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Increased microRNA-21 gene expression levels as a biomarker of myocardial damage in acute myocarditis

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Purpose: MicroRNAs (miRs) are implicated in various cardiovascular pathologies and are promising diagnostic and therapeutic targets. miR-21 plays a critical role in the regulation of inflammation and cardiac fibrosis. In this study, we evaluated miR-21 expression levels in peripheral blood mononuclear cells from patients with acute myocarditis compared to healthy individuals and explored their diagnostic potential as predictor of myocardial damage.

Methods: We assessed the expression levels of miR-21 in 55 patients with acute myocarditis (40 men, mean age 30 ± 12 years) and 20 healthy individuals (15 men, mean age 30 ± 9 years). Blood samples were taken on admission and miR-21 expression levels in peripheral blood mononuclear cells were quantified by real-time reverse transcription polymerase chain reaction. Plasma high sensitive troponine (TnI) was measured by immunoassay and a value above the laboratory reference range (11.6 pg/ml) was considered elevated.

Results: Myocarditis patients showed significantly higher troponine levels compared to healthy individuals (256.59 ± 94.9 versus 11.9 ± 9.01 , $p<0.001$). miR-21 expression levels in peripheral blood mononuclear cells were significantly elevated in the myocarditis group compared to the control group (47.01 ± 18.3 versus 3.8 ± 2.2 , $p=0.02$). In addition, miR-21 expression levels in peripheral blood mononuclear cells revealed a significant correlation with troponine levels in those patients ($r=0.55$, $p<0.001$).

Conclusions: Our data reveal that miR-21 is upregulated in peripheral blood mononuclear cells from patients with acute myocarditis relative to healthy individuals and is significantly correlated with myocardial damage in those patients. Our findings indicate that miR-21 may be involved in the pathophysiology of myocarditis and represent promising biomarker in the disease.