

A MULTICENTER TRACTOGRAPHY STUDY OF STRUCTURAL CONNECTIVITY IN BIPOLAR DISORDER AND EFFECTS OF PSYCHOTIC FEATURES

S. Sarrazin^{1,2,3}, C. Poupon⁴, J. Linke⁵, M. Wessa⁵, M. Phillips⁶, M. Delavest^{3,7}, A. Versace⁶, J. Almeida⁶, P. Guevara^{4,8}, D. Duclap⁴, E. Duchesnay⁴, J.-F. Mangin⁴, K. Le Dudal⁹, C. Daban^{1,2,3}, N. Hamdani^{1,2,3}, M.-A. D'Albis^{1,2,3}, M. Leboyer^{1,2,3}, J. Houenou^{1,2,4}

¹Pôle de Psychiatrie, APHP Hôpital Albert Chenevier, ²Inserm U 955, Psychiatrie Génétique, ³Fondation FondaMental, Créteil, ⁴Neurospin, CEA Saclay, Saclay, France, ⁵Section for Experimental Psychopathology and Neuroimaging, Department of General Psychiatry, Center for Psychosocial Medicine, Heidelberg University, Heidelberg, Germany, ⁶Department of Psychiatry, Western Psychiatric Institute and Clinic, University of Pittsburgh School of Medicine, Pittsburgh, PA, USA, ⁷Service de Psychiatrie, APHP Hôpital Fernand Widal - Lariboisière, Paris, France, ⁸University of Concepción, Concepción, Chile, ⁹Centre d'Investigation Clinique et Plateforme de Ressources Biologiques, APHP Hôpital Henri Mondor, Créteil, France

Introduction: A number of studies have investigated white matter abnormalities in patients with bipolar disorder (BD) using diffusion tensor imaging. However, tractography studies yielded heterogeneous results partly due to small sample sizes.

Aims: In this work we aimed to study white matter abnormalities using whole-brain tractography in a large multicenter sample of patients with BD I with and without psychotic features.

Objectives: To compare mean generalized fractional anisotropy (GFA) along deep white matter tracts between patients with BD with a positive history of psychosis during illness phases, no such history and healthy controls.

Methods: We acquired diffusion-weighted MRI for 118 patients with BD I and 86 healthy controls using the same acquisition parameters and scanning hardware. We used Q-ball imaging tractography and an automatized segmentation technique to reconstruct 22 known deep white matter tracts and to obtain the mean GFA along each tract.

Results: Patients with BD had lower GFA values than controls along the corpus callosum (body and splenium), the left cingulum and the left arcuate fasciculus, when controlling for age, gender and acquisition site. All results with an exception for the long fibers of the left cingulum were driven by patients with a positive history of psychotic symptoms.

Conclusions: We demonstrated a reduced integrity of interhemispheric, limbic and arcuate white matter tracts in patients with BD I. Further, interhemispheric pathways were more disrupted in patients with psychotic symptoms, underscoring the role of interhemispheric connectivity in the pathophysiology of BD with psychosis.