

Poster presentation

Post-seizure EEG fractal dimension and spectral power predict antidepressant response to unilateral ECT

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Background

Measures of EEG during ECT, for example, higher ictal amplitude and higher post-seizure EEG suppression have predicted antidepressant response. The earlier studies on this subject used bilateral ECT and had used spectral power to analyze EEG. This study aims to examine if this finding holds good even for unilateral ECT, using both fractal dimension and spectral power to analyze the EEG. The objective of the study was to determine measures of EEG seizure in unilateral ECT, which can predict response.

Material and Methods

Fifty-one right-handed, drug-free major depressive disorder patients received thrice weekly right unilateral ECTs at 2.5 times their seizure threshold. A rater blind to the clinical data measured fractal dimension and spectral power of early-mid- and post-seizure EEG, recorded from bilateral frontal and temporal areas (F3, F4, T3, T4) during their second ECT. Depression was rated using Hamilton's Rating Scale for Depression at baseline and on the 3rd, 7th and 14th days following ECT.

Results

Good quality EEG recordings were analyzed from 35 patients. These patients were not different from the rest in socio-demographic, clinical and outcome variables. Seventeen of this 35 patients reached criteria for early response of more than median percent improvement on HRSD on both 7th and 14th day. Univariate analysis showed significantly smaller fractal dimension ($p = 0.038$) and spectral power ($p = 0.04$), suggesting greater post-seizure EEG suppression in early responders compared to the late responders. This was particularly so in the left frontal area. Early responders had significantly

lower right/left ratio of mid-seizure fractal dimension compared to late responders, suggesting more symmetrical ictal EEG. Multivariate discriminant function analysis confirmed the findings of the univariate analysis. None of the other clinical, treatment or EEG parameters predicted early response.

Discussion

Effective seizure during right unilateral ECT may be characterized by high post-seizure EEG suppression particularly in the left frontal area and more symmetrical seizure activity.