

Pulmonary Disability Evaluations In Fdny Rescue Workers Exposed To Wtc Particulates: A Pilot Study

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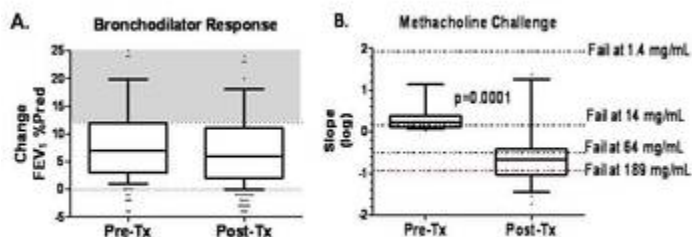
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Background: In the 7 years after the WTC disaster, the annual number of FDNY retirements attributable to pulmonary disability increased nearly 4-fold. FDNY rescue workers evaluated for pulmonary disability at our subspecialty center were previously found to have an obstructed phenotype based on FEV₁/FVC, Methacholine Challenge Test (MCT) reactivity, or bronchodilator (BD) reactivity (59% of N=1720). In this pilot study, we examined the long-term efficacy of treatment and its effect on disease progression in a subgroup (N=450) of individuals with subspecialty pulmonary testing who were referred for disability evaluation before and after a course of treatment.

Methods: Our study cohort includes individuals that were symptomatic, had subspecialty pulmonary testing (pre-treatment), and were referred for disability evaluation after a full course of treatment (post-treatment). Disability evaluations were performed 30 days after weaning from inhaled medication. Individuals were excluded if their post-treatment PFT was less than three months after starting treatment. Change in lung function over time and post treatment were analyzed (N=415). Values are presented as medians with IQR. We defined statistical significance as P<0.05 using the paired t-test. Analyses were performed using GraphPad and SPSS software.

Results: Individuals evaluated by MCT presented for disability evaluation earlier, with a shorter interval of treatment (7.5 months (5-10)) compared to those that received spirometry with BD, (14.5 months (8-25) p<0.0001). FEV₁ %Pred and FEV₁/FVC declined significantly; p<0.0001. FEV₁ observed declined at a slower rate in the treatment group than in the entire WTC-exposed FDNY cohort, including those not referred for subspecialty evaluation: 15cc/year vs. 26cc/year. After treatment course, BD response was unchanged, but methacholine reactivity improved significantly; Fig. 1.

Figure 1



Airway Hyperreactivity Post-Treatment. (A): BD response did not improve from pre- to post-treatment, (N=135). Shading represents a positive BD response. (B): Methacholine reactivity significantly improved, from failing at a cumulative dose of 1.4 mg/mL to failing at a cumulative dose of 64 mg/mL (N=35). There was no difference between individuals receiving bronchodilator response and methacholine challenge in FEV₁ or FEV₁/FVC both pre- and post treatment, the decline FEV₁ from pre- to post-Treatment, time to entry into treatment cohort, or demographics (years of service, exposure, age at 9/11, or BMI).

Conclusion: Treatment with removal from fire fighting, inhaled steroids and beta agonists did not improve spirometric measures, or BD response, but slowed the rate of decline and decreased hyper-reactivity to the MCT. Improvement in reactivity defined by MCT but not defined by BD response suggests that the pathways leading to BD response and MCT reactivity may be different and may respond differently to treatment.

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