Prevalence and Significance of Isolated Inferior T-Wave Inversion in Young Athletes

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Introduction

Regular, intense physical activity is associated with structural, functional and electrical changes, coined as the 'athlete's heart'.

Differentiation between physiological adaptations and pathology is important to avoid erroneous diagnoses, which may have adverse consequences.

Previous estimates of the prevalence of isolated inferior T-wave inversion (ITWI) in athletes range from 0.1% to 0.9%, however there are conflicting data regarding its clinical significance.

Aims

To describe the prevalence and significance of isolated inferior t-wave inversion in young athletes.

Methods

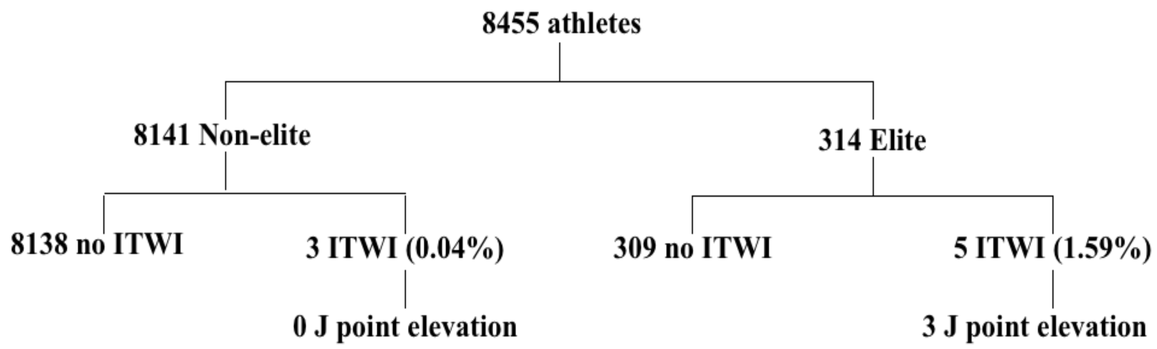
Between October 2012 to November 2018, we performed pre-participation sporting evaluations using 12-lead ECGs on US high school athletes and elite US Soccer players through Simon's Heart Foundation and Major League Soccer.

We considered ITWI as ≥1 mm in depth off the isoelectric baseline in both II and aVF without any other abnormality in accordance with the latest International Criteria for ECG interpretation in athletes.

Echocardiograms were performed in all cases of ITWI.

Results

Presence of ITWI in Screened Athletes



ECG Characteristics of Athletes with ITWI

	Age	Gender	Race	Sport	BSA	HR	PR interval	QRS interval	LAD	RAD	LVH
Athlete 1	29	Male	Hispanic	Soccer	2.06	54	236	102	0	0	0
Athlete 2	19	Male	Hispanic	Soccer	1.9	68	138	90	0	1	0
Athlete 3	24	Male	Caucasian /White	Soccer	2.03	64	156	84	0	0	0
Athlete 4	26	Male	African-American/ Black	Soccer	1.98	58	154	100	0	0	0
Athlete 5	24	Male	Hispanic	Soccer	1.76	57	142	108	0	1	0
Athlete 6	17	Male	African-American/ Black	Basketball	1.75	48	158	95	0	0	1
Athlete 7	19	Female	Caucasian /White	Cheer	1.5	90	116	79	0	1	0
Athlete 8	18	Male	Caucasian /White	Hockey	1.75	72	158	93	0	0	1

Eight out of 8455 athletes presented with ITWI (0.09%).

The mean age of the non-elite and elite cohort was 17 and 25 years, respectively.

63% of the non-elite cohort were male. All elite athletes screened were male.

The prevalence of isolated inferior t-wave inversion in non-elite and elite athletes was 0.04% and 1.59%, respectively.

Echocardiographic evaluation of individuals with ITWI did not demonstrate any abnormality consistent with hypertrophic, dilated or arrhythmogenic right ventricular cardiomyopathy, left ventricular non-compaction or myocarditis.

Conclusions

The prevalence of ITWI is rare and our data suggest that ITWI is not associated with underlying cardiac pathology.

The higher prevalence of ITWI in older and elite athletes indicates that it may be a physiological phenomenon related to the age and/or training history of the athlete.

Although our data suggest that this ECG entity is benign, longitudinal follow-up is required to ensure that a cardiomyopathy does not manifest in these individuals later in life.

The exact frequency of follow-up for these individuals remains uncertain.

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