Subclinical thyroid disease in patients with Parkinson’s disease

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Received 2 March 2001; received in revised form 16 July 2001; accepted 19 July 2001

Abstract

The objective of this study was to determine whether hypothyroidism is more common in Parkinson patients than in a control group without Parkinson, as suggested in the past. We performed a retrospective file review of all admissions to the geriatric ward during a 1-year period. Concentrations of thyroid stimulating hormone (TSH) and thyroxine (T4) from 92 Parkinson patients were compared with those of 225 randomly selected controls from the same ward. Hypothyroidism was not found to be more common in patients with Parkinson disease as previously suggested. Incidentally, we found an unexpected increase in the prevalence of abnormal thyroid laboratory tests in this group. Statistically significant differences were found in two subgroups, (1) men with Parkinson were more likely to have abnormal thyroid laboratory tests as compared with controls; and (2) 'subclinical' hyperthyroidism was found to be more prevalent in Parkinson patients than in controls. Further research in this field is warranted in non-hospitalized patients. © 2001 Elsevier Science Ireland Ltd. All rights reserved.

Keywords: Parkinson disease; Thyroid stimulating hormone; Hypothyroidism

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0167-4943/01/$ - see front matter © 2001 Elsevier Science Ireland Ltd. All rights reserved.
PII: S0167-4943(01)00196-0
1. Introduction

Parkinson's disease (PD) is a common disorder, with an overall prevalence rising from 0.6% at age 65–69 up to 3.5% at age 85–89 (De-Rijk et al., 1997). When hypothyroidism develops in these patients, the diagnosis may be overlooked, as some of the classic clinical manifestations of the two disorders are similar (Berger and Kelley, 1981; Johannessen et al., 1987; Tandeter and Shvartzman, 1993), unless thyroid function tests are routinely done. In the past some researchers have found a high prevalence of hypothyroidism among PD patients (Berger and Kelley, 1981), but others could not confirm this (Johannessen et al., 1987). The present study was designed to define whether hypothyroidism is indeed more common in patients with PD than in those without PD. We report some unexpected results.

2. Patients and methods

We reviewed the files of all patients admitted to the geriatric ward of the Soroka University Medical Center, in Israel, between 1995 and 1996. We identified 92 patients with PD (62% male and 38% female). From the same chart review we randomly selected a control group of 225 patients (34% male, and 66% female), who did not have a diagnosis of PD. The mean age of the patients was similar in the study group and the control group (78.78 vs. 78.33). Concentrations of thyroid stimulating hormone (TSH) and free thyroxine (T4), routinely performed on all patients on admission to this ward, were measured by standard radioimmunoassays.

For the contingency table analysis, the $\chi^2$ or Fisher's exact test were used, as appropriate and $P \leq 0.05$ was considered significant.

3. Results

Hypothyroidism was not found to be significantly more prevalent in PD patients. Patients were classified as having normal or abnormal thyroid laboratory tests. Abnormalities in thyroid tests were classified as:

1. Hypothyroidism, (high TSH and low T4).
2. Hyperthyroidism, (low TSH and high T4).
3. Subclinical hypothyroidism, (high TSH with normal T4).
4. Subclinical hyperthyroidism, (low TSH with normal T4).

Overall, 25% of the subjects in our study group had some abnormality in their thyroid laboratory tests as compared with 16% in the control group (Table 1). This difference was found to be statistically borderline significant ($P = 0.06$). When men and women were analyzed separately, we found that 22.8% of the male population in the study group had some abnormality in their thyroid laboratory tests as compared with 10.3% of the controls. This difference did show to be statistically significant ($P < 0.05$).
Table 1

Thyroid laboratory tests

<table>
<thead>
<tr>
<th></th>
<th>Study group</th>
<th></th>
<th>Control group</th>
<th></th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male (n = 57)</td>
<td>Female (n = 35)</td>
<td>Total (n = 92)</td>
<td>Male (n = 77)</td>
<td>Female (n = 148)</td>
</tr>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Normal thyroid laboratory tests</td>
<td>44</td>
<td>48</td>
<td>25</td>
<td>27</td>
<td>69</td>
</tr>
<tr>
<td>Abnormal thyroid laboratory tests</td>
<td>13</td>
<td>22.8</td>
<td>10</td>
<td>28.5</td>
<td>23</td>
</tr>
<tr>
<td>High TSH normal T4</td>
<td>6</td>
<td>10.5</td>
<td>6</td>
<td>17.1</td>
<td>12</td>
</tr>
<tr>
<td>High TSH low T4</td>
<td>2</td>
<td>3.5</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Low TSH normal T4</td>
<td>3</td>
<td>5.2</td>
<td>4</td>
<td>11.4</td>
<td>7</td>
</tr>
<tr>
<td>Low TSH high T4</td>
<td>2</td>
<td>3.5</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

Comparison between PD patients and controls without PD.
Subclinical hyperthyroidism was found to be significantly more prevalent \( (P < 0.05) \) in Parkinson patients as compared with the control group (Table 1).

4. Discussion

The intention of this study was to test whether hypothyroidism is more common in patients with PD than in the general population. The search was motivated by the conflicting results presented in two previous studies (Berger and Kelley, 1981; Johannessen et al., 1987). Our findings did not confirm that hypothyroidism is more common in PD patients but unexpectedly showed that men with PD, had more thyroid laboratory tests abnormalities than controls, and that 'subclinical hyperthyroidism' was more prevalent in patients with PD than in controls. Subclinical hypothyroidism/hyperthyroidism are incidental findings in asymptomatic patients. Thirty-four percent of patients with subclinical hypothyroidism may develop overt hypothyroidism in a 10-year follow-up (Huber et al., 1998), and the presence of thyroid antibodies increases the risk of developing overt hypothyroidism (Weetman, 1997). In subclinical hyperthyroidism, the incidence of progression to overt thyrotoxicosis is nearly 5% per year (Wiersinga, 1995). Reported unwanted effects of subclinical hypothyroidism include memory impairment (Monzani et al., 1993; Baldini et al., 1997), depression (Haggerty et al., 1993); elevated low density lipoprotein (LDL)-cholesterol levels and low high density lipoprotein (HDL)-cholesterol levels (Kung et al., 1995; Bindels et al., 1999) [thyroid substitution therapy may decrease total cholesterol (Tanis et al., 1996)]; impaired muscle energy metabolism (Monzani et al., 1997); and impaired diastolic function (Biondi et al., 1999). Reported pathology associated with subclinical hyperthyroidism includes a slightly increased bone turnover that may lead to a reduced bone mass and decreased bone density (Faber et al., 1998); atrial fibrillation (Koutras, 1995); and possible increase in left ventricular systolic function and mass, impaired diastolic function, reduced maximal exercise capacity, reduced ejection fraction during exercise (Hanna et al., 1999). However, despite a possible association between 'sub-clinical' disease and pathology, there is no universal recommendation for the treatment of these entities, and screening programs are not recommended since the associated burden of disease is small and early diagnosis and treatment has not been shown to improve clinical outcome in the asymptomatic phase.

One hypothesis about a likely ‘relation’ between PD and thyroid disorders suggests a possible role of iodine deficiency in PD and Alzheimer’s disease, as in hypothyroidism (Foster, 1987). Another possible mechanism relating thyroid disease and PD may be a disturbance in pituitary hormone secretion due to hypothalamic dysfunction (Otake et al., 1994).

We recognize some limitations in our data. The number of subjects studied is relatively small. Testing hospitalized patients was convenient but not ideal. Future research in this field should be performed in the ambulatory setting, since hospitalized patients may have a higher frequency of abnormal thyroid function tests than asymptomatic ambulatory elderly (Cervantes-Covarrubias et al., 1992) and do not
necessary reflect the characteristics of the general population. In conclusion, an unexpected increase in the prevalence of some abnormal thyroid laboratory tests was found in a cohort of hospitalized PD patients as compared with a control group. Further research in this field is warranted, in order to clarify the details, since there are implications both for the understanding of the basic mechanisms that might link the two disorders, and for clinical practice.

References


