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REGION

Prevalence of Wolff-Parkinson-White syndrome, association with congenital heart disease, and natural history in newborns

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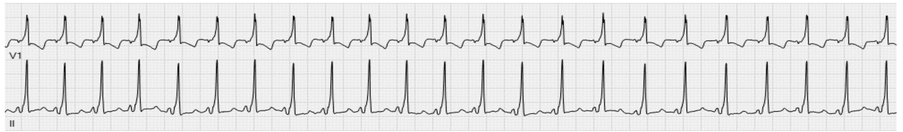
Background

Wolff-Parkinson-White (WPW) syndrome is characterized by an accessory electrical pathway between the atria and ventricles. Clinically, the condition can lead to supraventricular tachycardia and sudden cardiac death. Studies investigating the prevalence, associated structural cardiac abnormalities, and natural history in newborns are few.

Methods

The Copenhagen Baby Heart Study is a prospective population-based cohort study, which from 2016-2018 offered inclusion to all newborns delivered in the Copenhagen area. All participants had an electrocardiography (ECG) and an echocardiography performed between day 0–30 of life. WPW cases were identified through manual evaluation of outliers in PR-interval, QRS-duration, and QRS axis. Newborns with suspected or confirmed pre-excitation on their initial ECG were offered a cardiac follow-up. Localization of the accessory pathway was assessed utilizing a QRS polarity algorithm. Cases were matched 1:4 to controls by age, sex, weight and gestational age.

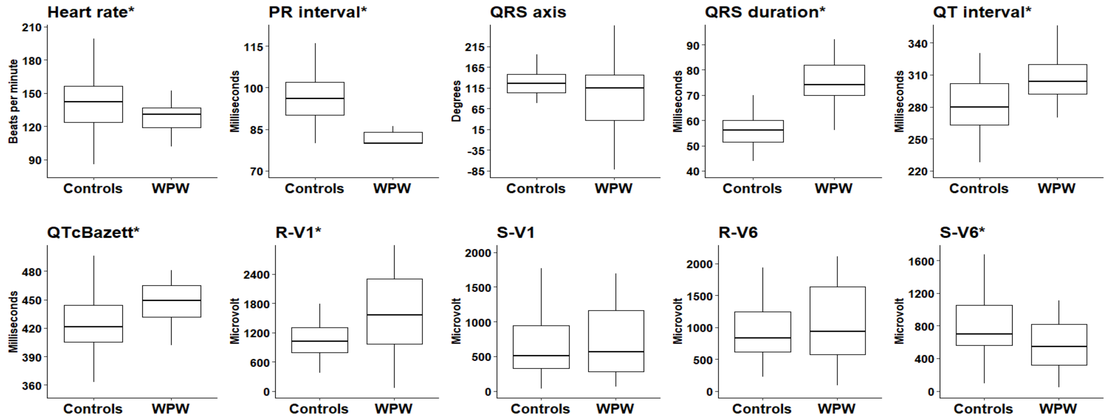


ECG from a 21-days-old boy with Wolff-Parkinson-White syndrome

Results

Among 17,489 ECGs we identified 17 (76% boys) newborns with definite WPW syndrome consistent with a prevalence of 0.1%. The median values for the newborns heart rate, PR-interval, QRS-duration, QTc(Bazett), maximum amplitude in R-V1 and S-V6 were significantly different between cases and controls (all $p<0.05$), whereas the QRS axis, max amplitude in S-V1 and R-V6 did not differ (all $p>0.05$). Echocardiographic measurements of the newborns left ventricular diameter and function, wall thicknesses, and doppler measurements of trans-mitral- and main pulmonary artery blood flow did not differ between cases and controls (all $p>0.05$).

The accessory electrical pathway was left-sided in 14 (82%) of the newborns. One newborn had significant mitral regurgitation while all other newborns had structurally normal hearts; there were no cases of Ebstein's anomaly. At follow-up (available in 12/17 children, mean age 3 years), the WPW pattern remained in three children.



Box plots of ECG parameters for newborns with WPW syndrome and matched controls. ECG parameters with significant differences between cases and controls are marked with *.

Conclusion

The prevalence of WPW syndrome in our cohort of asymptomatic newborns was 0.1%. The syndrome was more frequent in boys, the accessory pathway was mostly left-sided, and was associated with changes in several ECG parameters, but generally not associated with structural heart disease. A striking observation was, that the WPW pattern in most children could not be reproduced on follow-up ECGs at a mean age of three years, suggesting either that the ECG pattern is intermittent, or normalization occurs.

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