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Research Article

Effect of glutathione S-TRANSFERASE polymorphisms and proximity to hazardous waste sites on time to systemic lupus erythematosus diagnosis: Results from the roxbury lupus project

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Abstract

Objective

The high prevalence of systemic lupus erythematosus (SLE) among African American women may be due to environmental exposures, genetic factors, or a combination of factors. Our goal was to assess association of residential proximity to hazardous waste sites and genetic variation in 3 glutathione Stransferase (GST) genes (GSTM1, GSTT1, and GSTP1) with age at diagnosis of SLE.

Methods

Residential histories were obtained by interviewing 93 SLE patients from 3 predominantly African American neighbourhoods in Boston. Residential addresses and locations of 416 hazardous waste sites in the study area were geocoded using ArcView software. Time-varying Cox models were used to study the effect of residential proximity to hazardous sites, GST genotype, and interaction between genotype and exposure in determining age at diagnosis.

Results

The prevalence of SLE among African American women in these neighbourhoods was 3.56 SLE cases per 1,000. Homozygosity for GSTM1-null and GSTP1 Ile105Val in combination was associated with earlier SLE diagnosis ($P = 0.03$), but there was no association with proximity to 416 hazardous sites. Available data on specific site contaminants suggested that, at a subset of 67 sites, there was higher potential risk for exposure to volatile organic compounds ($P < 0.05$ with Bonferroni correction). GST genotypes had a significant interaction with proximity ($P = 0.03$) in analyses limited to these sites.

Conclusion

There was no independent association between residential proximity to hazardous waste sites and the risk of earlier SLE diagnosis in this urban population. However, analysis of a limited number of sites indicated that the risk of earlier SLE associated with proximity to hazardous sites might be modulated by GST polymorphisms.