Format: Abstract

Environ Res. 2012 Jul;116:44-51. doi: 10.1016/j.envres.2012.04.004. Epub 2012 Apr 26.

Low-level exposure to ambient particulate matter is associated with systemic inflammation in ischemic heart disease patients.

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Abstract

Short-term exposure to ambient air pollution is associated with increased cardiovascular mortality and morbidity. This adverse health effect is suggested to be mediated by inflammatory processes. The purpose of this study was to determine if low levels of **particulate** matter, typical for smaller cities, are associated with acute systemic inflammation. Fifty-two elderly individuals with ischemic heart disease were followed for six months with biweekly clinical visits in the city of Kotka, Finland. Blood samples were collected for the determination of inflammatory markers interleukin (IL)-1β, IL-6, IL-8, IL-12, interferon (IFN)γ, C-reactive protein (CRP), fibrinogen, myeloperoxidase and white blood cell count. Particle number concentration and fine particle (particles with aerodynamic diameters <2.5 μm (PM(2.5))) as well as thoracic particle (particles with aerodynamic diameters <10 μm (PM(10))) mass concentration were measured daily at a fixed outdoor measurement site. Light-absorbance of PM(2.5) filter samples, an indicator of combustion derived particles, was measured with a smoke-stain reflectometer. In addition, personal exposure to PM(2.5) was measured with portable photometers. During the study period, wildfires in Eastern Europe led to a 12-day air pollution episode, which was excluded from the main analyses. Average ambient PM(2.5) concentration was 8.7 μg/m(3). Of the studied pollutants, PM(2.5) and absorbance were most strongly associated with increased levels of inflammatory markers; most notably with C-reactive protein and IL-12 within a few days of exposure. There was also some evidence of an effect of **particulate** air pollution on fibrinogen and myeloperoxidase. The concentration of IL-12 was considerably (227%) higher during than before the forest fire episode. These findings show that even low levels of **particulate** air pollution from urban sources are associated with acute systemic inflammation. Also particles from wildfires may exhibit pro-inflammatory effects.

PMID: 22541720 DOI: 10.1016/j.envres.2012.04.004

[Indexed for MEDLINE]

Publication type, MeSH terms, Substances

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