

Exposure to Agent Orange is Associated with Increased Recurrence After Surgical Treatment of Stage I Non-Small Cell Lung Cancer

Objective:

Approximately 3 million Americans served in the armed forces during the Vietnam War. The Department of Veterans Affairs has demonstrated that Veterans have a higher rate of lung cancer compared to the general population, which may be related to exposures sustained during service. Agent Orange (AO), one of the tactical herbicides utilized by the armed forces as a means of destroying crops and clearing vegetation, has been linked to development of several cancers including non-small cell lung cancer (NSCLC). However, traditional risk models of lung cancer survival and recurrence often do not include such exposures. We aimed to examine the relationship between AO exposure and overall survival (OS) and disease recurrence for surgically-treated stage I NSCLC.

Methods

We performed a retrospective cohort study using a uniquely compiled dataset of US Veterans with clinical stage I NSCLC. We included adult patients who served in the Vietnam War and underwent surgical resection for pathologic stage I NSCLC between 2010-2016. Our two comparative groups included those with identified AO Exposure and those who were unexposed. We used multivariable Cox proportional hazards and Fine and Gray competing risks analyses to examine OS and disease recurrence for patients with pathologic stage I disease, respectively.

Results

A total of 3958 Vietnam veterans with pathologic stage I disease were identified (994 who had AO exposure and 2964 who were unexposed). Those who had AO exposure were more likely to be male, Caucasian, and live a further distance from their treatment facility ($p < 0.05$). Tumor size distribution, grade, and histology were similar between cohorts. Multivariable Cox proportional hazards modeling identified similar OS between cohorts (AO exposure hazard ratio 0.97; 95% CI 0.86-1.09). Patients who had AO exposure had a 19% increased risk of disease recurrence (hazard ratio 1.19; 95% confidence interval, 1.02-1.40).

Conclusions.

Veterans with known AO exposure who undergo surgical treatment for stage I NSCLC have an almost 20% increased risk of disease recurrence compared to their non-exposed counterparts. AO exposure should be taken into consideration when determining treatment and surveillance regimens for Veteran patients.

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Exposure to Agent Orange and Risk of Recurrence in Surgically Resected Stage I NSCLC

