

POSTER PRESENTATION

Open Access

Changing places to study the medium-term effects of air pollution: carotid arterial stiffness

Hans Scheers^{1*}, Lidia Casas¹, Tim Nawrot², Ben Nemery¹

From Methods in Epidemiology Symposium
Leuven, Belgium. 17 September 2015

Background and aim

A biomarker for cardiovascular disease, carotid arterial stiffness is linked with exposure to air pollution. In a panel study on short- to medium-term health effects of air pollution, we evaluated the association between NO₂ exposure and indicators of carotid arterial stiffness.

Methods

Arterial stiffness was measured in 20 healthy volunteers (59-76 years of age) in three locations and at 11 time points during one year: seven times in Leuven (Belgium) and twice during each 10-day stay in Milan (Italy) and Vindeln (Sweden). Pulse Wave Velocity (PWV), distensibility (DC) and compliance (CC) were measured using Esaote MyLabOne ultrasound. Personal NO₂ exposure, an indicator of traffic-related air pollution, was monitored during 5 consecutive days before each health assessment using passive samplers. Associations between arterial stiffness and exposure to NO₂ were evaluated with linear mixed models, adjusting for sex, age, heart rate, arterial pressure, and time.

Results

In Milan, NO₂ was higher by about 40 µg/m³ and in Vindeln it was lower by about 15 µg/m³ than in Belgium. A 10 µg/m² increase in NO₂ was associated with an average increase in PWV of 0.087 m/s (95% confidence interval (CI): 0.016-0.157 m/s). Adjusting for personal and weather characteristics did not alter the result (+0.104 m/s; CI: 0.002-0.206). A 10 µg/m³ increase in NO₂ was also associated with a decrease in DC (adjusted coefficient: -0.039 kPa⁻¹; CI -0.061 - -0.017) and CC (-0.031 mm²/kPa; CI -0.055 - -0.008). Similar results were obtained when using PM₁₀ (obtained from monitor stations, the average of lag0 to lag6) as the exposure variable.

Conclusion

Given that increased PWV and decreased DC and CC indicate greater arterial stiffness, we found in a real life intervention study that exposing healthy elderly to higher or lower air pollution results in concurrent changes in carotid arterial stiffness.

Authors' details

¹KU Leuven, Leuven, Belgium. ²UHasselt, Hasselt, Belgium.

Published: 17 September 2015

doi:10.1186/2049-3258-73-S1-P21

Cite this article as: Scheers et al.: Changing places to study the medium-term effects of air pollution: carotid arterial stiffness. *Archives of Public Health* 2015 **73**(Suppl 1):P21.

Submit your next manuscript to BioMed Central and take full advantage of:

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at
www.biomedcentral.com/submit



¹KU Leuven, Leuven, Belgium

Full list of author information is available at the end of the article