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Influenza immunization at midlife and the risk of Parkinson Disease

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Parkinson disease (PD) is the second most common neurodegenerative disease worldwide, affecting more than one million people in the US alone. The incidence of PD increases with advancing age and is higher among men than women. However, the etiology of PD remains largely unclear. As a result, there are no curative or disease-modifying treatments available, and approved medications mainly alleviate symptoms, such as hypokinesia, rigor, or tremor.

A potential etiologic mechanism for PD is based on infections, with different bacteria, viruses, and fungi having been suggested as possible causative pathogens over the years. The influenza virus is one of the most prominent pathogens in this regard, with preclinical studies suggesting its involvement in the degeneration of dopaminergic neurons. Moreover, several observational studies have shown that influenza infection was associated with an increased risk of PD.

Given the accumulating evidence, there is a need to understand the potential role of immunization for influenza at midlife as a preventive measure against the development of PD later during the life course. To address this important knowledge gap, we conducted a large, population-based cohort study with almost 30 years of follow-up to assess whether immunization for influenza at midlife (between ages 40 and 50 years) is associated with a decreased risk of PD.

Overall, influenza immunization at midlife was not associated with a statistically significant reduction in PD risk. Although point estimates suggested a possible decrease in risk several years after vaccination—reaching a lowest hazard ratio around 8 years post-vaccination—and among individuals vaccinated during influenza season, none of these findings were statistically significant. The association was not modified by age, sex, or prior vaccination history, and multiple sensitivity analyses supported the main results.

The study's strengths include its large sample size, long follow-up, and robust methods to reduce bias. Limitations include the observational design and potential misclassification of vaccination exposure.

In conclusion, influenza vaccination at midlife does not appear to reduce PD risk in the overall population, though potential delayed benefits or effects in specific subgroups warrant further investigation.

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