular diseases, such as miR-133a, miR-133b, miR-499 and miR-423-5p. In addition, we found that the expression level of new miRNAs, miR-193b, miR-324 and miR-339-5p was significantly increased 12 hours after PPCI, whereas miR-519a, miR-522 and miR-545 levels were significantly reduced. Next, we analyzed the correlation between cardiac remodeling, indicated by echocardiography hemodynamic parameters, and miRNAs levels changes. Importantly, the increment in some miRNA levels correlated with the appearance of left ventricular remodeling in 20% of the patients 6 months after the ischemic event.

CONCLUSION: We determined the time course of new circulating miRNAs release in patients with AMI treated with PPCI. Our data suggest, for the first time, that some miRNAs might be an early and sensitive marker predicting left ventricular remodeling in patients undergoing PPCI.