M. Roeske[1], M. McHugo[1], I. Lyu[2], J. Blackford[3], S. Heckers[1]

The impact of incomplete hippocampal inversion on hippocampal shape in schizophrenia

[1]Department of Psychiatry and Behavioral Sciences, VUMC
[2]Department of Computer Science and Engineering, Ulsan National Institute of Science and Technology, Ulsan, Korea
[3]Munroe-Meyer Institute Department of Research, University of Nebraska Medical Center

Incomplete hippocampal inversion (IHI) is an anatomical variant of the human brain that is more prevalent and severe in patients with schizophrenia. We hypothesized that IHI contributes to hippocampal shape differences observed in patients with schizophrenia. We studied 199 schizophrenia patients and 161 healthy control participants with 3-Tesla MRI and measured the prevalence and severity of IHI in each hippocampus bilaterally using established, quantitative criteria. Hippocampal surface reconstructions were completed using the SPHARM-PDM toolkit. We employed linear models in SurfStat to assess the relationship of IHI with hippocampal shape. IHI is associated with deflations of the lateral and medial surfaces and inflations of the superior and inferior surfaces of the hippocampus. Linear models not including IHI as a variable replicate well-known hippocampal shape differences in schizophrenia patients localized primarily to the CA1 region of the hippocampal head (left hemisphere cluster = 550 vertices, p = 1.24E-06; right hemisphere cluster = 413 vertices; p = 1.27E-06) and tail. Including an IHI by Group interaction in the model removes the significant shape differences in the CA1 region. These findings suggest that IHI contributes to hippocampal morphological differences observed in schizophrenia and may be associated with alterations in specific subfields of the hippocampus.

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