

Neural Changes Associated with Successful Antidepressant Treatment in Adolescents with Major Depressive Disorder

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Abstract : Introduction: 40% of adolescents with major depression (MDD) are unresponsive to 1st line antidepressant treatment. The neural mechanism underlying treatment-responsive and treatment-resistant depression in adolescent are unclear. Amygdala is important for emotion processing and has been implicated in mood disorders. Past research has shown abnormal amygdala connectivity in adolescents with MDD. This research study changes in amygdala resting-state functional connectivity to find neural correlates of successful antidepressant treatment. Methods: Thirteen adolescents aged 12-19 underwent rfMRI before and after 8-week antidepressant treatment and completed BDI-II at each scan. A whole-brain approach, using anatomically defined amygdala ROIs (1) identified brain regions that are highly synchronous with the amygdala, (2) correlated neural changes with changes in overall depression and specific symptom clusters within depression. Results: Some neural correlates were common across domains: (1) decreased amygdala RSFC with the default mode network (posterior cingulate, precuneus) is associated with improvement in overall depression and many symptom clusters, (2) increased amygdala RSFC with fusiform gyrus is associated with symptom improvement across many symptom clusters. We also found unique neural changes associated with symptom improvement in each symptom cluster. Conclusion: This is the first preliminary study that looks at neural correlates of antidepressant treatment response to overall depression as well as different clusters of symptoms of depression. The finding suggests both overlapping and distinct neural mechanisms underlying improvement in each symptom clusters within depression. Some brain regions found are also implicated in MDD among adults in previous literature.

Keywords : depression, adolescents, fMRI, antidepressants

Conference Title : ICSEP 2016 : International Conference on Society, Education and Psychology

Conference Location : San Francisco, United States

Conference Dates : June 09-10, 2016