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Smoking and Parkinson's disease in twins.

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Abstract

OBJECTIVE:
To test the hypothesis that cigarette smoking protects against the development of PD.

BACKGROUND:
Smoking has been inversely associated with PD in many studies, but whether this reflects a biologic effect on the underlying disease process or merely confounding or selection bias remains uncertain.

METHODS:
The authors compared smoking histories in male twin pairs identified from the National Academy of Sciences--National Research Council World War II Veteran Twins Cohort. The amount of cigarettes smoked (in pack-years) was collected until the time of PD onset in the affected twin or until the time of death for the unaffected twin, whichever came first. Differences in pack-years smoked until PD onset and until 10 and 20 years before onset were compared using paired t-tests. Comparisons were made overall and stratified by zygosity and concordance for PD. To assess the role of shared environment, correlation for smoking behaviors was compared between pairs concordant and discordant for PD.

RESULTS:
Detailed smoking histories were available for 113 twin pairs in which at least one twin had PD (discordant pairs: 43 monozygotic [MZ], 50 dizygotic [DZ]; concordant pairs: 10 MZ, 10 DZ). Within-pair correlation for ever smoking was high in MZ pairs (phi = 0.47, p = 0.001) but not in DZ pairs (phi = 0.007, p = 0.96). In 33 discordant MZ pairs and 39 discordant DZ pairs in which at least one twin had smoked, the twins without PD smoked more than their brothers smoked (32.5

vs. 22.7 pack-years, p = 0.026). This was more marked in the MZ pairs (37.1 vs. 25.3 pack-years, p = 0.077) than in the DZ pairs (28.6 vs. 20.5 pack-years, p = 0.17). A similar relationship was seen when smoking dose was calculated only until 10 years before PD onset, suggesting that the lower dose of smoking in the twin with PD was not the result of early, undiagnosed disease.

CONCLUSION:
Within twin pairs, risk of PD is inversely correlated with the dose (in pack-years) of cigarette smoking. This effect is most pronounced in MZ twins, despite the high correlation for smoking. Because MZ twins are genetically identical and are similar behaviorally, this difference is unlikely to result from either genetic factors or environmental confounders. These results are compatible with a true biologic protective effect of cigarette smoking.

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- Parkinson Disease/epidemiology*
- Parkinson Disease/prevention & control
- Smoking/epidemiology*

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