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Original article

Parkinson's patients cope with daylight saving time

Maladie de Parkinson et décalage horaire saisonnier

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ABSTRACT

Disturbances of the circadian timing system following daylight saving time (DST) may influence the symptoms of Parkinson's disease (PD). To address this question, we compared the severity of motor fluctuations and non-motor symptoms both before and after the time change. Total daily "off-time" based on diaries, excessive daytime sleepiness (Epworth Sleepiness Scale), depressive symptoms (Beck Depression Inventory), and psychosis associated with PD were assessed both before and after the DST. Eighty-three PD patients (mean age, 67 ± 7.7 years; mean disease duration, 10.4 ± 6.4 years) were included. Thirty-six patients had motor fluctuations (mean daily "off-time", 4.8 ± 2.4 h/day). There was no significant variation of the total daily "off-time" (2.5 ± 2.6 h/day versus 2.5 ± 2.7 h/day), ESS (8.3 ± 4.8 versus 8.1 ± 4.9), BDI (10.4 ± 6.2 versus 10.0 ± 6.9), or PAPD (1.4 ± 1.6 versus 1.1 ± 1.6) scores ($P > 0.05$) after DST. Our results suggest that PD patients cope relatively well with DST.

RÉSUMÉ

Les perturbations des rythmes circadiens consécutifs au décalage horaire saisonnier pourraient aggraver les symptômes de la maladie de Parkinson. Afin d'évaluer cette hypothèse, nous avons comparé la sévérité des fluctuations motrices (agenda) et non motrices (questionnaire), la somnolence diurne (échelle d'Epworth), l'humeur (échelle de Beck), et la présence d'hallucinations (questionnaire) avant et après le décalage horaire saisonnier. Quatre vingt-trois patients (âge moyen, $67 \pm 7{,}7$ ans ; durée moyenne d'évolution, $10{,}4 \pm 6{,}4$ ans) ont été inclus. Il n'existait aucune variation significative pour les différents paramètres étudiés. Ces résultats suggèrent que les patients parkinsoniens font face au décalage horaire sans difficulté.

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1. Introduction

Daylight saving time (DST) is commonly used in mid- and high-latitude countries to make better use of daylight on winter evenings. In the northern hemisphere, clocks are adjusted forward one hour near the start of spring and are adjusted backward in autumn. Disturbances of the circadian timing system following DST may be implicated in the pathogenesis of numerous clinical syndromes including sleep, neurological, and affective disorders (Monk and Aplin, 1980; Mc Carthy and Tarrier, 2002). In Parkinson's disease (PD), sleep disturbances and depression can increase the severity of motor disability (Hogl et al., 1998; Kuhn et al., 1996). Moreover, daily variations in PD symptoms severity are common, especially in patients suffering from ''wearing-off''. Similarly, visual hallucinations associated with PD often occur in the evening and nighttimes, suggesting that it may be more severe during the chronically low ambient light condition of winters (Fénelon et al., 2000). Therefore, we hypothesized that DST transitions may influence the symptoms of PD. To address this question, we compared the severity of motor fluctuations and non-motor symptoms, i.e. excessive daytime sleepiness, psychosis associated with PD and depressive symptoms both before and after the time change.

2. Materials and methods

2.1. Subjects

Eligible patients were at least 30 years of age, diagnosed with PD according to the UK Parkinson's Disease Society Brain Bank criteria, and seen at our center from 2010 to 2012. Patients' demographic and clinical variables were recorded and all levodopa-equivalent daily doses were calculated. The total daily ''off-time'' was assessed based on diaries. Patients underwent a week-long screening period, during which they were taught to recognize and record fluctuations. Diaries were to be completed by patients to record their clinical status every half hour for 24 hours during 3 consecutive days twice: one week prior to DST and one day after. Fluctuating patients were defined by a daily ''off-time'' of at least 2 hours during waking hours. Excessive daytime sleepiness was assessed by the Epworth Sleepiness Scale (ESS), depressive symptoms by the self-rated Beck Depression Inventory (BDI), and psychosis associated with PD (PAPD) by a structured questionnaire composed of ten qualitative items on hallucinations (visual, auditory, tactile, somatic, olfactory, and gustatory) (Fénelon et al., 2010), minor phenomena (sense of presence, visual illusions, passage hallucinations), and delusions. These three scales were completed both before and after the DST, respectively one week before, and one day after. Patients with PD dementia were excluded.

2.2. Statistical analyses

The different score changes were expressed as mean value ± SD. A Student *t* test was used to compare the scores obtained before and after the DST. To reduce the confounding effects of medication adjustments, analysis was restricted to patients with a baseline evaluation that did not involve a medication change. Statistical analysis was performed with the XLSTATS version 2012.4.031, Addinsoft®.

Table 1 – Characteristics of populations according to time changes. Values are mean ± SD.

Time Change	2011 Spring	2011 Autumn	2012 Spring
Nb. patient	45	24	14
Men/women	27/18	16/8	9/5
Age, years	68 ± 8	69 ± 5.2	66 ± 9.5
Disease duration, years	10 ± 6.6	11.6 ± 6.4	9.6 ± 6.0
Hoehn & Yahr stage	1.7 ± 0.8	1.8 ± 0.7	1.9 ± 0.9
Levodopa equivalent, mg	715 ± 372	703 ± 296	695 ± 338

3. Results

A total of 83 PD patients (31 women; mean age, 67 ± 7.7 years; mean disease duration, 10.4 ± 6.4 years; severity of the disease, mean Hoehn & Yahr 1.8 ± 0.8; mean L-dopa equivalent daily dose, 714 ± 344 mg/day) were included in the longitudinal analysis. Thirty-six patients (18 women; mean age, 65.9 ± 8.9 years) had motor fluctuations (mean daily ''off-time'', 4.8 ± 2.4 h/day). Fifty-nine patients completed the questionnaires during the spring-time change and 25 during the autumn time change (Table 1). In our population ($n = 83$), the change in total daily ''off-time'' after DST was not statistically significant (2.5 ± 2.6 h/day versus 2.5 ± 2.7 h/day, $P > 0.05$). Similarly, there was no significant variation of the ESS (8.3 ± 4.8 versus 8.1 ± 4.9), BDI (10.4 ± 6.2 versus 10.0 ± 6.9), or PAPD (1.4 ± 1.6 versus 1.1 ± 1.6) scores ($P > 0.05$) after DST (Table 2). The separate analyses of the spring and autumn shifts yielded essentially the same results (Table 3). The analysis of the group of fluctuating patients did not differ from the analysis of the population as a whole (Table 4).

4. Discussion

As there have been no studies that have assessed the impact of DST transitions on the severity of PD, we evaluated

Table 2 – Variations of fluctuations and non-motors symptoms after daylight saving time (DST) in 83 Parkinson's disease (PD) patients. Values are mean ± SD. The total daily ''off-time'' was assessed based on diaries completed 3 consecutive days.

	Before DST	After DST
Daily ''off-time'', hours	2.50 ± 2.60	2.46 ± 2.67
ESS	8.3 ± 4.8	8.1 ± 4.9
BDI	10.4 ± 6.2	10.0 ± 6.9
PAPD	1.4 ± 1.6	1.1 ± 1.6

Epworth Sleepiness Scale (ESS), Beck Depression Inventory (BDI), and psychosis associated with PD (PAPD). Scales were completed one week before, and one day after DST.

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