Relationship of the P Angle with Stereotactic Arc in Intraoperative Outcome of Patients with Parkinson’s Disease Undergoing Deep Brain Stimulation

Mansour Parvaresh, Maziar Azar, Babak Alijani

Abstract

Background & Aim: DBS (deep brain stimulation) is a new and successful technique in treatment of symptoms of Parkinsonism especially after drug resistance. Research in this field is mostly designed for evolution of this technique. The present study aimed at evaluating the relationship between the angle formed in midsagittal and STN (sub-thalamic nucleus) axis line and recording length in the final electrode placement.

Methods & Materials/Patients: 46 patient candidates for DBS operation were studied in terms of demographic variables, STN nucleus length, the angle between midsagittal line and STN axis (p angle), the number of tested electrodes, force and length of final electrode registration and final coordinates of the placed electrode. The primary information was obtained from patients records and other technical information based on MRI imaging using Stereonata software and during surgery. The information was analyzed using SPSS (version 16) and descriptive analysis and linear relationship.

Results: The mean force of the recording from trial microelectrodes implanted in the right side ranged from 1.49 ± 1.45 to 2.65 ± 1.42 and in the left side from 1.53 ± 1.35 to 2.65 ± 2.30. In comparative analysis, no significant statistical relationship was found between P angle of the right side and degree registered in the final electrode of the right side (Pearson correlation: 0.314, P value= 0.049).

Conclusion: Not only accurate electrodes positioning in the STN can lead to improved outcome within bilateral STN DBS, but also optimizing defined P angle can have beneficial effects on intraoperative outcome after STN DBS.

Keywords: Sub-thalamic Nucleus Axis; Mid-sagittal Line; Stereotactic; T2-weighted Coronal; Intraoperative Outcome; Parkinson, Deep Brain Stimulation