Elevation Of Serum Igg1 Within 6 Months Of Wtc Exposure Reduces The Odds Of Sinus Surgery Over The Subsequent 13.5 Years

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Background The World Trade Center (WTC) collapse generated caustic airborne particulates causing chronic rhinosinusitis (CRS) in WTC-exposed Fire Department of the City of New York (FDNY) firefighters. Surgery occurred when patients' symptoms remained uncontrolled despite medical management. The incidence of surgery remained elevated for years after exposure raising the possibility that differences in immune response contributed to susceptibility to persistent symptoms eventually treated with surgery. IgG_1 is an antibody transported into airway mucus. Its deficiency is a risk factor for sinusitis and pneumonia.

Methods In a pilot nested case control study of 291 WTC exposed non-smoking FDNY firefighters who had immunoglobulin levels measured in serum drawn between 9/11/2001 (9/11) and 3/11/2002, we assessed if Ig subtypes differed between 39 sinus surgery cases and 252 controls.

Results From 9/11 to 3/10/2015, CRS-surgery rates were 3.4 per 100 person years. Compared with surgery cases, IgG1 was higher in the controls (5.9 ± 4.5 mg/ml vs 4.5 ±2.5 mg/ml p<0.01 Figure 1A). There was no difference in other IgG subclasses, IgM, IgA or IgE. The odds of sinus surgery was 79% lower for those with a serum IgG_1 level of greater than 9 or greater mg/ml (n=55) compared with a serum IgG1 level less than 9 mg/ml (n=239) (Figure 1B, OR=0.21, 95% CI 0.05 to 0.88 P<0.02).

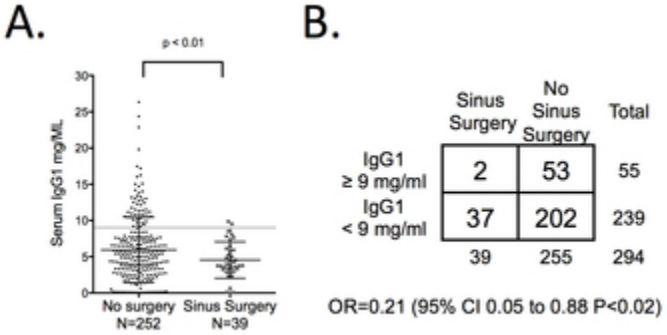

Figure 1

Conclusion Elevated IgG1 is a protective factor for eventual sinus surgery which is manifests early after exposure to irritant dust. This raises the possibility that high levels of mucosal Ig alter the microbiome or reduce susceptibility to infection and protect from non-resolving inflammation of the upper airway that may lead to sinus surgery.

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