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Abstract Information

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Abstract Submitter: Mrs Felber Dietrich Denise - denise.felber@unibas.ch
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Background

Altered heart rate variability (HRV), a measure of cardiac autonomic control, is a strong predictor of death and nonfatal cardiovascular events. We determined the effect of Body Mass Index (BMI), change in BMI over 11 years and exercise on different dimensions of HRV.

Methods

SAPALDIA (Swiss Study on Air Pollution and Lung Diseases in Adults) is a cohort study with baseline assessment in 1991. In 2001-2003, 24-hour electrocardiograms (ECG) have been recorded in a random sample of the participants aged 50 and over. Subjects with recordings of less than 18 hours were excluded, leaving 1718 recordings for analyses. Blood pressure, height and weight were measured and information about cardiovascular risk factors and exercise was obtained in an extensive interview. BMI in 1991 was based on measured height and reported weight. The influence of these variables on heart rate variability and heart rate was analyzed in multiple regression models adjusting for sex, age, age squared, educational level, diabetes and hypertension. Interaction between BMI and exercise was investigated, also looking at the part of HRV which is independent from heart rate.

Results

Obese subjects (BMI > 30 kg/m²) not exercising had significantly lower HRV (9% lower SDNN; p=0.003) than normal weight subjects not exercising. Compared to obese subjects not exercising, obese subjects exercising at least 2 hours per week had significantly increased time and frequency domain parameters of HRV (total power: 35%, p=0.002; high frequency (HF): 33%, p=0.039; low frequency: 32%, p=0.017; SDNN: 21%, p=0.000; SDANN: 21%, p=0.000). In addition, obese subjects exercising at least 2 hours per week had a 40% (p=0.007) higher HF and 8% (p=0.038)

higher SDNN than normal weight subjects not exercising regularly. Normal weight subjects and subjects having gained weight over the past 11 years who were exercising at least moderately had increased low frequency values compared to subjects not exercising, indicating effects on both the sympathetic and parasympathetic nervous system. A similar picture emerged when considering heart rate as endpoint of our analyses. However, exercise seemed to have an effect on HRV over pathways not involving heart rate that might even be stronger in the obese subjects.

Conclusions

Our results support the hypothesis that regular exercise has positive effects on cardiac autonomic control especially in the obese and that the respective beneficial effects of physical exercise may be stronger than the corresponding opposite effects of weight gain.