Early repolarization syndrome and the Brugada syndrome: forme frustes?

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Bianco and colleagues\(^1\) report in this issue ECG abnormalities in 155 elite male endurance athletes and compare and contrast their findings with those of 50 sedentary controls as well as a meta-analysis of ECGs from published reports on patients with the Brugada syndrome\(^2\). Astoundingly, their analysis demonstrates that 89% of athletes and 36% of controls have evidence of ST-segment elevation in the precordial leads, similar to that seen in the Brugada syndrome. This ST-segment elevation has been termed the ‘early repolarization syndrome’ and is believed to be a benign ECG change due to athletic training, an abnormality which disappears once deconditioning occurs\(^1,3-5\). In contrast, patients with the Brugada syndrome have been shown to be at high risk for ventricular fibrillation and sudden death\(^1,6,5\). Why the different outcomes and how could the clinician differentiate between these two disorders in the clinic?

The authors measured the amplitude of ST-segment elevation in controls, patients with the early repolarization syndrome, and the Brugada syndrome, as well as heart rate, the ECG lead involved, QRS duration, QT duration, and T wave morphology in order to attempt to differentiate these disorders. Interestingly, differences were identified. The amplitude of ST-segment elevation was higher in athletes vs controls, but significantly lower than in Brugada syndrome patients. In addition, the ‘abnormal’ ST-segments were seen in more leftward leads (i.e., \(V_3\) and \(V_4\)) in early repolarization syndrome (70%) vs that seen in the Brugada syndrome. A small percent-age (8.6%) of early repolarization syndrome patients had right precordial lead abnormalities of the Brugada-type morphology, as well. Concerning right ventricular conduction delay, only 27% of athletes had abnormalities with only one patient having complete right bundle branch block. Although this finding is not necessary for the diagnosis of the Brugada syndrome, patients with the Brugada syndrome did in fact have a longer QRS duration than early repolarization syndrome patients.

Collating the data reported in this work, the authors suggest that utilization of measurements of 2 mm for the maximum right precordial ST-segment elevation with QRS duration >0.11 s ensures 100% positive and 80% negative predictive values for the presence of the Brugada syndrome, thus enabling clinical differentiation of this serious health hazard from the benign (and common) early repolarization syndrome in athletes. This probably holds true for controls (i.e. the general population) as well.

No molecular analysis of early repolarization syndrome patients is provided here, but one would expect this analysis to be negative for mutations in the known Brugada syndrome gene, \(SCN5A\) (the cardiac sodium channel)\(^7\). In addition, the authors do not note whether the athletes had significant cardiac hypertrophy (and for that matter, the cardiac features of controls), nor speculate whether this feature could be involved in the repolarization abnormality. While there are apparent differences in outcome between this patient cohort and the Brugada syndrome, it is not clear whether these patients could be at increased risk for clinical symptoms in the face of provocation, such as medications, sleep, etc.

Although the work presented here adds importantly
to our knowledge, it should not be taken as the final word. Future studies and long-term follow-up will be important to determine if this stratification approach indeed differentiates those at-risk.

J. A. TOWBIN
Pediatric Cardiology,
Baylor College of Medicine,
Texas Children’s Hospital, Houston, Texas, U.S.A.

References


