Subcortical brain grey matter deficits in schizophrenia and unaffected relatives

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Key Words: Brain imaging, Schizophrenia: clinical, Neuroimaging: estructural

Objectives

This study aimed at determining brain structural imaging on decreased gray matter in individuals with schizophrenia and in unaffected first-degree relatives, by Estructural Magnetic Resonance Imaging using optimized voxel-based morphometry.

Methods

We recruited a group of 29 patients diagnosed with schizophrenia, with an illness duration range from 5 to 15 years, treated with atypical antipsychotic and clinical stable in the last 6 months. Patients who had received electroconvulsive therapy or clozapine were excluded. We also recruited a group of 23 unaffected siblings of patients with schizophrenia not included in the study, without history of other mental, neurological or somatic diseases, and a group of 27 healthy volunteers. None of the three groups met criteria for substance use disorder or history of other mental disorder.

In this cross-sectional morphometry study we compared volume of grey matter using high-resolution 3D-anatomical MRI imaging data and using Voxel-Based Morphometry (VBM) with SPM8. We used an absolute threshold masking of 0.1 and implicit but no explicit masking. The resulting statistical maps indicate all voxels of the brain that show a significant group difference at a minimum cluster size = 100mm^3, p-value thresholded at p>0.05. In the post-hoc tests, owing to the three comparisons (patients, relatives, controls), the significance level was adjusted to p>0.05.

Table 1. Demographic characteristics

	Healthy Controls n=31	Unaffected Siblings n=22	Patients n=28	p
Mean Age (years) ± SD	36.78 ± 7.61	40.92±10.32	37.97±7.13	0.165[a]
Gender (M/F)	14/17	10/12	15/13	0.713[b]
School Level (years) ± SD	12.89±1.76	11.50±2.65	10.00±2.80	0.033[*a]
PANSS Positive			10.13±1.43	
PANSS Negative			13.29±2.21	
GAF			68.5±5.67	

SD: Standar Desviation a: Anova
M: Male F: Female b: Chi- square tests *:Significant Differences

Results

Table 2. GM volumes differences across all groups

Structure	Coordinates	P-value (FWE corrected)	Post-hoc t-test Cluster KE t-value
Left inferior frontal	-50, 18, 2 -45, 42, 5	0.029 0.027	CON>PAT (1350): t=4.43 CON>REL (1885): t=3.11
Right inferior frontal	54, 20, 4	0.002	CON>PAT (2224): t=4.10
Left superior parietal	-24, 52, 50 -24, 54, 50	0.976 0.978	REL>CON(211):t=3.18 REL>PAT(558):t=2.76
Right temporal middle	52, -46, -2 50, -34, 2	0.978 0.258	REL>CON(453): t=.278 REL>PAT(558):t=2.76
Right cerebelum	44, -68, 54 34, 36, 38	0.999 0.967	CON>REL(266): t=3.35 REL>PAT(148): t=3.39
Right cingulum ant	4, 48, 10	0.005	CON>PAT(1923): t=3.08
Right paracentral	8, -26, 76 6, 22, 74 -12, 20, 78	0.999 0.956 0.999	CON>PAT (128): t=3.54 CON>REL (1409): t=3.10 REL>PAT (7563): t=3.40
Right postcentral	34, 22, 50 -18, -28, 74	0.956 0.999	CON>REL(1409): t=3.10 REL>PAT(113): t=3.27

Conclusions

- We found significantly lower volumes in patients and relatives in comparison with control in bilateral inferior frontal cortex.
- Our results also show significant lower volumes in patients than controls in right anterior cingulated cortex.

References

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The authors report no conflict of interest in this study. LG is recipient is funded by the Instituto de Salud Carlos III through a "Río Hortega" Spanish government research (ISCIII-FIS, CM14/00111)