Letter to the Editor

Increased levels of endothelial progenitor cells in Parkinson’s disease

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The prevalence of the most common cardiovascular risk factors (type 2 diabetes, dyslipidemia, arterial hypertension) has proved to be low in patients with Parkinson’s disease (PD) [1]. The factors underlying the low cardiovascular risk in PD have not been elucidated. It has been suggested that sympathetic modulation by levodopa may play a role [2]. A recent study [3] points out the role of Endothelial Progenitor Cells (EPC) in protecting subjects against atherogenesis. These cells are synthesized by the bone marrow and are found in the bloodstream; they are able to proliferate and differentiate into endothelial cells, thus promoting vascular regeneration. In humans a reduction in circulating EPCs increases cardiovascular risk [4,5]. To our knowledge, circulating EPCs have not been measured in PD patients. However, the findings of in vitro studies suggest that dopamine plays an important role in EPC mobilization: dopamine stimulates D2 receptors, which induce endocytosis of the Vascular endothelial growth factor (VEGF) 2 receptor and inhibit EPC mobilization from the bone marrow [6]. It has not been established whether there are any differences between the effects of endogenous and exogenous dopamine (levodopa therapy) on EPC mobilization.

We recruited 12 patients (Table 1) who were admitted consecutively to our Parkinson Institute. All the patients were diagnosed with PD according to the criteria of the UK Brain Bank and were on levodopa treatment with benefit. Patients with other forms of parkinsonism and/or cardiometabolic diseases were excluded. We also recruited a group of 12 healthy controls of similar gender

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<th>Table 1</th>
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<td>EPC levels in PD patients and healthy controls (absolute value and percentages of total white cell count). NS means non significant.</td>
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<td>Age</td>
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<td>Mean duration of disease</td>
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<td>Levodopa (mg/kg)</td>
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<td>Dopamine-agonists users</td>
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<td>Other therapies and/or diseases</td>
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<td>EPC/ml (mean ± SD)</td>
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Fig. 1. Representative flow cytometric analysis for circulating EPC levels from a patient. Left: flow cytometry gating (R1). Right: representative flow cytometric analysis for determining the number of CD34/CD133 double-positive cells on Q2 (FL1: CD34 FITC; FL2: CD133 PE).
and age (Table 1), who did not have any important diseases and were not on any chronic pharmacological treatment. 4 ml venous blood were drawn to measure circulating EPCs, by detecting two markers expressed on the cell surface: CD34 and CD133. EDTA was used as anticoagulant. The percentage of double-positive (CD34+ and CD133+) cells was converted into number of cells per ml blood (Table 1, Fig. 1).

The statistical comparison between means was carried out by Wilcoxon’s Test for non parametric data using JMP software, version 3.2.6, SAS Institute Inc, USA. A p-value <0.05 was the set limit for statistical significance.

The EPC count, both in absolute value and as a percentage of total white cell count, was significantly higher in PD patients than in controls (3293 ± 1422.6 in PD patients, 2206 ± 925.8 in controls; p<0.05).

A randomized, double-blind, controlled clinical trial is warranted to assess whether the increase in EPC count may have anti-atherogenic effects in PD patients. Furthermore, the addition of a third group of medication-naive newly-diagnosed PD subjects might be important to understand the potential role of levodopa therapy on EPC levels. Moreover, the method for defining EPCs is not conclusive and the future studies should include additional markers as well as the cell culture.

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References


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