

Effect of air pollution on acute heart failure hospitalization differ across specific heart failure populations

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Introduction: Several report showed the association between ambient air pollution including particulate matter under 2.5 μm (PM_{2.5}) and increasing rate of hospitalization for heart failure. However, these report analyzed mainly cross-sectional, epidemiological data, thus the reports regarding association between vulnerability to PM_{2.5} and specific populations in acute heart failure (AHF) were scarce.

Purpose: 1. To analyze the association between air pollution and rate of hospitalization for AHF

2. To analyze whether the vulnerability to air pollution differ between specific populations in AHF. Methods

A case-cross over analysis was conducted to 4980 consecutive patients registered for multicenter acute heart failure registry in 2017 in our city Japan. This registry enrolled patients transferred to cardiovascular care unit (80 institutions) via emergency medical services across our city

area. Logistic regression analysis were conducted to estimate percentage changes in the rate of acute heart failure hospitalization associated with per 1 $\mu\text{g}/\text{m}^3$ PM_{2.5} concentration increase. We also conducted subgroup analysis for patients stratified by age, gender, comorbidities, left ventricular ejection fraction, and clinical scenario.

Results: An increase in 1 $\mu\text{g}/\text{m}^3$ PM_{2.5} concentration corresponded to 2.9% (95% CI 1.2–4.6%) increase in AHF hospitalization. Patients with age younger than 75, without prior heart failure hospitalization, without history of hypertension, without anemia, and with reduced ejection fraction were more susceptible to increase in PM_{2.5} concentration (Figure).

Conclusions: Increase in PM_{2.5} concentration was associated with increased rate of AHF hospitalization. Effect of PM_{2.5} may differ across specific AHF subpopulations.

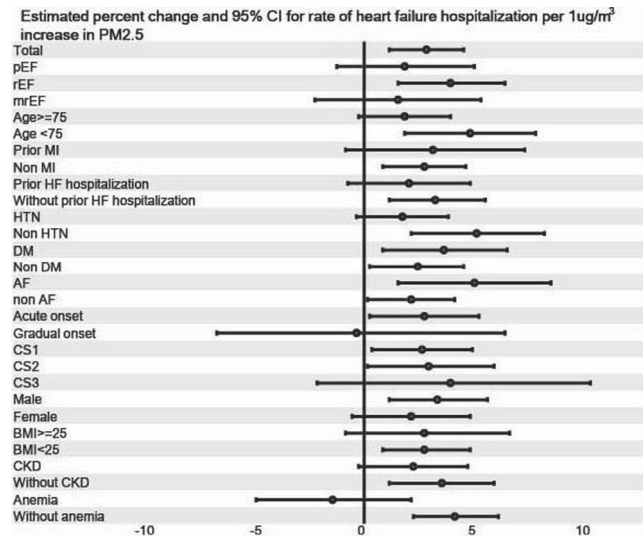


Figure 1