

Microvolt T-wave alternans in adults with the chosen forms of congenital heart diseases.

Cieplucha A. (1), Trojnarska O. (1), Plaskota K. (1), Bartczak A. (1), Kramer L. (2), Grajek S. (1)

(1) 1st Department of Cardiology, University of Medical Sciences, Poznan, Poland

(2) Department of Computer Sciences and Statistics, University of Medical Sciences, Poznan, Poland

Introduction. Sudden cardiac death (SCD) in adults with congenital heart diseases (CHD) is usually caused by ventricular arrhythmia (VA). The problem of primary prevention of SCD in this group remains unsolved. Among the noninvasive methods of risk stratification is microvolt T-wave alternans (MTWA), reflecting repolarization inhomogeneity. Aim of the study was to evaluate the incidence of spectral MTWA among adults with chosen forms of CHD; to assess the coincidence between MTWA and malignant VA, as well as other clinical findings presumably associated with an increased risk of malignant VA and SCD.

Methods. The study group: 102P (47M), mean age $34,2 \pm 13,6$ y with CHD characterized by pathology within right ventricle or single ventricle physiology (TGA, UVH, Ebstein's anomaly, ccTGA, Eisenmenger syndrome, DORV, CAT, unoperated ToF). Controls: 45 volunteers age and sex-matched. All subjects underwent spectral MTWA test, ambulatory ecg monitoring, cardiopulmonary test, BNP assessment. MTWA positive and indeterminate were labeled 'abnormal'.

Results. Abnormal MTWA was present more often in the study group, compared to controls (39,2% vs 2,3%, $p=0,00001$). The highest ratio of abnormal MTWA was in: Eisenmenger syndrome (87,5%), unoperated ToF (66,7%), TGA (50%) and UVH (44,4%). Among subjects with abnormal MTWA sustained ventricular tachycardia (sVT) was observed more often compared to MTWA(-): 19,4% vs 3,6%, $p=0,026$. The patients with abnormal MTWA had a lower blood saturation (94,5% vs 97%, $p=0,047$), more often were males (58,3% vs 33,9%, $p=0,031$), had higher NYHA grade [2,0(min-max 1,0-3,0) vs 1,0(min-max 1,0-3,0), $p=0,04$], worse cardiopulmonary parameters: %PeakVO₂ ($58,7 \pm 15,4\%$ vs $66,4 \pm 17,1\%$, $p=0,034$), %HRmax ($81,4 \pm 11,7\%$ vs $88,8 \pm 11,0\%$, $p=0,003$). Factors associated with abnormal MTWA: sVT (OR=20,7 $p=0,037$), male gender (OR=15,9 $p=0,001$) in multivariate regression; in univariate analysis: male gender (OR=2,7, $p=0,021$), presence of VA (OR=2,6, $p=0,049$), NYHA > I (OR=2,06, $p=0,033$), %HRmax, %PeakVO₂, VE/VCO₂ slope (OR=0,94, $p=0,005$; OR=0,97, $p=0,042$; OR=1,05, $p=0,037$).

Conclusions. The abnormal MTWA occurs significantly more often in adults with CHD characterized by pathology within right ventricle or single ventricle physiology than among healthy subjects. The probability of abnormal MTWA increases in patients with malignant VA, in males and among subjects with heart failure and cyanosis. MTWA might be of potential role in risk stratification for SCD.