(18)F-FDG PET database of longitudinally confirmed healthy elderly individuals improves detection of mild cognitive impairment and Alzheimer's disease.

Abstract:
The normative reference sample is crucial for the diagnosis of Alzheimer's disease (AD) with automated (18)F-FDG PET analysis. We tested whether an (18)F-FDG PET database of longitudinally confirmed healthy elderly individuals ("normals," or NLs) would improve diagnosis of AD and mild cognitive impairment (MCI).

METHODS: Two (18)F-FDG PET databases of 55 NLs with 4-y clinical follow-up examinations were created: one of NLs who remained NL, and the other including a fraction of NLs who declined to MCI at follow-up. Each (18)F-FDG PET scan of 19 NLs, 37 MCI patients, and 33 AD patients was z scored using automated voxel-based comparison to both databases and examined for AD-related abnormalities. RESULTS: Our database of longitudinally confirmed NLs yielded 1.4- to 2-fold higher z scores than did the mixed database in detecting (18)F-FDG PET abnormalities in both the MCI and the AD groups. (18)F-FDG PET diagnosis using the longitudinal NL database identified 100% NLs, 100% MCI patients, and 100% AD patients, which was significantly more accurate for MCI patients than with the mixed database (100% NLs, 68% MCI patients, and 94% AD patients identified). CONCLUSION: Our longitudinally confirmed NL database constitutes reliable (18)F-FDG PET normative values for MCI and AD.