

PET images of cardiac amyloidosis with an amyloid-specific tracer

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Cardiac amyloidosis is a disease that “amyloid”, such as transthyretin, deposits in the myocardium leading to cardiac failure. For its definitive diagnosis myocardial biopsy is needed. In order to visualize amyloid deposition in the myocardium, we performed a cardiac positron-emission tomography study with [11C]-BF-227 that sensitively and specifically binds to aggregated amyloid fibrils. The positron-emission tomography images revealed significantly robust retention of [11C]-BF-227 in the patient's heart compared with that of the normal control. Biopsy specimens from the patient's duodenum also showed higher signals of BF-227 compared with that of the normal control. The present result provides evidence that our amyloid-specific positron-emission tomography tracer, [11C]-BF-227, can successfully detect amyloid deposition in the heart. Several molecules, such as ^{99m}Tc-aprotinin and ^{99m}Tc-labeled phosphatederivatives, have been investigated to visualize cardiac amyloidosis. None of the previous tracers, however, could specifically bind to aggregated amyloid, which forms a pleated sheet structure. In any of the amyloidogenic disorders, such as transthyretin-related systemic amyloidosis and Alzheimer's disease, it is surmised that the monomer of the amyloid protein itself is not very toxic, whereas misfolded oligomers could cause damage to human organs. It is therefore truly important to detect the accumulation of real amyloid fibrils for the early and accurate diagnosis of amyloidosis. To our knowledge, our group first succeeded in showing the usefulness of a pleated sheet structure-specific positron-emission tomography in investigating visceral organ amyloidosis.

Biography

Katsutoshi Furukawa has completed his M.D. degree at Yamagata University in 1988, and has obtained Ph.D. degree from Tohoku University in 1992. After he performed postdoctoral studies at University of Kentucky and University of Washington, he worked as a tenure track investigator at the National Institute on Aging. He is now an associate professor at the Department of Geriatrics and Gerontology, Tohoku University, Sendai, Japan. He has published more than 100 papers in reputed journals and serves as an editorial board member of three medical journals.

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