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Tau imaging detects distinctive distribution of tau pathology in ALS/PDC on the Kii Peninsula

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Study objective

To characterize tau pathology distribution in a form of amyotrophic lateral sclerosis/parkinsonism-dementia complex associated with Japan's Kii Peninsula (Kii ALS/PDC).

Summary results

Patients with Kii ALS/PDC exhibit increased tau deposition in the hippocampus and in frontal and parietal white matter areas.

What is known and what this paper adds

The brains of patients with Kii ALS/PDC contain tau fibrils and tau-positive astrocytes. This study provides a neuroimaging-based characterization of the dissemination of tau pathologies in patients' brains.

Participants and setting

This study recruited 5 men with Kii ALS/PDC and 1 asymptomatic man with a dense family history of Kii ALS/PDC (mean age, 76 ± 8 years). This study also recruited 13 healthy men as controls (HCs; mean age, 69 ± 6 years).

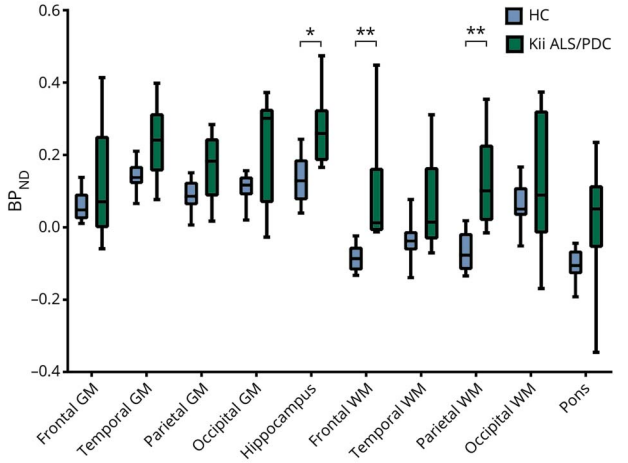
Design, size, and duration

The participants underwent neuropsychological assessments, MRI scans, and PET scans with 2-((1*E*,3*E*)-4-(6-([^{11}C]methylamino)pyridin-3-yl)buta-1,3-dienyl)benzo[*d*]thiazol-6-ol ([^{11}C]PBB3) for tau imaging. This study used a multilinear reference tissue model for voxel-by-voxel binding potential (BP^*_{ND}) calculations to generate parametric PET images. A group-wise volume-of-interest analysis of [^{11}C]PBB3 PET data was used to identify areas in which the Kii ALS/PDC group and the HCs differed in terms of BP^*_{ND} values.

Primary outcome measures

The primary outcomes were differences between the Kii ALS/PDC group and the HCs in terms of BP^*_{ND} values.

Figure Regional BP^*_{ND} values in the HC and Kii ALS/PDC groups



*p < 0.05, **p < 0.005 by the Holm-Šídák multiple comparisons test. Abbreviations: GM, gray matter; WM, white matter.

Main results and the role of chance

Compared to the HCs, the Kii ALS/PDC group had higher BP^*_{ND} values in the hippocampus and in frontal and parietal white matter areas.

Bias, confounding, and other reasons for caution

This study had a small sample size.

Generalizability to other populations

Kii ALS/PDC is not sex-specific, but this study's participants were all men. This may limit the generalizability of this study's results to women with Kii ALS/PDC.

Study funding/potential competing interests

This study was funded by the Japanese government and various Japanese foundations. Some authors report holding a patent on compounds relevant to this study. Go to Neurology.org/N for full disclosures.

A draft of the short-form article was written by M. Dalefield, a writer with Editage, a division of Cactus Communications. The authors of the full-length article and the journal editors edited and approved the final version.

