Supplementary Material

Extremely Early-Onset Frontotemporal Dementia: A Case Report and Literature Review

FDG PET/MRI acquisition parameters

The parameters of the T1 data were as follows: repetition time (TR) = 6.9 ms, echo time (TE) = 2.98 ms, flip angle = 12◦, inversion time = 450 ms, matrix size =256×256, field of view (FOV)=256×256 mm2, slice thickness = 1 mm, 192 sagittal slices with no gap, voxel size = 1×1×1 mm3, and acquisition time = 4 min 48 s. Static 18F-FDG-PET data were acquired in list mode for 30 minutes and 89 slices were captured to encompass the entire brain, using the following parameters: matrix size: 192×192, FOV: 350×350 mm2, and pixel size: 1.82×1.82×2.78 mm^3. Corrections were made for random coincidences, dead time, scatter, and photon attenuation. Attenuation correction was performed based on MR imaging of the brain (Atlas-based co-registration of 2-point Dixon). The default attenuation correction sequence was automatically determined and acquired as follows: LAVA-Flex (GE Healthcare) axial acquisition, TR: 4 ms, TE: 1.7 ms, slice thickness: 5.2 mm with a 2.6-mm overlap, 120 slices, pixel size: 1.95×2.93 mm, and acquisition time: 18s. The images were reconstructed with a time-of-flight point spread function and the order subset expectation maximization (TOF-PSF-OSEM) algorithm (32 subsets 8 iterations and a 3-mm cut-off filter).

FDG PET/MRI imaging preprocessing

Structural images were preprocessed using the computational anatomy toolbox 12 (CAT 12), which is based on statistical parametric mapping 12 (SPM12), and is used in MATLAB (MathWorks, Natick, MA). The DICOM files were converted to nifti format. Voxel-based morphometry (VBM) preprocessing was performed using the default settings of the CAT12 toolbox and the “East Asian Brains” ICBM template. T1-weighted 3D images were segmented into gray matter (GM), white matter (WM), and cerebrospinal fluid partitions. Subsequently, the

GM and WM partitions of each subject in native space were high-dimensionally registered and normalized to the standard Montreal Neurological Institute (MNI) space using diffeomorphic anatomical registration through exponentiated lie algebra normalization. The images were then smoothed using an 8-mm full-width half-maximum Gaussian kernel.

PET images were preprocessed using SPM12, implemented in MATLAB (MathWorks, Natick, MA). After spatial normalization of the structural MR images to standard Montreal Neurological Institute (MNI) space using diffeomorphic anatomical registration through exponentiated lie algebra normalization, the transformation parameters determined by the T1-weighted image spatial normalization were applied to the co-registered PET images for PET spatial normalization. The images were then smoothed using an 8-mm full-width half-maximum isotropic Gaussian kernel. Finally, PET scan intensity was normalized using a whole cerebellum reference region to create standardized uptake value ratio (SUVR) images.

Supplementary Table 1. See Excel file.