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The analysis of q-space images (:mean displacement, zero-displacement, kurtosis) by new MR q-space sequences

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Abstract

MRI q-space imaging can be enabled in analysis of spatial resolution at the micro-order sizes. So, it is tried that is developed of the new sequences for MR q-space imaging in a clinical side in our research. It is called to q-space that signal decay curve corresponding to q-value in NMR system. And, as for the Fourier conversion of q-space is the diffusion displacement spectrum whereas Fourier conversion of K-space is raw data of MRI is the consistency spectrum. It is obtained to diffusion displacement distribution of water molecule that performed the Fourier transform which assumed correlative vector q (= $\gamma\delta g/2\pi$) which demanded displacement distribution of a water molecule a variable. It is displayed FWHM (diffusion mean displacement quantity) of obtained distribution and an image of the maximum distribution (the ratio null quantity of diffusion mean displacement). We used EPIC (ver9.0) made in GE company for imaging pulse sequence development. It is showed quantity of displacement in voxel in the polyhedron mode. Water molecule diffusion displacement was shown greatly in the high signal, and the image of zero displacement distribution showed probability with a few water molecule diffusion displacements in the high signal with the corpus callosum and the medulla spinalis level of the axial displacement image. It was able to confirm correspondence with the q -space theory by these experiment facts. The displacement image reflects locus of fast diffusion coefficient in locus of high signal intensity in comparison with ADC map, and the derangement image depicted the fine structure part that is the signal change of the slow diffusion ingredient.

Biography

Kazuo YAGI has completed his Ph.D. at the age of 39 years from Nagoya University and NMR or MRI studies about technology from Tokyo University School of Medicine Hospital from the age of 30 years. He is a professor of Tokyo Metropolitan University, Graduate School of Health Science. He has published more than 50 papers in reputed journals and He has experience an assistant in University of Tokyo, Graduate School of Engineering and Kanazawa University at department of Medical Technology College, an assistant professor in Mie University Graduate School of Engineering for total 14 years.