Inferior T wave inversion in young individuals: should we be worried

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Introduction: Cardiac screening in young individuals may identify individuals at risk of sudden cardiac death (SCD). The ECG is crucial to identify individuals who harbour pre-clinical/clinical phenotypes. T wave inversion (TWI) are often found at screening. Outcomes and clinical implications of individuals with TWI are dependent on demographic variables and territory involved. However, the implications of inferior TWI in young individuals are poorly understood.

Aim: This study was carried out to ascertain prevalence and outcomes of adolescent individuals with inferior TWI.

Methodology: Cardiac screening (questionnaire/ECG) was carried out in 2672 students (14-17 years) attending year 11 classes during the 2017/2018 scholastic year (3991 eligible citizens) as part of a national cardiac screening program (BEAT-IT). Cases with contiguous TWI in ≥2 leads in the inferior (II/III/aVF) leads were included (isolated and those extending into the lateral leads). ECGs with inferior TWI were repeated (in shallow breathing) to ensure appropriate lead placement. An athlete was defined as an individual who participated in organized sport and/or engaged in >4 hours of physical activity weekly.

Results: 2672 adolescents gave consent (mean, 50.4% were female). 1042 (39.0%) were athletes. Most were of Caucasian ethnicity (95.8%). Inferior TWI were present in 15 (0.6%), all were Caucasian and 9 of these were non-athletic individuals. 4 had symptoms (26.7%) and 1 (6.7%) had a positive family history [HCM].

Inferior TWI (n=15) was more frequent in females (n=13 [1.0%] vs n=2 [0.2%] vs 0.2%, p=0.037). The prevalence was similar in athletes and non-athletes (n=6 [0.6%] vs n=9 [0.6%], p=0.858). 11 (0.4%) had isolated inferior TWI. Only 1 (9.1%) had TWI involving all three inferior leads. Another 4 (0.1%) had inferior TWI extending into the lateral leads. Borderline/other pathological ECG patterns were as likely in both groups (p=0.770). Two participants with inferior TWI (22.2%) had other abnormal ECG patterns (P mitrale [n=1] and ST segment depression [n=2]). One participant (24.0%) from the inferolateral TWI group had ST segment depression.

Two patients (13.3% of all participants with inferior TWI) were given a clinical diagnosis (one HCM [inferolateral TWI] and one MVP [inferior TWI]). Both were asymptomatic. The yield was similar for inferolateral (25.0%) and isolated inferior (11.1%) TWI [2 leads] (p=0.523).

Most participants with isolated inferior TWI (n=5, 55.6%) were discharged after referral vs 0% in those with inferolateral TWI. Some (n=6) are under surveillance (mean±SD 1897±9 days). Two refused further evaluation.

Conclusion: Inferior TWI is an infrequent finding in young individuals and may be a marker of pathology in a small group of subjects. The number of leads with TWI (inferior [2 leads], inferior [3 leads] and inferolateral TWI) did not influence the diagnostic yield. Further evaluation is warranted in such cases.