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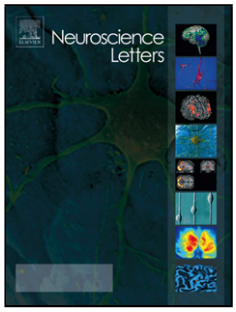

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ACCEPTED MANUSCRIPT

Higher serum levels of pro-hepcidin in patients with Parkinson's disease treated with deep brain stimulation

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Highlights

- Serum levels of pro-hepcidin are higher in PD patients treated with DBS
- Serum levels of pro-hepcidin are not higher in PD patients treated with BMT
- DBS affects the mediators of the chronic inflammation process in PD

Abstract

Hepcidin is an essential hormone responsible for the systemic metabolism of iron and simultaneously belongs to the family of the protein mediators of the acute inflammatory response, primarily induced in response to interleukin 6. It can therefore be regarded as a link between the oxidative stress processes, where iron plays an important role, and the processes of neuroinflammation – both considered to be responsible for the neurodegeneration in Parkinson's disease. We assessed the serum level of pro-hepcidin in patients with Parkinson's disease treated only pharmacologically and those treated additionally with deep brain stimulation (DBS) as compared to the control group. Thirty-seven patients with Parkinson's disease (18 females, 19 males, mean age: 57 years) were treated only pharmacologically with optimal, individualized therapy for each patient, whereas 15 (7 females, 8 males, mean age: 54 years) were treated additionally with DBS. The control group consisted of 31 healthy volunteers (15 females, 16 males, mean age: 58 years). In the subgroup of patients with Parkinson's disease treated with DBS the serum concentration of pro-hepcidin was significantly higher and the result was statistically significantly higher than in the control group ($p = 0.0003$) and in patients with Parkinson's disease treated only pharmacologically ($p = 0.025$). The results suggested the possible immunomodulatory effect of prolonged high-frequency stimulation and the implantation of the electrodes into the brain tissue of the host, most likely in the form of the increasaed production of inflammatory mediators, associated with the activation of the astroglia and microglia. The rational justification for the purpose of our study was the evidences and hypothesis from studies on the potential immunomodulatory and neuroprotective effect of DBS in patients with Parkinson's disease, the systemic influence of the DBS procedure on the improvement of motor function, reduction of dopaminergic drugs, improvement of the quality of life of patients, and animal studies, which have proven the presence of regional neuroinflammation around implanted electrodes.

Key words: Parkinson's disease, DBS, neuroinflammation, pro-hepcidin

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