Abstract

Objective: Mutations in the *parkin* (PARK2) gene have been associated with autosomal recessive early-onset Parkinson's disease (EOPD) with various frequencies in different populations. The aim of the study is to describe phenotypic characteristics of Czech EOPD patients, to evaluate the influence of environmental risk factors, and to determine the frequency of *parkin* allelic variants in patients and healthy controls.

Methods: A total of 70 EOPD patients (age at onset ≤ 40 years) and 75 controls were phenotyped and screened for the sequence variants and exon rearrangements in the *parkin* gene.

Results: The main features in the phenotype of the patients' sample were: the absence of cognitive deficit, high occurrence of dystonia, depression, hyperhidrosis, an excellent response to dopaminergic therapy, early onset of dyskinesia and motor fluctuation. Patients with mutations in the *parkin* gene had significantly lower age at onset. The agricultural occupation and work with chemicals increased the risk of EOPD, however the coffee drinking appeared to be a protective factor. *Parkin* mutations were identified in five patients (7.1%): the p.R334C point mutation was present in one patient, four patients had exon deletions. The detected mutations were observed in the heterozygous state except one homozygous deletion of the exon 4. No mutations were obtained in control subjects. A novel sequence variant p.V380I (c.1138G>A) was identified in one control. Polymorphisms p.S167N and p.D394N were seen in similar percentage in patients and controls, polymorphism p.V380L was almost twice as frequent in controls as in patients.

Conclusions: The clinical characteristics of patients correspond to previous descriptions of EOPD phenotype. Our study contributes to the growing body of evidence on the low frequency of the *parkin* mutations in the EOPD suggesting the potential role of other genes in the pathogenesis of the disease in Slavic population.