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EVALUATION OF AGING OF THE BRAIN BY MEASUREMENT OF IN VIVO T-1 VALUES. N.Kamata, A.Izawa, M.Furuse, K.Saso, S.Inao and Y.Motegi. Nakatsugawa Municipal General Hospital, Nakatsugawa.

Aging process of the brain was evaluated by measurement of in vivo T-1 value. Normal volunteers, as well as patients with neither neurological deficit nor abnormal findings on X-ray CT, were studied with FONAR QED-80 α system, composed of dual functions of imaging display by Steady-state-free-precession (SSFP) technique (static magnetic field; 433.6G) and measurements of T-1 relaxation times by field focusing technique. Age distribution ranged from 7 to 83 years old. T-1 values of cerebral gray matter altered with aging. Younger group below 25 in age revealed significantly prolonged values of T-1. In adult group (aged 26-45), the T-1 values were found to be shortened as compared with others. T-1 values tended to be prolonged in elder group above 46 years old. Otherwise, T-1 values of cerebral white matter, basal ganglia and other areas revealed no significantly difference corresponding to aging of the brain.

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ANALYSIS AND SYNTHESIS OF T₁ IMAGES BY NMR-CT. T.Yamazaki¹, A.Hatase², N.Fukuda³. Asahi Medical, Tokyo, Asahi Chemical, Fuji, Natl. Inst. Radiol. Sci., Chiba.

T₁ images as currently utilized in clinical practice are generally obtained by calculation from two IR or SR images having different parameters. In analytical chemistry on the other hand the T₁ values themselves are obtained from numerous IR signal measurements at various delay times, a method which not only yields a precise determination of T₁ but also allows analysis as to the number of components contributing to this value. This paper describes our application of the method of least squares, utilizing the T₁ and equilibrium magnetism parameters, to numerous IR images obtained by NMR-CT with various delay times, to obtain an analysis of T₁ for individual pixels and to construct both T₁ images and error approximation images. Analysis of the T₁ values thus obtained for brain tissues¹ in vivo indicates a single-component T₁ for many of the pixels. Comparison between the T₁ image thus obtained and that obtained by the conventional method, moreover, shows a close agreement between their respective T₁ values at numerous pixels, thus confirming the validity of conventional T₁ images.

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THE RELAXATION TIMES OF THE CVA. S.Ono, K.Yamada, S.Yamada, S.Yoshioka, T.Hishinuma, H.Yamaura, T.Matsuzawa. Department of Radiology & Nuclear Medicine, The Research Institute for Tuberculosis & Cancer, Tohoku University, Sendai.

The relaxation times of lesions of the cerebral infarction and the cerebral hemorrhage are examined T1 and T2 relaxation times of the cerebral infarction are significantly longer than those of the cerebral hemorrhage. In relation to its time course, the relaxation times of the both lesions lengthen significantly. And the slope of the regression line of the cerebral infarction is significantly higher than that of the cerebral hemorrhage.

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NMR-CT IMAGING OF MALIGNANT BRAIN TUMORS. T.Taksshima, Y.Ozawa, S.Mine, K.Sueyoshi, N.Yui, F.Kinoshita. Chiba Cancer Center Hospital, Chiba. H.Ikehira, N.Fukuda, Y.Tateno. National Institute of Radiological Sciences, Chiba. H.Nishiyama, A.Yamaura. Chiba Univ., Chiba. M.Ohshima and T.Mizutani, Asahi Medical Co., Tokyo.

Using with NMR-CT placed in the National Institute of Radiological Sciences, malignant brain tumor imaging study has been performed. Our experience and results will be reported. The Asahi Mark-J 10 NMR-CT scanner used in this study is an improved version of the Mark-1 scanner developed at Aberdeen Univ., and constructed by Asahi Chemical Group. It employs a resistive magnet to obtain a static magnetic field of 0.1 Tesla, with scanning by the spin-warp and 2-DFT method. Available pulse sequences are saturation-recovery (SR), inversion-recovery (IR) and calculated T₁. In addition to the improved quality of the image by the increased data samples from 128x128 to 256x256, the choice of appropriate pulse sequences makes images more sharp. Differentiation the tumor from the surrounding edema, intratumoral and peritumoral structures are shown to allow ready observation by NMR-CT. The availability of coronal and sagittal as well as transverse section is seen to yield more precise anatomical information and helpful to approach the lesion surgically.