Treatment of Levodopa-induced dyskinesia with Vitamin D: A Randomized, double-blind, placebo-controlled trial

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Abstract

Dyskinesia refers to any involuntary movement, such as chorea, dystonia, ballism that affect any part of the body. Levodopa-induced dyskinesia is a neurological disorder that affects many patients with Parkinson disease usually 5 years after the onset of levodopa therapy and can cause severe disability. The pathophysiology of this dyskinesia is complex and not fully understood. However, the association between vitamin D and Parkinson disease is interesting. The present study was conducted to evaluate the effect of vitamin D on levodopa induced dyskinesia in patients with Parkinson’s disease. In this Double blind clinical trial, 120 patients with PD divided into two groups randomly, vitamin D and placebo group. A dose of 1000 IU/d was selected. Demographic information is registered. In the first visit, three variables have been measured which were the duration, severity of dyskinesia and unified Parkinson’s disease rating scale (UPDRS). These variables were measured again after 3 months and the data was analyzed using SPSS 22. There are no differences between two groups after 3 months. This study revealed, vitamin D has no effects on improvement of levodopa induced dyskinesia.

Introduction

Levodopa-induced dyskinesia is one of the most important parameters of Parkinson’s disease along with other characteristics such as tremor, rigidity and bradykinesia. The Pathophysiology of dyskinesia is very complex, and yet its basic mechanism is not well defined. Dyskinesia include dystonia, chorea, ballism, myoclonus, tics, and tremor. In patients with Parkinson’s disease (PD), the treatment with levodopa causes various dyskinetic movements disorder. It usually appear within 5 years of treatment and may be due to depletion of dopaminergic nigrostriatal and pulsatile stimulation of levodopa on dopaminergic receptors. The role of vitamin D in Parkinson disease is interesting, the results of animal studies show that vitamin D may have protective effect in dopamine cells. The effect of vitamin D on the levodopa induced dyskinesia has not been studied in any research so far. In this study we aimed to evaluate the effect of vitamin D on levodopa induced dyskinesia in patients with Parkinson’s disease.

Materials and Methods

A randomized, double-blind placebo-controlled, parallel group trial was done at the Department of Neurology of Rasoul-Akram Hospitals affiliated with the Iran University of Medical Sciences, Tehran, Iran. The study was approved by Ethical Committee of the University. The study population included the patients with Parkinson disease that have levodopa induced dyskinesia. They were interviewed in the neurology clinic. All participants signed a written informed consent. The 120 patients with PD divided into two groups randomly, vitamin D and placebo. The two groups of patients were matched for the age, duration of Parkinson disease and dyskinesia that do not matched for the age in two groups. The results shows, the two variables have significant improvement after treatment with placebo and vitamin D. The Result of Pearson correlation show that the duration of dyskinesia (years) has positive and significant relationship with severity in two groups of patients and the duration of dyskinesia (years) with dyskinesia duration per day in vitamin D group. But in the placebo group, this relationship only exists before treatment is started. Finally the results of regression analysis showed that age, sex, duration of dyskinesia and Parkinson disease (years) on the treatment outcomes.

Discussion

Dyskinesia is a movement disorder including chorea, ballism, dystonia, tic or combination of these that usually encountered with levodopa therapy. Levodopa induced dyskinesia divided into different forms: peak dose dyskinesia that appear at the high levels of plasma, diphasic dyskine-
Brief Report

Table 1. Results.

<table>
<thead>
<tr>
<th></th>
<th>Vitamin D3</th>
<th>Placebo</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>44.02±13.2</td>
<td>49.9±11.4</td>
<td>0.011</td>
</tr>
<tr>
<td>Parkinson disease duration (years)</td>
<td>7.2±3.3</td>
<td>7.8±2.9</td>
<td>0.29</td>
</tr>
<tr>
<td>Dyskinesia duration (years)</td>
<td>2.1±1.72</td>
<td>2.4±1.61</td>
<td>0.34</td>
</tr>
<tr>
<td>Duration (according to per day by hour) Before treatment</td>
<td>3.08±2.1</td>
<td>1.42±0.71</td>
<td>0.001</td>
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<tr>
<td>Duration (according per day by hour) After treatment</td>
<td>2.2±2.1</td>
<td>1.19±0.74</td>
<td>0.008</td>
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<tr>
<td>Severity (according to UPDRS IV sub score) Before treatment</td>
<td>2.6±2.1</td>
<td>2.4±0.9</td>
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<tr>
<td>Severity (according to UPDRS IV sub score) After treatment</td>
<td>2.2±2.1</td>
<td>1.8±1.1</td>
<td>0.024</td>
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<tr>
<td>UPDRS motor score before treatment</td>
<td>20.52±7.6</td>
<td>21±7.2</td>
<td>0.6</td>
</tr>
<tr>
<td>UPDRS motor score after treatment</td>
<td>19.2±7.2</td>
<td>18.02±7.1</td>
<td>0.035</td>
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References