EV0689

Cerebellar activity in young people with familial risk for psychosis — The Oulu brain and mind study

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Objective The cerebellum plays a critical role in cognition and behavior. Altered function of the cerebellum has been related to schizophrenia and psychosis but it is not known how this applies to spontaneous resting state activity in young people with familial risk for psychosis.

Methods We conducted resting-state functional MRI (R-fMRI) in 72 (29 male) young adults with a history of psychosis in one or both parents (FR) but without their own psychosis, and 72 (29 male) similarly healthy control subjects without parental psychosis. Both groups in the Oulu Brain and Mind Study were drawn from the Northern Finland Birth Cohort 1986. Participants were 20–25 years old. Parental psychosis was established using the Care Register for Health Care. R-fMRI data pre-processing was conducted using independent component analysis with 30 and 70 components. A dual regression technique was used to detect between- group differences in the cerebellum with p b 0.05 threshold corrected for multiple comparisons.

Results FR participants demonstrated statistically significantly increased activity compared to control subjects in the anterior lobe of the right cerebellum in the analysis with 70 components. The volume of the increased activity was 73 mm^3. There was no difference between the groups in the analysis with 30 components (Fig. 1).

Conclusion The finding suggests that increased activity of the anterior lobe of the right cerebellum may be associated with increased vulnerability to psychosis. The finding is novel, and needs replication to be confirmed.
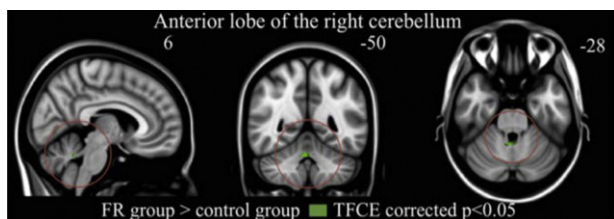

Fig. 1

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Atypical callosal morphology in developmental language disorder

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Introduction Developmental language disorder (DLD) is common, yet the neurobiology of DLD is poorly understood. A key hypothesis suggests atypical functional lateralization of language, which might be accompanied structurally by a deficit in inter-hemispheric connectivity of language-related regions. Indeed, aberrations of the corpus callosum have been associated with language deficits in children with frank neurological lesions and/or born pre-term. In contrast, studies examining the corpus callosum in children with DLD remain elusive.

Objective We aimed to expand this largely understudied field by comparing callosal morphology between 17 children with DLD and 17 typically developing children carefully matched for sex and age.

Methods We analyzed high-resolution structural magnetic resonance imaging data applying a well-validated computational approach, which captures the thickness of the corpus callosum with a high regional specificity at 100 equidistant points.

Results As shown in Fig. 1, we observed a significantly thinner corpus callosum, particularly in the splenium, in children with DLD compared to typically developing controls (DLD < CTL).

Conclusions These findings indicating pronounced aberrations in the brain's largest whiter matter tract make an important contribution to an understudied field of research and support the theory that DLD is accompanied by atypical lateralization of language function.
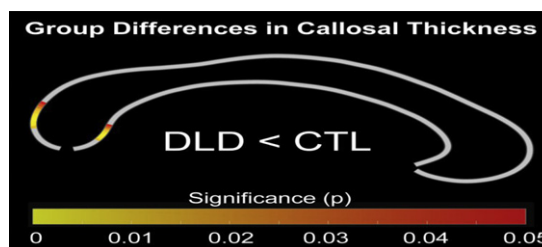

Fig. 1

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Quantitative EEG may help differentiating bipolar disorder at old age from frontotemporal dementia

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Introduction Especially the behavioral variant of Frontotemporal Dementia (FTD) may present with impulsivity, social disinhibition or depressive symptoms and these symptoms may create a clinical profile very similar to Bipolar Disorder (BD). In clinical practice, this similarity at symptom level creates substantial diagnostic confusion and often errors. As the treatment approach to the two disorders differ significantly, it is essential to make a reliable differential diagnosis.

Aim In this study we aimed to identify EEG differences between FTD and BD.

Methods For this aim we recruited 22 patients with FTD and 32 patients with BD. Patients in both groups were evaluated with a standardized neuropsychological battery and structural MRI. All patients were evaluated with resting EEG. There were no significant age and gender differences between groups.

Results   EEG power analysis showed that FTD group had increased frontal and temporal theta as compared to the BD group. There were no consistent group differences for other bands.

Conclusion   Based on this result we conclude that quantitative EEG may help differentiating BD from FTD and may eliminate diagnostic uncertainty.

Disclosure of interest   The authors have not supplied their declaration of competing interest.

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EV0692

The effects of medication on default mode network (DMN) connectivity in attention deficit/hyperactivity disorder (ADHD): Bibliographic review

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Introduction   ADHD is a neurodevelopmental disorder comprising brain structural and functional alterations, especially in default mode network (DMN), as MRI studies have recently shown. However, it is not clear in which extent medication for ADHD may influence the activity of these networks.

Objectives   The main purpose is to look up published evidence about the effects of ADHD medication on the connectivity of DMN in patients as measured with functional-MRI.

Methods   A review was conducted with Pubmed, using search terms 'default mode network'+ 'ADHD' + 'medication'/ 'methylphenidate'/'atomoxetine'/'stimulant'/'lisdexanfetamine'. Original research studies in English using f-MRI to assess DMN connectivity in ADHD patients were included in a more comprehensive review.

Results   The searches found 124 articles, 8 meeting the review criteria. A total size of 146 ADHD patients was comprised (mean size: 18.25 patients). Three studies used specific resting-state f-MRI. Seven were drug trials, 3 of them short-term, randomized and controlled ones. Six included methylphenidate, 2 atomoxetine, 1 lisdexanfetamine and 3 amphetamines. Two also assessed drugs clinical effects. Evidence seems heterogeneous, but mostly consistent with normalizing drug effects on DMN in patients (in some studies also compared with healthy controls), associated with a measured clinical improvement in one study with amphetamines and one with atomoxetine. One trial found little differences on DMN activity.

Conclusions   Psychostimulant drugs and atomoxetine are clinically effective medications; DMN connectivity may partially explain their action mechanisms and constitute a potential response predictor. Further f-MRI studies might more deeply assess the imaging-clinical relationships for each drug.

Disclosure of interest   The authors have not supplied their declaration of competing interest.

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EV0693

Dynamic of NAA and BOLD after single short stimulus in motor cortex of Schizophrenia patients

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Introduction   The aim of this study was the analysis of dynamics of motor cortex metabolite in the norm and in early stage of schizophrenia in period of BOLD response to event related single stimulus.

Objectives   The patients group consisted of 9 mails of 16–28 years old in initial stage of schizophrenia and in remission. The group of 9 age matched healthy mails was used as a control.

Methods   Phillips Achieva 3.0 T scanner was used for the study. Volume of interest in motor cortex was localized on the base of fMRI. 1H MR spectra were run using synchronization of FID signals acquisition (PRESS, TE = 30 ms TR = 3000 ms) with dynamics of BOLD response at the same paradigm.

Results   The BOLD signal in both groups demonstrated maximum at the 6th s after target stimulus, however its value was reliably lover in schizophrenia in comparison with the control. The only [NAA] in normal motor cortex was changed after stimulation. The stable values of [NAA], [Cr] and [Cho] were observed in dynamic of resting state as well. [NAA] in normal cortex statistically significantly decreased at the 12th s after stimulus presentation and returned to initial value at the 15th s.

Conclusion   Different behavior of [NAA] in the norm and schizophrenia might be related with a difference in location (or activity) of aspartoacylaze (ASPA). Decreased expression of glutamate transporters in schizophrenia could also reduce consumption of NAA as a source of acetate in synthesis of AcCoA which is used for restoration of ATP.

Disclosure of interest   The authors have not supplied their declaration of competing interest.

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Normal pressure hydrocephalus as a possible reversible cause of dementia, neuroimaging findings

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Introduction   Normal pressure hydrocephalus (NPH) occurs in 0.5% of persons over 65 years old. The etiology of NPH is still unknown. Clinically NPH is characterised by cognitive deterioration, gait impairment and urinary incontinence. NPH is a possible reversible cause of dementia. Neuroimaging techniques such as computed tomography (CT) and magnetic resonance imaging (MRI) allow to assess typical brain changes in this disorder.

The objectives are to present the typical findings of NPH on CT and MRI and to demonstrate differences between NPH and central brain atrophy in neuroimaging.

Results   The imaging features of NPH include: supratentorial ventriculomegaly with callosal angle less than 90o, tight sulci at the vertex and considerable out of proportion enlargement of Sylvian fissures. In case of central brain atrophy there may be a predominance of ventriculomegaly and/or widened sulci without crowding of the gyri at the vertex and callosal angle greater than 90o. In both entities, the decrease of density in periventricular region may be seen: in NPH could be a sign of transependymal oedema or in brain atrophy as an accompanying leukoaraiosis. Additionally, it is possible to assess changes in flow of cerebrospinal fluid (CSF) on MRI: in NPH an increased pulsatile CSF circulation in aqueduct as flow void sign may be observed.

Conclusions   Correct diagnosis of NPH on CT or MRI in relation to clinical data is very important. Treatment with ventriculoperitoneal shunt or third ventriculostomy may partially improve the