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Differential white matter involvement in drug-naïve children with obsessive-compulsive disorder and Tourette syndrome

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Background/Objective: Early-onset obsessive-compulsive disorder (OCD) and Tourette syndrome (TS) are frequently associated conditions. Evidence is accumulating in support of a common genetic liability of the two disorders [1-2], which has raised new interest for their comorbidity (TS + OCD), both in terms of clinical course and response to treatment. However, little is known on the relationship between OCD and TS in terms of early-stage white matter development and organisation. In this study we investigated white matter changes in drug-naïve children with OCD, TS and TS + OCD, to shed light on primary neural underpinnings and specifically characterise those of comorbid TS + OCD.
Methods: Fifty-one drug-naïve participants (mean age 10.2 years, SD=0.5) underwent magnetic resonance imaging (MRI) examination. By means of diffusion tensor imaging (DTI) analysis, white matter microstructure from pure TS (N=16), TS + OCD (N=14), OCD (N=10) children and 11 age-matched controls was investigated in five tracts of interest, i.e., the cortico-spinal tract (CST), the anterior thalamic radiations (ATR), the inferior longitudinal fasciculus (ILF), the corpus callosum (CC), and the cingulum. Tract selection was based on previous studies showing consistent white matter alterations in TS or OCD [3-6]. DTI changes were correlated to symptom severity assessed through the Yale Global Tic Severity Scale (YGTSS) and Children's Yale-Brown Obsessive-Compulsive Scale (CY-BOCS).
Results: TS and TS + OCD exhibited a shared pattern of DTI changes compared to controls, i.e., an increased fractional anisotropy (FA) within CST, ATR, ILF and CC. FA values showed a negative correlation with tic severity in the TS/TS + OCD group, suggesting an inverse relationship between white-matter organization and disorder expression. Within the same white-matter bundles, OCD showed an inverse pattern of microstructural abnormalities, i.e., decreased FA in respect to controls. FA values were negatively correlated to obsessive-compulsive symptoms, indicating that more severe clinical phenotypes were underpinned by less organized white-matter in OCD children.
Conclusions: Our study highlights differential white matter involvement in pediatric TS/TS + OCD as opposed to OCD. Our findings extend our prior observations on functional connectivity [7] and cerebellar involvement [8] in the two disorders. Compared to the normative population, the overall TS group showed a unique pattern of increased FA in callosal bundles and in tracts linking the frontal, occipital and temporal cortices with each other and with the thalamus. Conversely, children with OCD showed widespread reduced organization of callosal, temporo-occipital and fronto-thalamic bundles. Findings in TS may be regarded as neuroadaptive changes in response to tic pathophysiology, while in OCD they may derive from delay or damage to white matter development, but confirmation of these possibilities awaits longitudinal studies. The observation of shared DTI correlates of TS and TS + OCD gives preliminary support to the conceptualisation of TS + OCD as a peculiar subtype of TS. By characterising and differentiating early-stage neural underpinnings of OCD and TS, targeted interventions may be developed.
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Relationship between cognitive behavioural group therapy and neurocognitive functions in obsessive compulsive disorder

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INTRODUCTION: It has been shown in previous studies, that patients with Obsessive Compulsive Disorder (OCD), perform poorly in neuropsychological functions such as memory, attention and executive functions compared to healthy controls. There is limited data about improvement in neurocognitive functions after the pharmacotherapy or cognitive behavioral therapy. Besides, data about the efficacy of neurocognitive functions before treatment in terms of treatment response is contradictory. In OCD, it has been shown that 'advanced' theory of mind (ToM) abilities are deteriorated more than 'basic' ToM abilities. The primary aim of this study was to investigate whether there is a difference in social and neurocognitive performance between OCD-diagnosed individuals and healthy controls. Moreover we aimed to examine the relationship between pre-treatment neurocognitive functions and treatment response and whether Cognitive Behavioral Group Therapy (CBGT) has a therapeutic effect on social and neurocognitive functions.
METHOD: To evaluate neurocognitive functions before treatment, The Rey Auditory Verbal Learning Test (RAVLT), Stroop Test, Wisconsin Card Sorting Test (WCST), Trail Making Test (TMT) A ve B, to assess the theory of mind, the Reading the Mind in the Eyes Test (RMET) were applied to the participants. Ten sessions of CBGT were administered to the patient group once a week. After the therapy sessions were completed, social and neurocognitive tests were reapplied to all participants. Yale Brown Obsessive Compulsive Scale (YBOCS), Beck Depression Inventory (BDI), Obsessive Compulsive Inventory-Revised (OCE-R) ve Obsessive Beliefs Questionnaire-44 (OBQ-44) were applied to the patient group before and after treatment. For each participant, the Reliable Change Index was calculated to correct for practice effect.
Results: OCD group showed weaker performance in the tests; RAVLT (p=0,049), WCST number of categories completed (p=0,011), total trials administered (p=0,03), perseveration errors (p=0,043), TMT-A (p=0,032) and TMT-B (p=0,015) compared to the healthy controls. RMET performances were similar in the patient and control groups. After 10 sessions of CBGT, scores of YBOC, BDI,