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Acute Exposure to Air Pollution Triggers Atrial Fibrillation

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Abstract

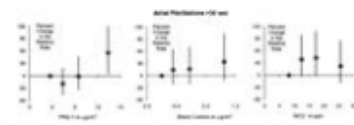
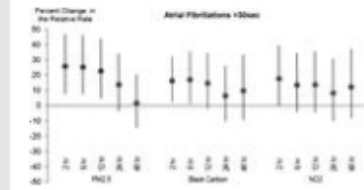
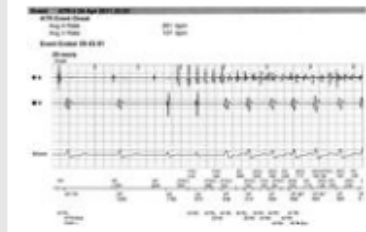
Objectives This study sought to evaluate the association of air pollution with the onset of atrial fibrillation (AF).

Background Air pollution in general and more specifically particulate matter has been associated with cardiovascular events. Although ventricular arrhythmias are traditionally thought to convey the increased cardiovascular risk, AF may also contribute.

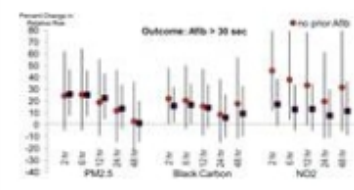
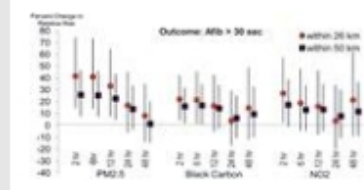
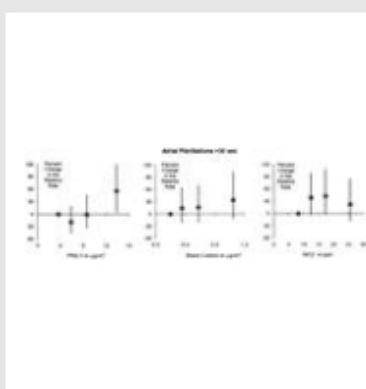
Methods Patients with dual chamber implantable cardioverter-defibrillators (ICDs) were enrolled and followed prospectively. The association of AF onset with air quality including ambient particulate matter <2.5 μm aerodynamic diameter (PM_{2.5}), black carbon, sulfate, particle number, NO₂, SO₂, and O₃ in the 24 h prior to the arrhythmia was examined utilizing a case-crossover analysis. In sensitivity analyses, associations with air pollution between 2 and 48 h prior to the AF were examined.

Results Of 176 patients followed for an average of 1.9 years, 49 patients had 328 episodes of AF lasting ≥ 30 s. Positive but nonsignificant associations were found for PM_{2.5} in the prior 24 h, but stronger associations were found with shorter exposure windows. The odds of AF increased by 26% (95% confidence interval: 8% to 47%) for each 6.0 $\mu\text{g}/\text{m}^3$ increase in PM_{2.5} in the 2 h prior to the event ($p = 0.004$). The odds of AF were highest at the upper quartile of mean PM_{2.5}.

Conclusions PM was associated with increased odds of AF onset within hours following exposure in patients with known cardiac disease. Air pollution is an acute trigger of AF, likely contributing to the pollution-associated adverse cardiac outcomes observed in epidemiological studies.



Figures in this Article



Figures in this Article



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