

URBAN AIR POLLUTION AND EFFECTS ON BIOMARKERS IN BLOOD

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Background and Aims: Exposure to ambient air pollution is associated with cardiovascular diseases and mortality. The mechanistic pathways are still unknown, however one hypothesis is that particulate air pollution induces airway inflammation, causing systemic inflammation leading to cardiovascular events and atherosclerosis. The aim was to study the effects of short term alterations in ambient air pollution on biomarkers of inflammation and coagulation in a panel consisting of healthy volunteers.

Methods: The study group consisted of 16 individuals (8 men and 8 women), all non-smokers and living in Gothenburg, Sweden. Median age was 35 years (range 26-55 years). The subjects were called for blood sampling the morning after either a day with high levels of air pollutants ($PM_{10} > 30 \mu/m^3$ as 24-hour mean) or after a day with low levels of air pollutants ($PM_{10} < 15 \mu g/m^3$ and $NO_2 < 35 \mu g/m^3$). Blood samples were analyzed for biomarkers of inflammation and coagulation (CRP, serum amyloid A (SAA), intercellular adhesion molecule 1 (ICAM-1), fibrinogen and factor VIII). Associations between each biomarker and exposure to air pollution were examined using linear mixed-effects models (SAS, version 9.1).

Results: All together, 12 sampling sessions were performed (six days of high and six of low levels of air pollutants). No significant increase in any of the biomarkers was found after days with high levels of PM_{10} (median: $49 \mu g/m^3$) compared with days with low levels (median: $10 \mu g/m^3$) in preliminary analyses. Similar results were found when the exposure instead was classified by the urban background NO_x concentrations, as a marker of traffic exhausts (median: $95 \mu g/m^3$ and $42 \mu g/m^3$ for high and low pollution events, respectively).

Conclusions: We found no significant increases in biomarkers of inflammation and coagulation after high ambient air pollution events compared with low pollution events when performing repeated investigations in a group of healthy study subjects.