

## 49 ETHNIC VARIATION IN QT INTERVAL AMONG HIGHLY TRAINED ATHLETES

doi:10.1136/heartjnl-2011-300198.49

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**Background** Studies in Caucasian (white) athletes indicate that a significant proportion exhibit an isolated prolonged corrected QT interval (QTc), raising concerns for potentially false diagnoses and disqualification from competitive sport. The prevalence of prolonged QTc interval in athletes of African/Afro-Caribbean (black) descent is unknown. However, this ethnic group generally exhibits a high proportion of ECG repolarisation changes and increased left ventricular wall thickness, that may impact on QTc.

**Aim** We aimed to assess the impact of ethnicity on QTc in young elite athletes.

**Methods** We assessed 3035 elite athletes, aged 14–35 years, who were participating at national and international level in a variety of sporting disciplines. Athletes were evaluated with ECG and 2D echocardiography. Athletes diagnosed with structural heart disease or hypertension were excluded from analysis.

**Results** Demographic and cardiological results are summarised in Abstract 49 table 1. Black male athletes exhibited shorter QTc than white male athletes, but QTc was similar among black and white female athletes. Bivariate analysis revealed that none of T wave inversions, ST segment elevation, or left ventricular wall thickness were associated with QTc. No ethnic difference was observed in prevalence of QT prolongation, as defined by ESC Sports Consensus criteria (male >440 ms; female >460 ms).

Abstract 49 Table 1 Characteristics of athletes evaluated

	Black Male (n = 901)	White Male (n = 1652)	Black Female (n = 122)	White Female (n = 360)
Mean Age, years	22 ± 5	17 ± 4	21 ± 5	18 ± 4
Mean Heart Rate, bpm	61 ± 12	56 ± 10	63 ± 10	59 ± 9
Mean QRS duration, ms	88 ± 14	96 ± 10	84 ± 10	88 ± 9
Mean LV wall thickness, mm	10.6 ± 1.6	9.4* ± 1.2	9.2 ± 1.2	7.9* ± 2.9
ST segment elevation, n (%)	570 (63.3%)	406 (24.6%)	20 (16.3%)	64 (17.8%)
T wave inversions, n (%)	204 (22.6%)	66* (4.0%)	18 (14.6%)	15* (4.2%)
Mean QTc (Bazett's), ms	393 ± 26	404* ± 20	407 ± 25	412 ± 27
QTc >440 ms, n (%)	20 (2.2%)	49 (3.0%)	13 (10.6%)	39 (10.9%)
QTc >460 ms, n (%)	4 (0.4%)	7 (0.4%)	1 (0.8%)	5 (1.4%)

Means presented as mean ± SD.

\*p < 0.001 white vs black athletes.

**Conclusion** Despite demonstrating a higher prevalence of repolarisation changes and morphological left ventricular hypertrophy, black athletes do not exhibit a longer QTc than white counterparts. Based on ESC Sports Consensus criteria, prevalence of a long QTc in black and white athletes is similar, obviating the need for ethnicity specific criteria for defining a long QTc.

## 50 DIAGNOSTIC ROLE OF EXERCISE TOLERANCE TESTING IN FAMILIAL PREMATURE SUDDEN CARDIAC DEATH

doi:10.1136/heartjnl-2011-300198.50

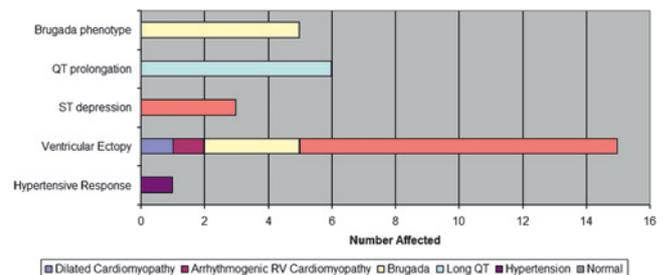
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**Background** Investigation of blood relatives for evidence of an inherited cardiac condition is advocated following an unexplained sudden cardiac death (SCD).

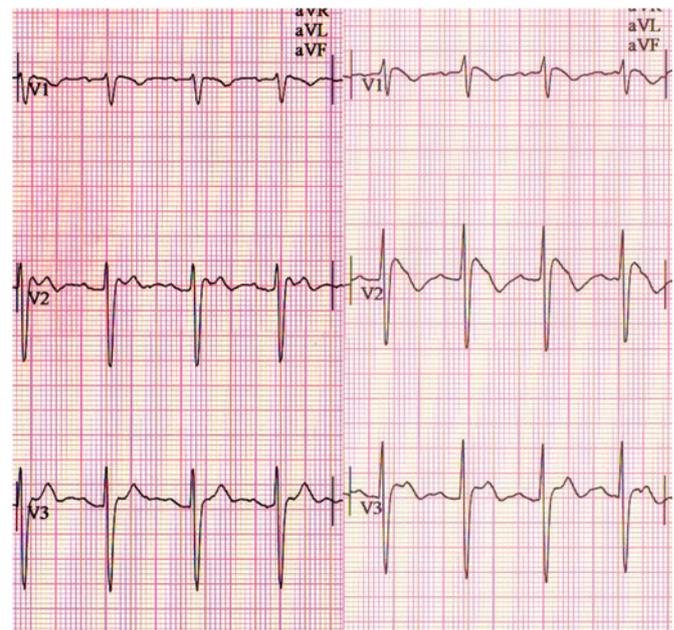
**Aim** We determined the diagnostic yield of exercise tolerance testing (ETT) in investigation of inherited cardiac conditions following familial premature SCD.

**Methods** Between 2006 and 2010, we evaluated 308 blood relatives of 148 SCD victims, who completed at least 3 min of the Bruce protocol. ETTs were analysed for: QT prolongation; Brugada type 1 pattern; ST depression; blood pressure (BP) response; multiple ventricular ectopics or arrhythmia. Individual pathological phenotypes were determined by a combination of 12-lead ECG, echocardiogram, 24-h holter monitor, with additional MRI, CT coronary angiography and genetic mutation analysis, as appropriate.

**Results** Thirty (9.8%) patients had an abnormality during ETT, details of which are summarised in Abstract 50 figure 1. All ETTs with abnormal QT prolongation and dynamic Brugada pattern were associated with diagnoses of long QT syndrome and Brugada syndrome respectively. An example of dynamic Brugada phenotype is given in Abstract 50 figure 2. Ventricular ectopy was seen in 15 patients, of whom 5 demonstrated phenotypic cardiomyopathy or channelopathy on further investigations. No patients with significant ST depression had evidence of coronary abnormalities on imaging. No hypotensive BP response was seen, but exertional hypertension was associated with systemic hypertension.



Abstract 50 Figure 1 ETT abnormalities and associated diagnoses at familial evaluation.



Abstract 50 Figure 2 Exercise tolerance test demonstrating dynamic Brugada ECG pattern. Stage 1 of Bruce protocol exercise (left) and post-exercise recovery (right).

**Conclusion** The ETT is a useful diagnostic adjunct when evaluating relatives of victims of premature SCD. Reliable diagnostic indicators include inappropriate QT prolongation and dynamic Brugada