Topic: Air pollution and inherent health risks

Format of presentation: No specific format requested

Key Words: Cardiovascular health , Heart rate variability, No2

Status of presenting author: young investigator

Award competition: yes

Long-term effect of NO_2 exposure on heart rate variability: results of the SAPALDIA study

**Felber Dietrich D, [2] Gemperli A, [2] Liu LS, [2] Schindler C, [2] Gaspoz J, [1] Ackermann-liebrich U, [2] y cols. (1) Division Of Primary Care Medicine, University Hospitals Geneva, Switzerland (2) Institute Of Social And Preventive Medicine, University Of Basel, Switzerland

Objective.

Altered heart rate variability (HRV), a measure of cardiac autonomic control, is a strong predictor of cardiovascular events. We determined the association between long-term exposure to NO_2 and HRV.

Material and methods.

SAPALDIA (Swiss Study on Air Pollution and Lung Diseases in Adults) is a cohort study with a baseline assessment in 1991. In 2001-2003, 24-hour electrocardiograms (ECG) have been recorded in a random sample of participants ≥ 50. Subjects with recordings of < 18 hours were excluded, leaving 1733 recordings for analyses. NO2 was measured at central sites and periodically outdoors at the homes of some participants. Exposure to NO_2, which has been shown to have a low interannual variability, was calculated for all participants for 2003 based on measured values adjusted for various determinants. The association between 3 groups of NO_2 exposure and HRV was analyzed for both sexes for subjects who have been living at the same address for at least one year by multiple regression models adjusting for age, educational level, hypertension, diabetes, BMI, physical exercise, CRP and uric acid.

Results.

Women with an average annual exposure of ≥ 40 µg/m^3 had a 7% (p=0.022) lower standard deviation of all normal RR intervals (SDNN) than women exposed to < 25 µg/m^3. Women exposed to NO_2 levels between 25 and 40 µg/m^3 had a 3% (p=0.065) lower SDNN than women in the lowest exposure group. In men, such an association was only seen in subjects exposed to levels of 47 µg/m^3 or higher, with a 20% (p=0.010) lower SDNN than men exposed to < 6 µg/m^3. Men exposed to NO_2 levels between 6 and 47 µg/m^3 had 10% (p=0.054) lower SDNN than men in the lowest exposure group.

Conclusions.

Our results show that high average annual NO_2 exposure is associated with negative effects on cardiac autonomic control.