On-the-job pesticide exposure associated with Parkinson's disease

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Individuals whose occupation involves contact with pesticides appear to have an increased risk of having Parkinson's disease, according to a report in the September issue of *Archives of Neurology*.

The development of Parkinson's disease related to chemical exposure was identified in the late 20th century, according to background information in the article. Since then, occupations such as farming, teaching and welding have all been proposed to increase the risk of Parkinson's disease. However, associations have been inconsistent and few previous studies have evaluated the direct relationship between occupational chemical exposure and disease risk.

Caroline M. Tanner, M.D., Ph.D., of the Parkinson's Institute, Sunnyvale, Calif., and colleagues studied 519 individuals with Parkinson's disease and 511 controls who were the same age and sex and lived in the same location. Participants were surveyed about their occupational history and exposure to toxins, including solvents and pesticides.

Working in agriculture, education, health care or welding was not associated with Parkinson's disease, nor was any other specific occupation studied after adjustment for other factors.

Among the patients with Parkinson's disease, 44 (8.5 percent) reported pesticide exposure compared with 27 (5.3 percent) of controls, such that occupational pesticide exposure was associated with an increased risk of

the disease. "Growing evidence suggests a causal association between pesticide use and parkinsonism. However, the term 'pesticide' is broad and includes chemicals with varied mechanisms," the authors write. "Because few investigations have identified specific pesticides, we studied eight pesticides with high neurotoxic plausibility based on laboratory findings. Use of these pesticides was associated with higher risk of parkinsonism, more than double that in those not exposed."

Three individual compounds—an organochloride (2,4-dichlorophenoxyacetic acid), an herbicide (paraquat) and an insecticide (permethrin)—were associated with a more than three-fold increased risk of Parkinson's disease. All three have been shown to have effects on dopaminergic neurons—affected by Parkinson's disease—in the laboratory.

"This convergence of epidemiologic and laboratory data from experimental models of Parkinson's disease lends credence to a causative role of certain pesticides in the neurodegenerative process," the authors conclude. "Other pesticide exposures such as hobby gardening, residential exposure, wearing treated garments or dietary intake were not assessed. Because these exposures may affect many more subjects, future attention is warranted."

More information: *Arch Neurol.* 2009;66[9]:1106-1113

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