Lung Pathology

SESSION TITLE: Lung Pathology Posters

SESSION TYPE: Original Investigation Posters

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AIRWAY HYPERREACTIVITY INCREASES RISK OF VASCULAR DYSFUNCTION IN WTC-EXPOSED FIREFIGHTERS

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PURPOSE: The World Trade Center (WTC) destruction on 9/11 caused an intense particulate matter (PM) exposure which resulted in airway hyperreactivity (AHR). We seek to validate our pilot study that found a positive association between obstructive airway disease and cardiovascular dysfunction. MetSyn is a diagnosis of having at least 3 of 5 risk factors of diabetes and atherosclerotic cardiovascular disease: Obesity, HDL<40mg/dL, triglycerides>150mg/dL, insulin resistance, and hypertension.

METHODS: ***Cohort:*** Firefighters (N=7,294) were consented for longitudinal monitoring in the WTC-health program. Subjects were included (N=4,151) if they had **1.** Consented recently **2.** Normal Pulmonary function tests (PFTs) prior to 9/11 **3.** Exposure at WTC site within two weeks of 9/11 **4.** First post 9/11 blood drawn before site closure on 7/24/2002 **5.** All available MetSyn data. Cardiovascular disease history, smoking status, lipids, glucose, vitals, PFTs and medication history were reviewed in the electronic medical record (EMR). Exposure level was defined on self-reported arrival times to the WTC site: 1. Morning of 9/11 2. Afternoon of 9/11 3. 9/12 and after. Database management and statistical analyses performed with SPSS 28. Binary logistic regression was used to identify risk factors of PM-related vascular dysfunction: myocardial infarction, cerebrovascular accident, cardiac arrest, coronary artery bypass graft, transient ischemic attack, angina, aortic aneurysm, peripheral artery disease, cardiomyopathy or hypertension after 9/11.

RESULTS: AHR (N=1420) was identified based on positive methacholine or bronchodilator testing and/or EMR diagnosis. Similarly, patients with cardiovascular disease and/or on antihypertensives (N=471) were identified. N=1319 had 1/5 characteristics for MetSyn, N=925 had 2/5 characteristics for MetSyn and N= 629 had 3 or more characteristics for MetSyn. There was a dose response seen with increasing number of MetSyn points and odds of developing vascular dysfunction; OR (95% CI) of 1.38(1.05-1.83), 1.84(1.38-2.44) and 2.48(1.85-3.34) for each additional MetSyn point respectively. Firefighters with AHR had a 26% increased risk of developing vascular dysfunction. Exposure level was not a significant risk factor in either model.

CONCLUSIONS: AHR and MetSyn increased the odds of developing vascular dysfunction. We have established a cohort of WTC-exposed first responders and have begun enrolling a sub cohort in our observational study (clinicaltrials.gov NCT05215171) to understand WTC-cardiorespiratory and vascular dysfunction, the heterogeneous phenotype that bridges respiratory and vascular disease. Further analysis is needed to investigate the link between their exposure and cardiopulmonary disease.

CLINICAL IMPLICATIONS: Globally, air pollution leading to cardiorespiratory and vascular disease accounts for 7 million annual deaths. PM is a significant component of ambient air pollution and contributes to AHR and cardiovascular disease. Understanding biologically plausible pathways in PM-induced AHR can identify future potential targets for therapy to reduce susceptibility to respiratory and vascular pathology.

DISCLOSURES:

No relevant relationships by George Crowley

No relevant relationships by Urooj Javed

No relevant relationships by Sophia Kwon

No relevant relationships by Anna Nolan

No relevant relationships by Sanjiti Podury

No relevant relationships by David Prezant

No relevant relationships by Theresa Schwartz

No relevant relationships by Rachel Zeig-Owens

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