FLUMAZENIL ADMINISTRATION DURING ELECTROCONVULSIVE THERAPY: A RETROSPECTIVE CHART REVIEW ON EEG DURATION, SIDE EFFECTS AND CLINICAL OUTCOME

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Introduction: Benzodiazepines are considered to negatively affect seizure quality and duration during electroconvulsive therapy (ECT). Several researchers have advocated the use of flumazenil, a competitive benzodiazepine receptor antagonist, for patients receiving benzodiazepines during ECT treatment. However, clinical evidence regarding flumazenil use in ECT remains sparse. The aim of this study is to describe the effects of flumazenil on EEG seizure duration, clinical outcome and adverse effects.

Method: Twenty-six depressive and/or catatonic patients with concomitant benzodiazepine use receiving flumazenil during ECT were identified through retrospective chart review. Effects of flumazenil on depressive symptoms, catatonia, EEG duration and postictal agitation were assessed by the Inventory of Depressive Symptomatology, the Bush-Francis Catatonia Rating Scale and seizure duration on EEG. Postictal agitation was ascertained by identifying patients who received sedatives immediately after ECT or who needed physical restraint. The study was approved by the ethics committee of Ghent University Hospital.

Results: In patients receiving flumazenil, response and remission rates after ECT were 66.7% and 41.7% for depression and 91.7% and 75% for catatonia. Flumazenil administration increased EEG seizure duration with 10.5 seconds on average in patients comparing ECT with or without flumazenil administration and 58.3% of patients had an adequate seizure (> 15s). We found no correlation between benzodiazepine dose and seizure duration in patients receiving flumazenil before ECT. Postictal agitation occurred in 34.6% of the patients. One case of prolonged seizure, successfully managed with diazepam administration, was noted.

Conclusion: Patients with depression and/or catatonia and concomitant benzodiazepine use show good clinical outcome and increased EEG seizure duration after flumazenil treatment before ECT. However, postictal agitation seems to be a frequent and important side-effect. Current strategies to mitigate agitation should be considered when administering flumazenil.

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PSYCHIATRIC SYMPTOMS IN PARKINSON DISEASE PATIENTS BEFORE AND AFTER ONE YEAR OF SUBTHALAMIC NUCLEUS DEEP BRAIN STIMULATION: ROLE OF LEAD POSITIONING AND TOTAL ELECTRICAL ENERGY DELIVERED

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Introduction: Most patients with Parkinson's disease (PD) experience psychiatric symptoms. Deep Brain Stimulation (DBS) is the most effective treatment for motor and non-motor symptoms of advanced Pd. However, several studies hypothesized a possible correlation between DBS and the occurrence of mood disorders such as apathy, depression, and suicidal ideation. Additionally, conflicting results have been reported on the correlation between psychiatric symptoms and lead placement and total electrical energy delivered.

Methods: The study was performed at the University Federico II of Naples from 2011 to 2020. Fourteen patients (7 females, and 7 males) underwent a comprehensive psychopathological examination at baseline and after one year of STN-DBS. We assessed PD motor symptoms, depression, anxiety, apathy, impulsivity, and suicidality using clinical rating scales and correlated the results to the leads' position using the Medtronic® Suretune™ software and to the total electrical energy delivered (TEED) according to the Koss formula.

Table 1. Outolook of the results of the psychiatric scales, lead positioning and TEED

Case #	Δ total UPDRS (%)	Δ HAM-D (%)	Δ BDI (%)	Δ HAM-A (%)	Δ HAM-A (C) (%)	Δ HAM-A (P) (%)	Δ BAI (%)	Δ AES (%)	Δ BIS-11 (%)	Δ BIS-11 (A) (%)	Δ BIS-11 (M) (%)	Δ BIS-11 (NP) (%)	Δ SSI (%)	Δ RFL-48 (%)	Lead positioning left	Lead positioning right	TEED
1	-37.2	-60	+33.3	-58.8	-63.6	-50.0	-17.6	+33.3	+18.5	+16.7	+4.3	+33.3	/	+0.9	PL	PL	0.0301
2	+6.1	-50	-73.3	-56.25	-54.5	-60.0	-30.0	18.2	+18.6	+33.3	+13.6	+16.0	/	-14.5	PL	PL	0.0288
3	-36.8	+109.1	-43.75	-16.7	+20.0	-42.9	+100	+85.0	-1.8	-6.7	-5.0	+4.5	/	-17.1	M	C	0.0298
4	-48.9	-46.1	-50	-26.7	0	-57.1	-64.7	+10.0	+9.1	+37.5	+11.8	-13.6	/	-5.7	PL	PL	0.0304
5	-37.2	-47.8	+27.8	-40.625	-50.0	-28.6	-30.3	+20.0	+9.7	+18.8	+15.8	0	/	-0.9	PL	C	0.0277
6	-48.6	+216.7	+100	+28.5	+140	-25.0	+100.0	+2.4	-4.1	-18.2	+33.3	-19.4	/	-13.9	M	M	0.0286
7	-51.6	-57.1	-36.4	-10	0	-33.3	-90.0	-33.3	-1.6	+7.1	0	-7.4	/	+3.1	C	MA	0.0284
8	-38	/	-50.0	-37.5	-33.3	-50.0	-57.1	-12.5	0	0	-9.5	+9.1	/	-8.9	PL	PL	0.0304
9	-58.8	+18.2	+100	0	0	0	-16.7	-24.3	+46.3	+110	+73.3	+10.3	/	-12.2	L	CA	0.0291
10	-45.1	+500	+12.5	+240	+1000	+50.0	+45.5	+27.0	+45.3	+40.0	+23.8	+76.5	/	-16.6	C	M	0.0295
11	-50.8	-46.7	-26.7	-29.4	-33.3	-25.0	-54.2	-16.7	+4.2	+33.3	+16.0	-18.8	/	-1.2	CA	PL	0.0285
12	-59	-41.2	-12.5	-62.5	-61.5	-66.7	-56.3	+19.2	-16.4	-21.1	+41.2	-23.3	-100	+13.3	LA	LA	0.0291
13	-37.2	-100	-89.5	-100	-100	-100	-53.8	-40.5	+27.9	+30.0	+43.8	+11.8	/	+22.9	PL	PL	0.0279
14	-16.1	-16.7	-25.0	-52.9	-50	-57.1	-53.8	+22.7	+3.6	0	-30.4	+47.4	/	+10.2	P	PL	0.0306

Δ (delta): percentual difference between pre-operative and post-operative evaluation; PL: postero-lateral; M: medial; C: central; CA: central anterior; LA: lateral anterior; P: posterior; MA: medial anterior; TEED: total electical energy delivered

Results: DBS induced a statistically significant improvement in motor symptoms (-38.5%, according to the Unified Parkinson's Disease Rating Scale part III), in anxiety (-29% according to the Hamilton Anxiety Rating Scale), with the strongest reduction in the physiological anxiety subscore (-36.26%). A mild worsening of impulsivity was detected at the Barratt Impulsiveness scale (+9%) with the greatest increase in the attentional impulsiveness subscore (+13.60%). No significant differences were found for the other scales. While the positioning of the stimulating electrodes was shown to considerably influence the outcome, with more anterior and/or medial lead position in the STN negatively influencing psychiatric symptoms, no correlation was found between TEED and clinical scales score (Table 1).

Conclusions: STN-DBS reduced anxiety and slightly increased impulsivity in PD patients after one year of DBS targeting the STN. While TEED did not correlate with any clinical scale score, leads' placement significantly impacted on psychiatric symptoms.

References:

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THE EFFECTS OF TRANSCRANIAL DIRECT CURRENT STIMULATION ON EPISODIC FUTURE THINKING FOLLOWING ACUTE PSYCHOSOCIAL STRESS

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Introduction: Research on stress-related disorders and brain imaging suggests that (acute) stress might impact the capacity to mentally simulate specific episodic future events (EFT) through the effects of cortisol on brain regions supporting this cognitive function, such as the prefrontal cortices. This study aims to examine the mechanisms underlying this link, using bifrontal transcranial Direct Current Stimulation (tDCS).

Methods: 60 healthy participants were subjected to the Montreal Imaging Stress Task (MIST), followed by either active or sham tDCS. After stimulation, the EFT task was administered. Salivary cortisol was measured throughout the protocol.

Results: Higher cortisol AUCi values were linked to less specific episodic future thoughts. Moreover, active tDCS enhanced EFT specificity irrespective of cortisol, especially in high trait ruminators. We did not observe an effect from active tDCS on cortisol AUCi, and equally there was no interaction effect between cortisol AUCi and stimulation condition predictive for EFT specificity.

Conclusion: Although we did not find evidence for the effects of tDCS on the HPA-system, our data reveal a crucial link between two critical predictors of mental health for the first time, and provide a solution to help rehabilitate EFT deficits.

Keywords: *transcranial direct current stimulation - trait rumination – cortisol - Montreal Imaging Stress Task - episodic future thinking*

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