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Myocardial Perfusion Single Photon Emission Computed Tomography (SPECT) in children with ventricular arrhythmias

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The aim of the study was to evaluate left ventricle (LV) myocardial perfusion defects (PD) in pediatric patients (pts) with ventricular arrhythmias (VA).
Material and methods: Retrospective review of data from 96 pts with: VA (VE- ventricular ectopic beats>2000/24hour, 50pts with ventricular tachycardia –VT, 57% VA with right ventricular outflow tract morphology), normal QTc, normal echocardiogram (initial diagnosis "idiopathic VA"). Radionuclide LVEF (ejection fraction at rest) and qualitative 99mTcMIBI SPECT (rest, exercise - Bruce protocol) were performed in all pts (100%). Mean age at VA diagnosis 9,6yrs, at SPECT 14,2yrs. PD had 69pts (72%): transient (TDP during exercise)-55pts, fixed (FPD during rest and exercise)-14pts. Diffuse PD (DPD in whole area of the analyzed LV wall)-30/69pts. Magnetic resonance imaging (MR) of the heart had 94pts (lipogenesis –20,PD-16/20pts), endomyocardial biopsy (EMB) 40pts: myocarditis-25 (PD 19/25), ARVC-8(PD 7/8)pts. Statistical analysis: $p<0.05$ considered to be statistically significant.
Results: PD had not significant correlation in pts with/without abnormalities in EMB or MR. PD had more often pts with older age at VA diagnosis (10vs8 yrs, p=0,03). Pts with normal EF/SPECT/MRI had lowest mean age during SPECT (11yrs, p=0,001). Symptomatic VA had pts with PD (67vs41%, p=0.21), negative LV-T waves in ECG pts with DPD (60vs29%, p=0.06), polymorphic VA (50vs16%, p=0,07) or higher VT rates (205vs158/min, $p<0,05$) pts with FPD. PD in anterior (67vs31%, $p<0.05$) or posterior (63vs16%, $p<0,05$) LV segment had pts with DPD. Group with both normal EF/SPECT was younger (7,2vs12,8yrs, p=0,01), had shortest mean duration of VE-QRS (127ms, p=0.03). Pts with PD had lower mean LVEF (53vs56%, p=0,05), especially with FPD (48vs54%, p=0,04) and children with both abnormal EF/SPECT had highest daily frequency VE/24h (x=18%QRS/24h, p=0,08) - suspected subclinical "VA induced cardiomyopathy".
Conclusions: 1.Perfusion defects in 99 mTc MIBI SPECT were found in LV walls in 72% of children with ventricular arrhythmia and normal echocardiogram but presence of PD did not correlate with abnormalities in EMB or MR. 2. PD were more often found in children with lower mean rest radionuclide LVEF, polymorphic morphology of VA, frequent VE in Holter-ECG, negative LV-T waves in ECG and older age at VA diagnosis.