

Causes of sudden cardiac death in young athletes and nonathletes: systematic review and meta-analysis

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Introduction. The etiology of sudden cardiac death (SCD) in young people is still debated. The aim of this meta-analysis was to identify the most frequent causes of SCD in individuals aged ≤ 35 years, the differences between athletes and nonathletes and among geographic areas.

Methods. Studies published between 01/01/1990 and 01/31/2020 and evaluating post-mortem the etiology of SCD in young individuals (≤ 35 years) were included. Individuals were divided in athletes and nonathletes. Studies that did not report separately data between athletes and nonathletes were excluded.

Results. Thirty-four studies met the inclusion criteria and a total population of 5,060 victims of SCD were analysed (2,890 athletes, 2,170 nonathletes). Structurally normal heart, hypertrophic cardiomyopathy (HCM), idiopathic left ventricular hypertrophy, and anomalous origin of coronary arteries (AOCA) were the most frequent causes of SCD in athletes while coronary artery disease (CAD), arrhythmogenic cardiomyopathy (ACM), and channelopathies were frequent causes of SCD in nonathletes. The number of SCDs due to ischemic heart disease (19.6% vs. 9.1%, $p = 0.009$), ACM (11.5% vs. 4.7%, $p = 0.03$) and channelopathies (8.4% vs. 1.9%, $p = 0.02$) was higher in nonathletes comparing with athletes. SCD due to non-ischemic left ventricular scar (5.1% vs. 1.1%, $p = 0.01$) was more frequent in athletes. HCM ($p = 0.01$) and AOCA ($p = 0.004$) were more frequently cause of SCD in US while ACM ($p = 0.001$), structurally normal heart ($p = 0.02$), and channelopathies ($p = 0.02$) in Europe.

Conclusions. Structurally normal heart, HCM, AOCA were frequent causes of SCD in athletes while CAD, ACM and channelopathies in nonathletes. The causes of SCD differ between US and Europe.