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Daytime sleep in Parkinson's disease measured by episodes of immobility

K Kotschet [1], W Johnson [2], S McGregor [2], J Kettlewell [3], A Kyoong [2], D M O'Driscoll [4], A R Turton [5], R I Griffiths [3], M K Horne [6]

Affiliations

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Abstract

Excessive daytime sleepiness (EDS) is common in Parkinson's Disease (PD). Actigraphy uses periods of immobility as surrogate markers of nighttime sleep but there are no examples of its use in assessing EDS of PD. A commercial wrist worn system for measuring bradykinesia and dyskinesia also detects 2 min periods of immobility, which have a 85.2% concordance with the detection of sleep by ambulatory daytime polysomnography, ($p < 0.0001$ Chi Squared). High Epworth Sleepiness Scores (ESS) were associated with a proportion of time immobile (PTI) ($p = 0.01$ Mann-Whitney U). The median PTI between 0900 and 1800 h w in 30 age matched control subjects was 2%, representing 10 min and PTI at or above the 75th percentile (5% or 27 min) was taken as a high level. PD patients had higher PTI (median 4.8%) than controls ($p < 0.0001$, Mann-Whitney U). PD subjects with a high PTI had more bradykinesia, less dyskinesia and higher PDQ39 scores than those with low PTI. There was no relationship between PTI and dose or type of PD medications. However, in 53% of subjects, PTI increased in the 30-60 min after levodopa confirming that in some subjects levodopa results in increased sleepiness. In summary, immobility is a surrogate marker of daytime sleep in PD, confirmed by correlation with PSG and ESS. PD subjects measured this way are more likely to be sleepy and sleepy PD subjects are more likely to be bradykinetic and have a higher PDQ39. Levodopa leads to an increase in sleepiness in more than half of subjects post dosing.

Keywords: Actigraphy; Automated analysis; Bradykinesia; Day time sleepiness; Parkinson's; Sleep.

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