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Determinants of left ventricular dysfunction in children with frequent premature ventricular complexes and/or asymptomatic ventricular tachycardia.

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Introduction: For a long time idiopathic frequent Premature Ventricular Complexes (PVCs) and asymptomatic Ventricular Tachycardia's (VTs) were considered benign. However, over the past decade PVCs have emerged as a cause of Left Ventricular (LV) dysfunction in adults. This study aims to assess which determinants of PVCs and VTs are associated with development of LV dysfunction in children.
Methods: For this retrospective study, databases for pediatric patients with the diagnosis of idiopathic frequent PVCs and asymptomatic VTs were searched. Frequent PVCs were defined as 5% or more ventricular ectopic beats in 24h. LV dysfunction was defined as a shortening fraction of 28% or less. Electrocardiograms, holter recordings and echocardiograms were reviewed.

Table – Comparison of determinants of PVCs in patients with different LV function

	SF < 28% (n=7)	**SF >= 28% (n=65)**	**P value**
Follow up (years ± SD)	3.8 (± 4.0)	3.9 (± 4.1)	0.830
QRS axis: Inferior (n %)	5 (71)	53 (84)	0.407
Block pattern: LBBB (n %)	3 (43)	42 (65)	0.218
QRS duration of PVC (ms ± SD)	172 (± 20)	162 (± 28)	0.383
QTc of PVC (ms ± SD)	484 (± 30)	487 (± 65)	0.915
Coupling-interval/RR-interval (ratio)	0.61 (± 0.13)	0.65 (± 0.13)	0.456
Couplets (n %)	7 (100)	33 (51)	**0.015**
Bigeminy (n %)	7 (100)	49 (75)	0.336
Trigeminy (n %)	5 (71)	44 (68)	0.841
Quadrigeminy (n %)	2 (29)	9 (14)	0.317
VT (n %)	6 (86)	26 (40)	**0.048**
PVC burden (% ± SD)	43 (± 18)	16 (± 11)	**0.002**
LVEDD Z-score (± SD)	1.9 (± 1.7)	1.3 (± 1.0)	0.195

QRS axis: Inferior = axis of PVC in frontal plane; Block pattern: LBBB = pattern of PVC left bundle branch block; PVC burden = Total percentage PVCs on holter; LVEDD z-score = adjusted value of LV end diastolic diameter by size.

Results: Seventy-two children were included. Seven showed LV dysfunction at diagnosis (4 (57%) males, age 11 ± 7 years, 3 (43%) had heart failure symptoms) and 65 showed normal LV function (37 (57%) males, age 8 ± 6 years, 21 (32%) with symptoms). Patients with LV dysfunction compared to normal LV function had a higher percentage of PVCs on holter (43± 18% vs 16± 11%, p=0.002), higher prevalence of VT (6 (86%) vs 26 (40%), p=0.048), and a higher number of couplets (7 (100%) vs 33 (51%), p=0.015). Other determinants which were analysed showed no significant difference. In the group of patients with LV dysfunction, 3 responded to medication (class Ic, II and III) and 6 underwent ablation, of which 1 was unsuccessful. During follow up, LV function normalized in 6 patients. In 1 patient LV dysfunction persisted at follow up, even after a successful ablation procedure. In this patient severe LV dysfunction was possibly related to multiple ablation lesions during prior procedures. In the group of patients with a normal function, no one developed LV dysfunction during follow up.
Conclusion: In children with idiopathic PVCs and asymptomatic VTs, development of LV dysfunction, is associated with a higher burden of PVCs, the presence of VTs, and couplets. LV dysfunction appears to be reversible if the burden of PVC's is decreased by medication or ablation.