

[P07.010] Dysfunction of Basal Ganglia Circuitry in Patients with Obsessive-Compulsive Disorders: Subthalamic Neuronal Activity Correlates with Symptom Severity

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OBJECTIVE: To characterise subthalamic neuronal activity in OCD patients, in comparison to patients with Parkinson's disease (PD), and its relationship to the severity of obsessions and compulsions. **BACKGROUND:** Modifications in the function and connectivity of the brain's corticostriatal systems have been reported in patients with obsessive-compulsive disorder (OCD). However, changes in the basal ganglia neuronal activity in relation to the severity of OCD have never been adequately elucidated. **DESIGN/METHODS:** Twelve patients with OCD and 12 patients with PD operated for subthalamic stimulation were included. Resting-state subthalamic single-unit neuronal activity was recorded during surgery. Recorded neurons were located with precision and mapped according to the motor, associative and limbic subdivisions of the subthalamic nucleus. Discharge frequency, pattern, bursting and oscillatory activities were characterized for each recorded neuron and compared between OCD and PD patients. Correlations with the severity of symptoms in OCD patients were explored. **RESULTS:** One hundred and thirty-seven subthalamic neurons were isolated and recorded in OCD patients and 173 subthalamic neurons in PD patients. Between groups, OCD patients had lower STN neuronal discharge frequency, with a similar fraction of subthalamic neurons exhibiting burst-type activity. Significant oscillatory activity was present in 46% and 68% of neurons in OCD and PD patients, respectively; predominantly in the low frequency band (1-8 Hz). In OCD patients, abnormal subthalamic neuronal activity was mainly observed in the associative-limbic part of the subthalamic nucleus. Additionally, OCD patients with more severe symptoms exhibited subthalamic neuronal activity with a higher proportion of bursts, intraburst frequency, proportion of low frequency oscillatory activity. **CONCLUSIONS:** Heightened burst and low frequency oscillatory activities in the associative limbic subthalamic subdivision demonstrate its involvement in the pathophysiology of OCD. Supported by: Grants Assistance-Publique Hpitaux de Paris (APHP, P030422); Fondation pour la Recherche sur le Cerveau (FRC 2008), Agence Nationale pour la Recherche (N ANR-06-NEURO-006-01, BG EMO/PATH 2006-2010).
Category - Clinical Neurophysiology: Intraoperative Monitoring

Thursday, April 14, 2011 2:00 PM

Session P07: Clinical Neurophysiology: General Clinical Neurophysiology (2:00 pm-6:30 pm)