
RAPID ANTIDEPRESSANT EFFECT OF NMDA ANTAGONIST AND QEEG BIOMARKER OF SUSTAINED RESPONSE

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Background: A series of clinical studies demonstrated that QEEG (quantitative electroencephalography) prefrontal theta cordance value decreases after one week of treatment in responders to antidepressants and precedes clinical improvement. Ketamine, a non-competitive antagonist of NMDA receptors, has a unique rapid antidepressant effect but its influence on QEEG measures is still unknown. To date wasn't studied predictive value of cordance in response to single infusion of ketamine in depressive subjects.

Methods: In a double-blind, cross-over, randomized, placebo-controlled experiment we studied the influence of ketamine (0.54 mg/kg) on theta cordance in a group of 27 right-handed hospitalized depressive patients on stable antidepressant medication. QEEG cordance values in theta frequency band were calculated according to UCLA algorithm.

Results: Responders (n=11) to ketamine in compare to non-responders (n=16) showed significant difference in cordance values at the end of ketamine infusion (Spearman, $p=0.039$). The cordance decrease, measured between the end of infusion and next day, positively correlated with ketamine antidepressant response (MADRS decrease) fourth day after infusion (two-tailed Fisher's Exact test, $df=1$, $p=0.0076$) with NPV 90.9% (95% CI 64.3%-99.5%) and PPV 62.5% (95% CI 44.2%-68.4%).

Conclusions: Our data indicate that ketamine infusion immediately induces similar changes as monoaminergic-based antidepressants do gradually after a series of downstream signalling steps. The reduction in theta prefrontal cordance could serve as a biomarker of sustained antidepressant response, a hypothesis that should be tested in larger depressive population.

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