Connectomics-based structural network alterations in obsessive-compulsive disorder.

Given the strong involvement of affect in obsessive-compulsive disorder (OCD) and recent findings, the current cortico-striato-thalamo-cortical (CSTC) model of pathophysiology has repeatedly been questioned regarding the specific role of regions involved in emotion processing such as limbic areas. Employing a connectomics approach enables us to characterize structural connectivity on a whole-brain level, extending beyond the CSTC circuitry. Whole-brain structural networks of 41 patients and 42 matched healthy controls were analyzed based on 83 × 83 connectivity matrices derived from cortical and subcortical parcellation of structural T1-weighted magnetic resonance scans and deterministic fiber tracking based on diffusion tensor imaging data. To assess group differences in structural connectivity, the framework of network-based statistic (NBS) was applied. Graph theoretical measures were calculated to further assess local and global network characteristics. The NBS analysis revealed a single network consistently displaying decreased structural connectivity in patients comprising orbitofrontal, striatal, insula and temporo-limbic areas. In addition, graph theoretical measures indicated local alterations for amygdala and temporal pole while the overall topology of the network was preserved. To the best of our knowledge, this is the first study...
combining the NBS with graph theoretical measures in OCD. Along with regions commonly described in the CSTC model of pathophysiology, our results indicate an involvement of mainly temporo-limbic regions typically associated with emotion processing supporting their importance for neurobiological alterations in OCD.