

Blood Eosinophils And World Trade Center Exposure Predict Surgery In Chronic Rhinosinusitis: A 13.5-Year Longitudinal Study

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Background The World Trade Center (WTC) collapse generated caustic airborne particulates causing chronic rhinosinusitis (CRS) in exposed fire department of New York (FDNY) firefighters. Surgery occurred when patients' symptoms remained uncontrolled despite medical management. **Methods** We assessed predictors of CRS-surgery in 8,227 firefighters with WTC-exposure between 9/11/2001 (9/11) and 9/25/2001, including WTC-site arrival time, months of rescue/recovery work, and blood eosinophil concentration between 9/11 and 3/10/2003 using Cox proportional hazard models. **Results** Between 9/11 and 3/10/2015, CRS and CRS-surgery rates were 3.4 and 0.47 cases per 100 person years, respectively. Medically managed CRS (CRS no-surgery) was associated with arriving at the WTC site 9/11 or 9/12/2001, hazard ratio [HR] 1.33 (95% confidence interval [CI] 1.11 to 1.44; P<0.001). Surprisingly, compared with one month of work at the WTC site, ≥6 months work duration was protective (HR 0.83 CI 0.74-0.93 P<0.001). CRS no-surgery was not significantly associated with blood eosinophils in the cohort's top quartile, (≥240 cells/ml 1.09 0.99-1.19 p=0.08). CRS-surgery patients had higher blood eosinophil concentration than the study cohort (median 184 cells/ml interquartile range (IQR) 116 to 285 vs. 160 cells/ml IQR 106 to 240; P <0.001). Increased CRS-surgery risk was associated with blood eosinophils ≥240 cells/ml, HR 1.50 (95% CI 1.24 to 1.81; P <0.001); arriving at the site 9/11 or 9/12/2001, HR 1.45 (95% CI 1.05 to 2.01; P=0.02); and working ≥6 months at the WTC-site, HR 1.48 (95% CI 1.14 to 1.93; P<0.01). There was a significant synergistic interaction between earlier arrival time and working 6 or more months at the site (P=0.034).

Conclusions In WTC-exposed FDNY firefighters, the risk profile of patients with medically managed CRS differs from the profile of those who received CRS surgery. Blood eosinophil ≥240 cells/ml identified a vulnerable group with higher risk for irritant-associated CRS-surgery, particularly in those with both intense acute and prolonged chronic irritant exposures.

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