Two Schizophrenias?

A machine-learning algorithm robustly differentiates two neuroanatomical patterns in patients diagnosed with schizophrenia, but associated clinical features were few.

The psychiatric disorders grouped as schizophrenia are known for their clinical heterogeneity and highly diverse patterns in brain abnormalities on neuroimaging. To explore discrete patterns linked to the diagnosis, and not simply overall averages, an international team of investigators employed a machine-learning algorithm using neuroimaging data for comparisons between 307 patients with schizophrenia aged <45 and 364 healthy controls.

The algorithm accounted for age, sex, and imaging protocols. Analyses further controlled for medication, illness duration, symptom severity, and other variables. Two distinct neuroanatomic subtypes emerged. In subtype 1 (63% of patients), the algorithm showed widespread lower gray-matter volumes (as typically reported in schizophrenia), most prominently in thalamus, nucleus accumbens, and in the medial temporal, medial prefrontal/frontal, and insular cortices. In subtype 2 (37%), the algorithm revealed no gray-matter volume reductions but, rather, small increases in basal ganglia gray-matter and internal capsule white-matter volumes, which were not explained by antipsychotic dose — the brains of subtype 2 patients basically resembled those of controls. Clinically, however, the two subtypes were similar regarding age, sex, age at illness onset, illness duration, severity of positive and negative symptoms, and antipsychotic types and doses. In subtype 1 only, illness duration inversely correlated with gray-matter volume. Subtype 1 patients had poorer premorbid functioning and lower educational attainment.

COMMENT

Subtype 1 patients did not show a great degree of deficit syndrome. Further research is necessary to ascertain whether these profiles are accompanied by differences in cognitive functioning, specific treatment response or resistance patterns, and long-term outcomes. If such clinically meaningful distinctions are identified, imaging might prove useful for precise treatment planning and prognostication.

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Chand GB et al. Two distinct neuroanatomical subtypes of schizophrenia revealed using machine learning.
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