



## Heart Failure and Cardiomyopathies

### AIR POLLUTION AND ADVERSE CARDIAC REMODELLING IN PATIENTS WITH DILATED CARDIOMYOPATHY

Poster Contributions

Saturday, May 15, 2021, 9:45 a.m.-10:30 a.m.

Session Title: Heart Failure and Cardiomyopathies: Clinical Science 1

Abstract Category: 08. Heart Failure and Cardiomyopathies: Clinical Science

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**Background:** Exposure to air pollution has a strong link with heart failure but the biological basis of this remains unclear. We evaluate the association of air pollution with adverse cardiac remodelling in patients with dilated cardiomyopathy.

**Methods:** Prospective cohort study comprising UK patients with a clinical diagnosis of dilated cardiomyopathy confirmed by cardiac magnetic resonance imaging recruited between 2009-2015 (n=716, 66% male, 85% Caucasian). Long-term air pollution exposure estimates in the year of the baseline scan were assigned to each residential postcode centroid (on average 12 households) using annual average maps for concentrations of nitrogen dioxide (NO<sub>2</sub>) and particulate matter with diameter  $\leq 2.5\mu\text{m}$  (PM<sub>2.5</sub>) at a resolution of 200m and 100m respectively.

**Results:** In total, 659 patients were assigned air pollutant estimates. The median exposure to NO<sub>2</sub> was 32.4 (interquartile range, IQR 24.1 - 40.6)  $\mu\text{g}/\text{m}^3$  and to PM<sub>2.5</sub> was 15.4 (IQR, 14.3 - 16.3)  $\mu\text{g}/\text{m}^3$ , with 26% of the cohort having NO<sub>2</sub> exposure higher than European legal limits. Greater ambient exposure to NO<sub>2</sub> was associated with higher indexed left ventricular mass (4.4 g/m<sup>2</sup> increase per IQR increase in NO<sub>2</sub>, 95% confidence intervals (CI) 1.9 to 6.9 g/m<sup>2</sup>,  $p_{\text{adjusted}}=0.0007$ ) and lower left ventricular ejection fraction (-1.6% decrease per IQR increase in NO<sub>2</sub>, 95% CI -2.8 to -0.4%,  $p_{\text{adjusted}}=0.008$ ), independently of age, sex, and clinical covariates. Similar association was detected with ambient PM<sub>2.5</sub> exposure (2.7 g/m<sup>2</sup> increase in indexed left ventricular mass per IQR increase in PM<sub>2.5</sub>, 95% CI=0.4 to 5.2 g/m<sup>2</sup>,  $p=0.02$ ).

**Conclusion:** Increased exposure to air pollution is associated with adverse cardiac remodelling through lower left ventricular ejection fraction and raised left ventricular mass in patients with dilated cardiomyopathy. These findings provide biological plausibility for established pre-clinical and epidemiological links between air pollution and heart failure and have global public health implications in managing patients with heart failure.