Parkinsonian Signs and Incident Falls in Older Persons without Parkinson's Disease

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To the Editor

Parkinsonian signs, similar to those in Parkinson's disease (PD) but mild and not medication responsive, are common in older persons without known neurologic disease.[1] They are progressive, and associated with morbidity[2, 3] and mortality.[4] A better understanding of associated adverse health outcomes is needed. Although persons with PD have been shown to be at risk for falls, we are not aware of any previous study that directly examined the relation of change in parkinsonian signs to falls in persons without PD. Using data from the Rush Memory and Aging Project, a prospective epidemiologic, community-based cohort study of aging, we tested the hypothesis that worsening parkinsonian signs in almost 600 older persons without PD or dementia are associated with increased risk of falls.

Participants, recruited from >40 Chicago area retirement communities and subsidized-housing facilities, underwent annual uniform, structured clinical evaluations. These included a detailed medical history with documentation of falls and physical examination focusing on neurological status. Participants were asked annually, "How many times would you say that you have fallen over the past year? That is, how many times have you unintentionally come to rest on the floor?" Number of falls during the preceding year was recorded, and data was summarized as falls present (one or more) vs. absent.

Parkinsonian signs were assessed using a modified version[5] of the motor portion of the Unified Parkinson's Disease Rating Scale (UPDRS).[6] Using this data, we created two summary scores of parkinsonian signs. A global score was calculated by averaging four individual sign scores (bradykinesia, rigidity, tremor, and gait impairment) each of which was based on two or more items, as previously described.[7] To examine whether parkinsonian signs other than gait were related to falls, we created a summary sub-score of signs that excluded parkinsonian gait, by averaging three sign scores (bradykinesia, rigidity, and tremor). Scores range from 0–100, with higher values indicating more severe signs. Because scores were not normally distributed, they were log-transformed for analyses. Data on factors with potential to affect relations of interest, including vision impairment, peripheral neuropathy, and arthralgias, were available.

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Analyses were performed on a sample excluding participants with a history of falls prior to baseline evaluation, PD,[8] and dementia.[9] Yearly log odds of falls were modeled using proportional odds models with time-varying covariates, adjusted for age, sex, and education. Change in scores for a given year was the slope of the ordinary least squares regression of parkinsonian signs, considering data up to the year for which falls were assessed. A primary analysis examined the relation of worsening global score of parkinsonian signs to risk of falls, and secondary analyses controlled for potential confounders. An additional analysis examined the relation of change in the parkinsonian sign sub-score that excluded gait to risk of falls. Programming was done in SAS®.

From first enrollment in 1997 to 2006, 599 persons without prior falls, PD, or dementia, with follow-up data were eligible for inclusion in the study (mean follow-up three years, maximum nine years). Baseline characteristics of persons with and without falls are shown in Table 1.

At baseline, most subjects had mild parkinsonian signs (mean global score 8.4; range, 0–33.6). During the study period, 290 (48.4%) participants reported falls in the preceding year. There was a 14% increase in odds of falls in persons with worsening global parkinsonian sign score (OR=1.14; 95%CI=1.03,1.27). Results remained essentially unchanged when controlling separately for factors known to increase fall risk, vision impairment (OR=1.13; 95%CI=1.01,1.26), peripheral neuropathy (OR=1.13; 95%CI=1.02,1.26), and arthralgias (OR=1.13 95%CI=1.08,1.26). In a subsequent analysis excluding parkinsonian gait, the odds of falls associated with worsening parkinsonian sign sub-score was essentially unchanged (OR=1.11; 95%CI=1.01, 1.22).

In summary, in this longitudinal study of almost 600 community-dwelling older persons without PD, we found that worsening parkinsonian signs were related to increased risk of falls. This finding remained in an analysis of a sub-score of parkinsonian signs which was based on bradykinesia, rigidity, and tremor, suggesting that the relation of worsening parkinsonian signs to falls is unlikely to be attributable to only a worsening of gait impairment. This suggests that parkinsonian signs are a risk factor for falls aside from gait impairment and that central nervous system processes play a role in this relation.[10] Limitations of the study include recall bias for falls and unavailability of more sophisticated means to identify confounders. Strengths are the validated and standardized method to assess parkinsonian signs, and large community-based cohort with longitudinal data. Our findings will need to be replicated in other studies.

Acknowledgments

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Table 1

Baseline Characteristics* of Subjects.

Subject Characteristics	Persons with falls over the course of the study n = 309	Persons without falls over the course of the study n = 290
Age, years	80.2 (6.7)	80.5 (6.6)
Male sex, %	22%	24 %
Education, years	14.6 (2.8)	14.7(3.0)
MMSE score	28.1 (1.9)	28.1 (1.9)
Global parkinsonism	8.4 (6.6)	8.4 (6.6)

*
Mean (±SD) unless otherwise specified