

### Signal-Averaged Electrocardiogram (SAECG) in children with ventricular arrhythmias

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SAECG is a noninvasive technique for identification of low amplitude signals (LAS) at the end of the QRS complex, called ventricular "late potentials"(VLP) representing regions of abnormal myocardium with slow conduction. Abnormal SAECG poses the potential of identifying patients (pts) at increased risk of malignant ventricular arrhythmias (VA) and sudden cardiac death. There have been limited studies using SAECG in children, mainly in the postoperative congenital heart disease and in arrhythmogenic right ventricular cardiomyopathy (ARVC). Little is known about SAECG in the children with "idiopathic" VA.

The aim of the study was to evaluate SAECG in children with VA.

Material and methods: Retrospective review of SAECG data from 187 pts with VA (ventricular ectopic beats>2000/24hour, 70pts had ventricular tachycardia –VT, 53pts - VA with left bundle branch morphology-VA-LB), normal QTc, normal echocardiogram (initial diagnosis "idiopathic VA"). Radionuclide LVEF (left ventricular ejection fraction) was performed in all pts (decreased EF-20pts), qualitative 99mTcMIBI SPECT (rest/exercise) in 80pts =43%(PD=perfusion defects- 60pts). Mean age at VA diagnosis 8,8yrs, at SAECG =14,5yrs.. Magnetic resonance imaging (MR) had 108pts =58% (small focuses of lipogenesis –23/108pts), endomyocardial biopsy (EMB) 36pts(19%) (MYO=myocarditis-24, ARVC-6pts). No deaths were observed Statistical analysis:  $p<0.05$  considered to be statistically significant.

Results: VLP were found in 15/187 pts (8%) without significant correlation with malignant VA (7/70pts with VT), symptoms(7/43pt), VA-LB(10/123pts), VA during exercise test (2/18pts), PD(9/60pts), MYO (5/24), abnormal MR (2/23pts). Longer filtered QRS had pts with age at VA diagnosis >10yrs(96vs84ms,  $p=0,000$ ), symptoms(96vs91ms, $p=0,01$ ), sinus bradycardia (97vs91ms, $p=0,017$ ), polymorphic VA (103vs91ms, $p=0,014$ ), PD (96vs88ms, $p=0,011$ ), decreased LVEF (97vs91ms, $p=0,04$ ), VA>50% of all beats in Holter ECG (104vs91ms,  $p=0,05$ ), VA—LB superior axis (101ms,  $p=0,015$ ). Lower RMS-40 values had pts >10yrs at VA diagnosis (55vs71microV,  $p=0,000$ ),VA-RB superior axis (32microV, $p=0,035$ ). Longer LAS had pts with age at VA diagnosis >10yrs(25vs22ms,  $p=0,012$ ),syncope(28vs23ms, $p=0,024$ ).

Conclusions: 1.Ventricular late potentials were found only in 8% of children with VA and normal echocardiogram but did not significantly correlate with malignant ventricular tachycardia and abnormalities in SPECT, EMB and MR. Discrete significant abnormalities in mean values of selected SAECG parameters were found in patients older than 10yrs age at VA diagnosis and especially regarding to mean QRSf duration.