Early Repolarization Patterns in Young Healthy Individuals: Prevalence, Morphological Characteristics; and Impact of Gender, Ethnicity and Physical Activity

Saqib Ghani1,2, Sara Di Fino1, Angela Gravina1, Abbas Zaidi1,2, Nabeel Sheikh1,2, Sabiha Gati1,2, Hari Raju1,2, Sanjay Sharma1,2

1Division of Cardiovascular Sciences, St. George’s University of London; 2Cardiac Risk in the Young (CRY)

Background

- Early repolarization (ER) is commonly observed in athletes and young healthy individuals (Figure 1).
- Recently, ER in the inferior and lateral leads has been associated with sudden cardiac arrest from idiopathic ventricular fibrillation.

Objectives

- We studied the prevalence, distribution and morphology of ER patterns in inferior and lateral leads in young healthy individuals.

Methods

- 12-lead ECG was performed at rest in 1,929 young healthy individuals (February to December 2011).
- We evaluated the impact of gender, ethnicity and physical activity on ER.
- Individuals were classified as physically-active (exercise >2 hrs/week) and sedentary.
- Early repolarization was defined as notched or slurred J-point elevation of at least 0.1mV from baseline, in ≥2 contiguous inferior or lateral leads (Figures 2 & 3). ER changes in anterior leads were not considered in this study.
- The morphology of ST-segment was classified as horizontal/descending or rapidly ascending/up sloping.

Results

- Cohort demographics:
  - Mean age of 17.9 ± 4.4 years (Age range 13-38)
  - 1406 (73%) male
  - 1557 (80%) physically-active (exercise >2hrs/week)
  - 1780 (92%) Caucasians
- ER pattern seen in 382 cases (19.8%):
  - 40% in inferior leads
  - 35% in lateral leads
  - 25% in both
- ER pattern is more prevalent in:
  - Males vs. females (20% vs. 12%, p=0.003)
  - Physically-active vs. sedentary (20.4% vs. 14.8%, p=0.013)
  - Afro-Caribbean vs. Caucasian (31.2% vs. 19.9%, p=0.012)
- Morphology of ER / ST-segment: (Figure 8)
  - Notched ER more prevalent compared to slurred morphology
  - ER pattern more commonly associated with ascending/up-sloping ST-segment elevation.
  - Other associated findings:
    - LVH and sinus bradycardia were more common in individuals with ER compared to those without (p=0.0001 for both).
    - Only 5% of individuals with ER had J-point elevation of >0.2mV.

Conclusion

- Early repolarization is a common finding in young healthy individuals, and is more prevalent in males, physically-active individuals and those with Afro-Caribbean ethnicity.
- ER is more common in inferior leads (not statistically significant).
- Notched ER with ascending ST-segment elevation was the most commonly observed morphological pattern.
- More research is required to understand precise long term implications of such repolarization changes in young individuals.