Sudden Cardiac Death during Exercise in Young Individuals with Hypertrophic Cardiomyopathy

Abstract 11

Study consort diagram. Abbreviations: ESE, exercise stress echocardiography; AVR, aortic valve replacement; AS, aortic stenosis; HCM, hypertrophic cardiomyopathy; TIA, transient ischaemic attack; CABG, coronary artery bypass graft; NSVT, non-sustained ventricular tachycardia.

Abstract 11 Figure 1

Risk Ratio for CV Events

- NYHA ≥ 2
- BMI > 30
- Age > 35
- Modified WHO Category III
- Multiple Cardiac Lesions
- Prior Cardiac Medications
- Abnormal Exercise
- Abnormal ESE

Abstract 11 Figure 2

Risk of maternal cardiovascular event based on associated factors. Abbreviations: NYHA, New York heart association; BMI, body mass index; mWHO, modified world health organisation risk source; ESE, exercise stress echocardiography.

Background

Sudden cardiac death (SCD) in young individuals and athletes is generally caused by hereditary cardiac conditions, including cardiomyopathies such as hypertrophic cardiomyopathy (HCM). Although historically HCM has been reported as the predominant cause of SCD in young athletes, it is unclear as to what degree exercise is a trigger for possible fatal arrhythmias.

Aim

We aimed to report on the circumstances of SCD in a cohort of young individuals aged ≥ 10 and < 30 whose autopsies were consistent with HCM.

Methods

We reviewed 6860 consecutive cases of SCD referred to our specialist cardiac pathology centre 1994 and 2020. SCD was defined as death from a cardiovascular cause within 12 hours of apparent well-being. All cases underwent detailed autopsy evaluation of the heart, including histological analysis, by expert cardiac pathologists. A minimum of 10 blocks of tissue were taken for histological analysis. HCM was defined by the presence of increased heart weight or increased wall thickness and significant myocyte disarray at histological examination.

Results

Of the total cases of SCD, 264 (4%) were due to HCM. Our cohort of young decedents comprised of 66 individuals (average age 21±5 years, males 76%). For the majority (n=52, 79%) SCD was the first manifestation of HCM. Our cohort of young decedents comprised of 66 individuals (average age 21±5 years, males 76%). For the majority (n=52, 79%) SCD was the first manifestation of HCM. Our cohort of young decedents comprised of 66 individuals (average age 21±5 years, males 76%). For the majority (n=52, 79%) SCD was the first manifestation of HCM.

Conclusion

Male athletes have a significantly larger PA than sedentary controls with 22% athletes having a PA≥27 mm compared to just 7% of controls. This suggests that PA dilatation may be part of the cardiopulmonary adaptation to exercise. These findings need corroboration in larger-scale, prospective studies, including pulmonary pressures and a wider array of sporting disciplines. The long-term implications of pulmonary artery dilatation in athletes is unknown but it may be used as an additional parameter to indicate athletic adaptation.

Conflict of Interest

Nil

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SUDDEN CARDiac DEath DURING EXERCISE IN YOUNG INDIVIDUALS WITH HYPERTROPHIC CARDIOMYOPATHY

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Abstracts

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more commonly observed in individuals who died during exercise (56% compared with 34% in the group who died at rest, p=0.08). Younger individuals between 10–15 years of age died mostly during exercise (80%), in other age groups death occurred mainly at rest (33% in age group 16–20 years, 30% in age group 21–25 years, 33% in age group 26–30 years) (Figure 1B).

Conclusion We observed a high age-related variability in terms of circumstances of death. In the context of HCM, our findings suggest that individuals aged 10–15 years are the most vulnerable in terms of exercise-related-SCD. This exemplifies the importance of preventative cardiac screening in young individuals who might be harbouring quiescent cardiac conditions associated with young SCD.

Conflict of Interest None

THE LONG-TERM EFFECTS OF ADIPOSE DEPOT CHANGE FOLLOWING BARIATRIC SURGERY ON CARDIAC GEOMETRY

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Abstract 13 Figure 1

Introduction Total body adipose volume is associated with left ventricular (LV) dilatation (due to increased intravascular volume and cardiac output) while visceral adipose tissue (VAT) is associated with smaller LV cavity size and concentric remodeling (because of insulin resistance). We therefore hypothesised that changes in VAT and total body weight during weight loss would have a differential impact on cardiac geometry. Furthermore, changes in epicardial adipose tissue (EAT), may have an additional mechanical effect by reducing pericardial restraint. We therefore sought to investigate long term changes in VAT, total weight and EAT following bariatric surgery and relate them to cardiac geometry.

Methods Thirty-eight patients underwent cardiac magnetic resonance (CMR) imaging before and after bariatric surgery, including 20 who underwent short-term (median 209 days), 28 medium-term (median 428 days) and 11 long-term (median 1030 days) imaging follow up. Cardiac volumes (left atrial (LA), LV end-diastolic volume (LVEDV) and stroke volume (LVSV)) were assessed using cardiac MRI. VAT was assessed at rest, p=0.08). Younger individuals between 10

Abstract 13 Figure 2

Introduction Takotsubo cardiomyopathy (TC) is often preceded by emotional or physical stress. Literature is conflicted on the effects of reducing VAT, and increased space within the pericardium resulting from EAT loss allowing expansion to occur. (Figure 2B), LA volume increased relative to day 209 (by 11%, p<0.0001). Between 428 and 1030 days LA volume remained the same size, and was similar to preoperative size (p = 0.86). In contrast between 428 and 1030 days LVEDV enlarged (by 11%, p = 0.03), and was similar to preoperative size (p = 0.92). LVSV followed a similar pattern being reduced at 209 days (by 10%, p = 0.002), then increasing after 428 days to become similar to pre-weight loss at 1030 days (p = 0.68).

Conclusions Cardiac volumes show a biphasic response to weight loss, initially becoming smaller and then returning to baseline by 1030 days. We hypothesise that the early drop in LA and LV cavity size is a response to reduced volume from body mass reduction. In contrast, we propose that the increase in LA and LVEDV that follows results from the longer term effects of reducing VAT, and increased space within the pericardium resulting from EAT loss allowing expansion to occur.

Conflict of Interest None

IMPACT OF EPILEPSY OR SEIZURES ON OUTCOMES FOLLOWING TAKOTSUO CARDIOMYOPATHY

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