Abstract


Circulating inflammation-resolving lipid mediators RvD1 and DHA are decreased in patients with acutely symptomatic carotid disease.

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BACKGROUND: Efficient biomarkers for early prediction and diagnosis of an acutely symptomatic carotid plaque rupture event are currently lacking, impairing the ability to diagnose and treat patients with an acute plaque rupture events in a timely fashion. Resolvins are endogenous inflammation-resolving lipid mediators that are induced by inflammatory insults. We hypothesized that resolvin and other lipid profiles in sera likely mark the process towards plaque rupture.

METHODS: Circulating lipids associated with plaque rupture events were quantitatively profiled via targeted mediator-lipidomics using ultraperformance liquid chromatography tandem mass spectrometry in patients with acutely symptomatic and asymptomatic carotid disease.

RESULTS: Resolvin D1 (RvD1, 82 ± 11pM vs. 152 ± 17pM, p = 0.001) and docosahexaenoic acid (DHA) (0.052 ± 0.007µM versus 0.076 ± 0.008µM, p = 0.025) levels are decreased in the sera of patients presenting with an acutely symptomatic carotid plaque rupture event (n = 21) compared to patients with asymptomatic (n = 24) high-grade carotid stenosis. Circulating arachidonic acid (AA) levels, however, were higher (0.429 ± 0.046µM versus 0.257 ± 0.035µM, p < 0.01) in acutely symptomatic compared to asymptomatic carotid patients. ROC curve analysis demonstrates that the serum ratio AA:RvD1 (AUC 0.84, sensitivity 0.71, specificity 0.92) and AA:DHA (AUC 0.86, sensitivity 0.90, specificity 0.71) are biomarkers for the risk of atherosclerotic plaque rupture.

CONCLUSIONS: A circulating pro-inflammatory lipid profile, characterized by high AA:RvD1 and AA:DHA, is associated with acutely symptomatic carotid disease and stroke.

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