Inflammatory and fibrotic myocardial involvement

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Introduction: The aim of my work was to evaluate the comprehensive approach to diagnosis and eventually monitoring the trend in two cardiac diseases of non-ischemic etiology. The first part is focused on evaluation of the inflammatory changes in patients with "infarct-like" myocarditis based on magnetic resonance (MRI) and laboratory tests. We also considered the possibility of restricting the length of physical activity restriction by bicycle ergometry.
The second topic was the comprehensive assessment of cardiac risk in patients with systemic sclerosis, including the assessment of possible MR and new laboratory markers of myocardial fibrosis.

Materials and methods: In the first part, we included prospectively 30 patients with “infarct-like" myocarditis and with a positive finding of late gadolinium enhancement (LGE) on MRI. Follow up MRI, echocardiography and stress ECG were performed at 1 and 6 month intervals. In the study focused on systemic sclerosis, a total of 33 long-term patients were prospectively enrolled. The study included a comparison of a group of 20 healthy volunteers.

Results: In 47% of patients with infarct-like myocarditis, we found a left ventricular dyskinesia, but only 17% of patients were found to have mild systolic dysfunction (EF LV 40-50%). The total number of segments affected by LGE was 131 at the entrance examination (4.3 per patient), followed by a statistically significant decrease in the followi-up. At the same time, the LGE signal intensity regression and the total volume of affected tissue (LGE mass) regressed ($p<0.001$), all patients underwent stress ECG without subjective symptoms or significant ECG disorders. No development of LV systolic dysfunction was found in study.
Patients with systemic sclerosis had a higher prevalence of LGE than in controls (42.4% vs. 0%, $p=0007$). The volume of extracellular fluid (ECV) and native T1 relaxation time were significantly higher ($p<0.0001$). Altogether 14 patients with systemic sclerosis with LGE findings had higher ECV (28.8 ± 2.3 vs. 26.6 ± 2.7%, $p=0.021$) T1 (1283 ± 49 vs. 1241 ± 46%, $p=0.020$), compared with 19 patients with systemic sclerosis without LGE. MRI parameters correlated with serum levels of galectin-3, ECV ($r=0.38$, $p=0.0081$) and native T1 ($r=0.35$; $p= 0.012$). Growth differentiation factor (GDF15) correlated positively with ECV ($r=0.36$, $p= 0.0076$) and native T1 ($r = 0.31$, $p=0.023$).

Conclusion: "Infarct like" myocarditis had a relatively uniform clinical course and a favorable prognosis in our study. Physical activity initiated at a month delay after the acute onset did not lead to the development of LV systolic dysfunction or relapse over the next 3 years. Virtually uniform development of myocardial involvement in the MRI was demonstrated, when the transition of acute inflammation in chronic change was not accompanied by a decrease in the LV systolic function. During stress ECG, we did not detect the occurrence of supraventricular or ventricular arrhythmias.
Patients with systemic sclerosis had higher ECV and native T1 values compared to the control group, which corresponds to diffuse fibrotic involvement of the myocardium. The correlation of MR parameters with LK global systolic deformation was determined according to echocardiography and degree of skin involvement. Myocardial fibrosis detected with MR correlated only GDF-15 and galectin-3 levels. GDF-15 also correlated with the severity of skin sclerosis and impaired pulmonary function in patients with systemic sclerosis. The question of whether the screening assay for GDF-15 and galectin-3 could help stratify the risk of systemic sclerosis and help with MR and Holter ECG.