Even Low Levels of Air Pollution May Pose Stroke Risk

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A new study investigated the association between short-term exposure to ambient fine particulate matter and the risk of stroke and found that even low pollutant levels may increase that risk. The study is published in *Annals of Neurology*, the official journal of the American Neurological Association.

Led by Dr. Lynda Lisabeth of the University of Michigan School of Public Health and University of Michigan Stroke Program, researchers studied the effects of air pollution in a southeast Texas community where there is a large petroleum and petrochemical industry presence.

They identified ischemic strokes and transient ischemic attacks (TIAs) from the Brain Attack Surveillance in Corpus Christi Project (BASIC), a population-based stroke surveillance project designed to capture all strokes in Nueces County, TX. Ischemic stroke and TIA cases between 2001 and 2005 were identified using trained staff and later verified by neurologists.

Daily historical air pollutant and meteorological data were obtained for the same time period from the Texas Commission on Environmental Quality's Monitoring Operations database. Data on fine particulate matter and ozone were available from a centrally located monitor in Corpus Christi (Nueces County, TX) located upwind of the local industrial facilities. The majority of stroke/TIA cases were also located upwind of local chemical plants and refineries.

The results showed borderline significant associations between same day and previous day fine particulate matter exposures and ischemic stroke/TIA risk. Similar associations were seen with ozone. Despite the fossil fuel industry in the area, fine particulate matter exposures were relatively low relative to other regions in the US, probably because of the proximity to the coast and prevailing wind patterns. “Although the magnitude of elevated risk of stroke/TIA due to PM2.5 exposure was relatively small, the vast majority of the public is exposed to ambient air pollution at the levels observed in this community or greater every day, suggesting a potentially large public health impact.”

These findings support the hypotheses that recent exposure to fine particulate matter may increase the risk of ischemic cerebrovascular events specifically. There is experimental evidence that particulate air pollution is associated with acute artery vasoconstriction and with increases in plasma viscosity (thickening of the blood) which may enhance the potential for blood clots, although this requires further study.

“While our observed association between PM2.5 and stroke/TIA risk requires further study in additional regions in the US with varying types of climates and possibly with alternative study designs, it does call into question current standards for fine particulate matter and whether these standards are sufficient to protect the public with regard to stroke, our nation’s third leading cause of death,” the authors note. Although the study focused on fine particulate matter, the association of ozone levels and stroke/TIA risk suggests that ambient air pollution in general may affect stroke risk.

Article: “Ambient Air Pollution and Risk of Ischemic Stroke and TIA,” Lynda Lisabeth, James Escobar, Joseph Dvonch, Brisa Sanchez, Jennifer Majersik, Devin Brown, Melinda Smith, Lewis Morgenstern, *Annals of Neurology*, 2008. DOI: 10.1002/ana.21403. Published online May 28.

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