Abstract: 4100

Exercise related sudden cardiac death in the young in Sweden 2000–2010 – a nationwide study showing decreasing incidence in competitive athletes

Authors:
A. Wisten¹, M. Borjesson², P. Krantz³, E.L. Stattin⁴, ¹Umea University - Umea - Sweden, ²Sahlgrenska Academy - University of Gothenburg - Goteborg - Sweden, ³Lund University - Lund - Sweden, ⁴Uppsala University - Uppsala - Sweden.

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Background: Sudden cardiac death (SCD) is uncommon, but accounts for a majority of natural, unexpected sudden death in the young population. Exercise, although clearly health promoting for the vast majority of individuals, is also historically well known as a potential trigger of SCD. Previous studies have reported varying results concerning the comparative risk of SCD in competitive athletes versus non-athletes.

Purpose: The aim was to study all exercise related SCD in 10–35 years old in Sweden during the 11-year period 2000–2010, regarding the frequency, etiology, prevalence of symptoms, family history and/or ECG-changes; and to estimate the SCD incidence in the young and specifically in competitive athletes and to compare it with data from the previous decade.

Methods: We have previously identified all cases of SCD in 1–35 years old during 2000–2010 by systematic search in the Swedish Cause of Death Registry and the database of Forensic Medicine (n=552). From this cohort, we identified 514 cases in 10–35-years old, 373 (73%) men, and 141 (27%) women. For each case, information on circumstances at death, pathogenesis, athletic activity, medical history, symptoms, substance use, and heredity was assembled from autopsy-, police- and medical records.

Results: Exercise-related SCD occurred in 12% (62/514), a majority being men (56/62; 90%). Two thirds were recreational athletes, one-third competitive athletes. In total, 48% had either previous cardiac disease (27%), family history (27%), symptoms (32%), or an abnormal ECG (45%) before death. The most prevalent diagnosis was sudden arrhythmic death syndrome (SADS) (15/62; 24%). Exercise-related SCD was more frequent in men with hypertrophic cardiomyopathy (p=0.0008) and arrhythmogenic right ventricular cardiomyopathy (p=0.001), compared to non-exercise related SCD. The SCD incidence in competitive athletes was 9.4/million per year in men, and 0.6/million per year in women, which was around half the incidence compared to the years 1992–99. The SCD incidence in the general population was 22.3/million per year in men and 9.6/million per year in women. However, the risk of exercise-related SCD was twice as high in competitive athletes compared to recreational athletes.

Conclusions: 12% of SCD cases in the young Swedish population are exercise-related, with SADS being the most common etiology. The risk of exercise-related SCD is higher for competitive athletes compared to non-athletes. Specifically, exercise seems to trigger SCD in men with ARVC and HCM. About 50% have a pre-mortal risk profile. Importantly, the incidence of SCD in competitive athletes has been approximately halved in the 2000's compared to the 1990's. Theoretically, increased awareness, safety measures and cardiac screening may all have attributed to this positive development. We advocate a uniform evaluation of all exercise-related SCD in young athletes, including optimal histology and genetic analysis at autopsy.