Left ventricular fibrosis influences the time to recovery in patients with arrhythmia-induced cardiomyopathy

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Background: The hallmark of arrhythmia-induced cardiomyopathy (AIC) is reversibility of left ventricular systolic dysfunction (LVSD) following rhythm restoration. Atrial fibrillation and LVSD very frequently co-exist and hence AIC is likely to be under recognized in daily practice. We tested the hypothesis, that left ventricular fibrosis has an influence on the time to recovery (TTR) in patients with AIC.

Method: We prospectively screened patients hospitalized for newly diagnosed and otherwise unexplainable LVSD (i.e. left ventricular ejection fraction (LVEF) <50%) and coexisting tachyarrhythmia (atrial fibrillation/flutter + heart rate (HR) >100/min). Causes other than tachyarrhythmic for LVSD had to be excluded (e.g. valvular, ischaemic, inflammatory). Left ventricular function was assessed by echocardiography at presentation and at follow-up visits 2, 4, and 6 months after rhythm control. Left ventricular (LV) late gadolinium enhancement (LGE) was measured via magnetic resonance imaging after rhythm restoration. Patients were classified AIC, if LVEF significantly recovered after 6 months (increase by ≥15% or above 50% with an increase of ≥10%) and then correlated with LGE as an indicator for fibrosis.

Results: 39 patients were included in the LGE analysis, 31 of them recovered and were classified AIC. Although we found no difference in LGE content in AIC vs. non-AIC patients (mean ± SEM 7.7 ± 0.9% vs. 6.5 ± 1.4%; p = 0.542) and contingency analysis of AIC/non-AIC vs. LGE-positive/LGE-negative patients revealed no difference between the groups (p = 0.682), there was a negative correlation of ΔLVEF (month 2 minus baseline) with LGE (Fig. 1) and a positive correlation of the TTR with LGE (Fig. 2) in LGE-positive patients, suggesting an influence of LV fibrosis on the speed of recovery.

Conclusion: Reliable criteria for recovery of LVEF in patients with newly diagnosed LVSD and coexisting arrhythmia are lacking. We found, that LV LGE correlated with the time to recovery of LVEF in patients with AIC. These results may help to estimate the recovery period and thereby optimize the diagnostic and therapeutic strategy for patients with AIC.

Figures 1 and 2.