Chronic Parenchymal Lung Disease Radiological Abnormalities and Declining Longitudinal FEV1 Trajectory in WTC Workers and Volunteers

R. E. de la Hoz[1], K. Antoniak[1], X. Liu[2], J. T. Doucette[1], J. Weber[1], Y. Jeon[1]; [1]Environmental Medicine and Public Health, and Medicine, Icahn School of Med at Mount Sinai, New York, NY, United States, [2]Population Health Science and Policy, Icahn School of Med at Mount Sinai, New York, NY, United States.

Corresponding author's email: rafael.delahoz@mssm.edu

Background: Occupational health exposures at the WTC site after September 11, 2001 have been associated with several inflammatory lower airway diseases among WTC workers and volunteers. In this study, we examined whether expiratory airflow slope trajectories are correlated with semiquantitative visual radiological scores for interstitial lung disease abnormalities (rounded opacities, linear opacities, ground glass opacities, and honeycombing), and emphysema. Methods: We selected the first-second forced expiratory volume (FEV_1) to establish the expiratory air flow trajectories of 1348 former WTC workers and volunteers with at least 3 periodic spirometries, and available semiquantitative CT scan scores (“sumgrades”) according to the International Classification for Occupational and Environmental Disease (ICOERD). We calculated individual FEV_1 slope regression lines, and then classified subjects as “stable”, “gainers” or “decliners” based on their FEV_1slope. We then used multivariable logistic regression to model decliner vs. stable trajectories in a dichotomous model that compared those with higher and lower scores for each of the selected radiological abnormalities. Results: We observed a statistically significant unadjusted association between decliner FEV_1slope , and groundglass opacity (p=0.024), but multivariable analysis failed to show significance. Conclusions: Groundglass opacities were the only of the 5 examined radiological abnormalities associated with declining FEV_1slope in this study in unadjusted, but not adjusted analyses. Studies with larger sample sizes and longer follow-up time merit further research.

Table 1. Comparison of interstitial lung disease abnormalities and emphysema between decliners and stable subjects, unadjusted, and then adjusted for race/ethnicity, age, height, gender, smoking status, and BMI.

	Stable		Decliner		P value Unadjusted	P value Adjusted
	No.	%	No.	%		
Rounded Opacities					0. 79	0.88
Sumgrade <2	549	94.5	399	94.1		
Sumgrade ≥ 2	32	5.5	25	5.9		
Linear Opacities					0.09	0.91
Sumgrade < 2	524	90.2	368	86.8		
Sumgrade ≥ 2	57	10.2	56	13.8		
Ground Glass					**0.024**	0.054
Sumgrade < 2	546	94.8	382	91.2		
Sumgrade ≥ 2	30	5.2	37	8.8		
Honeycombing					0.53	0.99
Sumgrade = 0	571	98.6	416	98.1		
Sumgrade ≥ 1	8	1.4	8	1.9		
Emphysema					0.88	0.58
Sumgrade = 0	511	88.3	372	88.6		
Sumgrade ≥ 1	68	11.7	48	11.4		

This abstract is funded by: CDC/NIOSH U01 OH010401