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Auditory Cortex Characteristics and Association with Auditory Hallucinations in Schizophrenia Patients

L. Mørch-Johnsen¹, R. Nesvåg², C.B. Hartberg³, U.K. Haukvik³, K.N. Jørgensen¹, E.H. Lange¹, K. Kompus⁴, R. Westerhausen⁴, O.A. Andreassen³, I. Melle³, K. Hugdahl⁴, I. Agartz¹

¹Department of Psychiatric Research, Diakonhjemmet Hospital, Oslo, Norway ; ²Department of Genetics Environment and Mental Health, Norwegian Institute of Public Health, Oslo, Norway ; ³Norment and K.G. Jepsen Centre for Psychosis Research, Institute of Clinical Medicine University of Oslo, Oslo, Norway ; ⁴Department of Biological and Medical Psychology, University of Bergen, Bergen, Norway

Introduction

Neuroimaging studies indicate that auditory hallucinations are associated with smaller grey matter volume in the auditory cortex in schizophrenia patients. However, reduced cortical volume can be the result of reduction in either cortical thickness or cortical surface area, and these two components may reflect different pathophysiological processes.

Objectives

To measure cortical thickness and surface area of auditory cortex in schizophrenia spectrum patients and healthy controls and investigate putative association of cortical characteristics with auditory hallucinations.

Aims

To determine how thickness and surface area of the auditory cortex relate to auditory hallucinations in schizophrenia patients.

Methods

Schizophrenia spectrum patients and healthy controls from the Thematically Organized Psychosis study, Oslo, Norway, underwent 1.5 T MRI. General linear models were used to compare cortical thickness and surface area (obtained with FreeSurfer) in transverse temporal gyrus (TTG), planum temporale (PT), and lateral superior temporal gyrus (STG) between hallucinating (score > 3 on Positive and Negative Syndrome Scale, PANSS, item P3; n=82), non-hallucinating (n=139) schizophrenia spectrum patients, and healthy controls (n=323).

Results

Both patient groups had thinner cortex bilaterally in PT and STG, as well as larger left STG surface area compared to controls. The hallucinating group showed reduced thickness in left TTG and trend reduction in left PT compared to non-hallucinating patients. No cortical surface area differences were found between hallucinating and non-hallucinating patients.

Conclusions

Our results indicate that auditory cortex volume reductions associated with auditory hallucinations in schizophrenia patients are driven by reductions in cortical thickness.