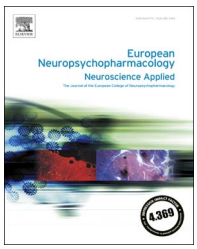
European Neuropsychopharmacology (▮▮▮▮) ▮, ▮▮▮–▮▮▮

www.elsevier.com/locate/euroneuro



Gray and white matter changes and their relation to illness trajectory in first episode psychosis

Alejandro Keymer-Gausset[a,b], Anna Alonso-Solís[b,c], Iluminada Corripio[a,b,c,*], Rosa B. Sauras-Quetcuti[b], Edith Pomarol-Clotet[d,c], Erick J. Canales-Rodriguez[d,c], Eva Grasa-Bello[a,c], Enric Álvarez[a,b,c,e], Maria J. Portella[a,b,c,e]

[a]*Department of Psychiatry, Hospital de la Santa Creu i Sant Pau, Spain*
[b]*Institut d'Investigació Biomèdica Sant Pau (IIB Sant Pau), Spain*
[c]*Centro de Investigación Biomèdica en Red de Salud Mental (CIBERSAM), Barcelona, Catalonia, Spain*
[d]*Benito Menni Complex Assistencial en Salut Mental, Barcelona 08830, Spain*
[e]*Universitat Autònoma de Barcelona (UAB), Spain*

Received 30 March 2017; received in revised form 22 December 2017; accepted 27 December 2017

KEYWORDS
Schizophrenia;
First episode psychosis;
Neuroimaging;
Fractional anisotropy;
Prognosis;
Gray matter;
White matter

Abstract
Previous works have studied structural brain characteristics in first-episode psychosis (FEP), but few have focused on the relation between brain differences and illness trajectories. The aim of this study is to analyze gray and white matter changes in FEP patients and their relation with one-year clinical outcomes. A sample of 41 FEP patients and 41 healthy controls (HC), matched by age and educational level was scanned with a 3 T MRI during the first month of illness onset. One year later, patients were assigned to two illness trajectories (schizophrenia and non-schizophrenia). Voxel-based morphometry (VBM) was used for gray matter and Tract-based spatial statistics (TBSS) was used for white matter data analysis. VBM revealed significant and widespread bilateral gray matter density differences between FEP and HC groups in areas that included the right insular Cortex, the inferior frontal gyrus and orbito-frontal cortices, and segments of the occipital cortex. TBSS showed a significant lower fractional anisotropy (FA) in 8 clusters that included segments of the anterior thalamic radiation, the left body and forceps minor of corpus callosum, the right anterior segment of the inferior fronto-occipital fasciculus and the anterior segments of the cingulum. The sub-groups comparison revealed significant lower FA in the schizophrenia sub-group in two clusters: the anterior thalamic radiation and the

*Corresponding author at: Department of Psychiatry, Hospital de la Santa Creu i Sant Pau, Spain.
E-mail address: icorripio@santpau.cat (I. Corripio).

https://doi.org/10.1016/j.euroneuro.2017.12.117
0924-977X/© 2018 Elsevier B.V. and ECNP. All rights reserved.

Please cite this article as: Keymer-Gausset, A., et al., Gray and white matter changes and their relation to illness trajectory in first episode psychosis. European Neuropsychopharmacology (2018), https://doi.org/10.1016/j.euroneuro.2017.12.117

anterior segment of left cingulum. These findings are coherent with previous morphology studies. The results suggest that gray and white matter abnormalities are present at early stages of the disease, and white matter differences may distinguish different illness prognosis.
© 2018 Elsevier B.V. and ECNP. All rights reserved.

1. Introduction

Schizophrenia is a disabling mental illness, characterized by a broad array of symptoms, and different courses of progression. Its prevalence in general population is between 1 and 4 per 100 and it remains one of the major causes of years of potential life lost (YPLL) in mental health (Tandon et al., 2008). The onset of the disease usually occurs during young adulthood, in an abrupt or a gradual pattern, conforming a first episode of schizophrenia-like psychosis. Most patients develop a recurring pattern of symptoms exacerbation with periods of clinical remission, some patients remain severely ill for long periods whereas some other patients can improve significantly or even completely (Jablensky, 2000).

In the last decades, the advances in different methodological approaches to the study of the disease have proven on new insights into the pathophysiology of schizophrenia (van Os and Kapur, 2009), with several neuroimaging studies have provided cumulative evidence of anatomical and functional changes in the full blown disease (Kubicki et al., 2002, 2005; Lynall et al., 2010; Pomarol-Clotet et al., 2010; Fitzsimmons et al., 2013).

On this matter, there is a growing corpus of evidence that supports the presence of brain changes already at the onset of a FEP (Guerrero-Pedraza et al., 2012). A meta-analysis by Fusar-Poli and colleagues (Fusar-Poli et al., 2012) describes consistent volume reductions in areas of the prefrontal and cingulate cortex in antipsychotic-naive FEP compared to healthy controls. More recently, different research groups have brought together robust evidence of white matter changes in FEP, assessed with the help of new methodologies for the analysis of diffusion weighed images, such as Tract Based Spatial Statistics (TBSS) (Smith et al., 2006). Lee and co-workers, identified extensive and distributed white matter abnormalities in mainly association and cortico-subcortical fibers of FEP patients, comprising the genu and body of the corpus callosum, internal and external capsule, fornix, cingulum, superior and inferior fronto-occipital fasciculus and the uncinate fasciculus (Lee et al., 2013). From a multimodal perspective, to date there are just a handful of approaches. One meta-analysis examined anatomical and functional differences in FEP studies giving account of a close relationship between structural and functional brain alterations in FEP patients, more specifically in the perigenual, cingulate and insular cortex (Radua et al., 2012; Alonso-Solís et al., 2012).

All these previous findings yield to an impaired circuitry embracing cortical and subcortical pathways. In this regard, the disconnection hypothesis was described formally by Friston (Friston, 1999), which reported abnormal connectivity between brain regions using PET. This concept has recently been extended by other findings from functional and anatomical neuroimaging studies which describe a wide range of connectivity disturbances with a distributed character in schizophrenia patients (Pettersson-Yeo et al., 2011; Skudlarski et al., 2010). From this perspective, there is cumulative research that supports the idea that the anatomical and functional changes observed in schizophrenia conform an endophenotype of the disease, which in fact should precede the onset of the clinical symptoms. These early brain changes may conform the actual underlying pathophysiology of schizophrenia that should be closely related to the course of the disease (Scheel et al., 2013; Kunimatsu et al., 2012; Davis et al., 2003; Camchong et al., 2009; Abdul-Rahman et al., 2011).

Although these studies have provided consistent evidence of the early brain alterations in psychosis, they lack information about their impact on the prognosis of the illness. However, there have been some efforts in establishing a correlation between neuroimaging findings and long-term outcomes. A recent and thorough review has highlighted the role of gray and white matter brain alterations as biomarkers of the disease state and prognosis (Dazzan et al., 2015). Hereof, a large sample study focused on the changes of gray and white matter in FEP patients and their relation with response to treatment (Reis Marques et al., 2014). They found that poor responders had lower fractional anisotropy (FA) than healthy volunteers and good responders at illness onset, specifically in association fibers of the corpus callosum, uncinate and cingulum.

The aim of this study is to further investigate the relation between early alterations of gray and white matter in FEP patients and the prognosis of the disease. Following the disconnection hypothesis, we expect to find: 1) significant morphological differences in gray and white matter between FEP and healthy control groups, and 2) a significant relation between morphological differences and prognosis of the disease.

2. Experimental procedures

2.1. Subjects

All patients were recruited from the inpatient service at Hospital de la Santa Creu i Sant Pau(Barcelona). We included a total of 41 patients of ages between 18 and 35 years, who presented psychotic symptoms assessed with the Positive and Negative Symptom scale (PANSS) (Kay et al., 1987). The diagnosis was confirmed using the Structured Clinical Interview for DSM-IV diagnoses (SCID) (Firstetal et al., 2002) and the clinical criterion of experienced psychiatrists. The exclusion criteria were (a) diagnosis of past or present of substance abuse disorder, (b) past or present history of head trauma or neurological disease, (c) prominence of affective symptomatology at the time of assessment over psychotic symptoms.

Please cite this article as: Keymer-Gausset, A., et al., Gray and white matter changes and their relation to illness trajectory in first episode psychosis. European Neuropsychopharmacology (2018), https://doi.org/10.1016/j.euroneuro.2017.12.117

Download English Version:

https://daneshyari.com/en/article/6790842

Download Persian Version:

https://daneshyari.com/article/6790842

Daneshyari.com