

Electrical Cardiac Remodeling in Triathletes: A Comparative Study in Elite Male and Female Athletes

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Abstract : Background: Prolonged ultra-endurance exercise training associated with cardiac adaptations in triathletes. However, the sex differences in electrocardiographic (ECG) performance in these competitive populations are poorly understood. Methods: ECG results of male and female triathletes registered on the French ministerial lists of high-level athletes between 2015 and 2021 were involved. The ECG was evaluated according to commonly accepted criteria. Results: Eighty-six triathletes (male 50, female 36) were involved; the average age was 19.9 ± 4.8 years. The training volume was 21 ± 6 hours/week in males and 19 ± 6 hours/week in females ($p > 0.05$). Despite the relatively larger P wave (96.0 ± 12.0 vs. 89.9 ± 11.5 ms, $p = 0.02$) and longer QRS complex (96.6 ± 11.1 vs. 90.3 ± 8.6 ms, $p = 0.005$) in males than in females, all indicators were within normal ranges. The most common electrical manifestations were early repolarization (46.5%) and incomplete right bundle branch block (39.5%). No difference between sexes was found in electrical manifestations ($p > 0.05$). Conclusion: All ECG patterns were within normal limits under similar training volumes, but male triathletes were more susceptible to cardiovascular changes than females. The most common ECG manifestations in triathletes were early repolarization and incomplete right bundle branch block independently of sexes. Large samples involving both sexes are required.

Keywords : cardiovascular remodeling, electrocardiography, triathlon, elite athletes

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