

## Combination of ECG electrical myocardial instability markers in patients with idiopathic ventricular arrhythmia

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**Background:** Ventricular arrhythmia (VA) is the one of electrical myocardial instability (EMI) markers. It is important to study other markers, such as fragmentation of QRS (fQRS) complex, microvolt T-wave alternans (mTWA), heart rate turbulence (HRT) and heart rate recovery (HRR).

**Purpose:** To study the markers of EMI (VA, fQRS complex, mTWA, HRT, HRR) during Holter ECG and exercise treadmill test (ETT) in patients with idiopathic VA.

**Materials and methods:** 49 patients (26 men, mean age 43±12 years) with idiopathic VA more than 300 VEC/hour without any therapy. Structural abnormality of the heart was excluded by an ECG, echoCG, stress ECG and cardiac MRI. EMI markers were analyzed using Holter ECG and ETT (protocol Bruse). ETT was performed up to submaximal heart rate 85% or more.

**Results:** During Holter ECG 59% of VA was monomorphic. Night type of arrhythmia was dominant (387±152 VEC/hour during the day vs. 495±203 VEC/hour at night,  $p<0.05$ ). Nonsustained VT was in 8% of patients. FQRS in sinus complex was not found. FQRS in VEC was registered in 7% in the II, III, aVF leads. mTWA was positive in 59%. Pathological turbulence onset was in 3.7%, while turbulence slope was in the normal range in all patients.

During ETT HRR at the 1 min was 26,5±9,5 bpm. HRR at the 3 min stayed normal (19,0±10,6 bpm). At the 5 minute HRR decreased (9,7±7 bpm). At pretest VA was in 66% patients, mean 6.3 single ventricular ectopic complexes/min (SVEC/min). At the peak ETT VA persisted in 44%, mean 3.4 SVEC/min. At the recovery period (RP) VA gradually returned to the pretest values. At the 1 min of RP VA was in 44% (3,5 SVEC/min), at the 3 min of RP - 48% (5,4 SVEC/min), at the 5 min of RP - 53% (7,9 SVEC/min).

**Conclusion:** We found no abnormal markers that could indicate structural changes of the myocardium. However, we observed the pathological changes due to autonomic nervous system modulation (the abnormal mTWA in 59% and high detection of ventricular arrhythmias during ETT).