CLINICAL EVALUATION OF NMR-CT.
K.YOSHIKAWA, T.MACHIDA, T.APAKI, J.NISHIKAWA, M.IIO. Department of Radiology, Tokyo University, Tokyo.

Clinical evaluation of NMR-CT particularly in diagnosing diseases of the central nervous system (CNS) and myocardium were examined.

NMR-CT were performed on the patients with CNS and myocardial diseases by Toshiba, Hitachi, and Shimazu experimental machines using 0.12 0.15 Tesla resistive magnet ciols. Imaging method of the former two machines was the progection reconstruction method and that of the last machine was the spin-warp method, a sort of the 2D Fourier transformation method.

Our imaging technics were spin echo and inversion ricovery sequences. In the former, because of the short echo delay time, the signal intensities related with spin-lattice (T2) relaxation time were almost cancelled. In the latter recovery interval was determined 300-400 msec.

ECG gated inversion recovery images at endosystolic and endodiastolic period were performed in myocardial examinations.

NMR-CT images were compared with X-CT almost at the same time in CNS diseases, but with cardiovascular nuclear medicine study in myocardial diseases.

For our limited initial experiences with NMR-CT, we could not reach sufficient conclusions, but NMR-CT was useful in diagnosing CNS and myocardial diseases.

In CNS diseases there are mainly three advantages in NMR-CT.

First was its ability to depict optional plane images. Sagittal plane especially provided more precise anatomical informations particularly about mid-line structures. Second was T1 calculating images, from which we could have any informations with regards to differencial diagnoses or components of fluid of the lesions.

In myocardial diseases ECG gated inversion recovery technic was useful, because cardiac muscle could be visualized clearly without using any contrast materials nor radioisotopes. In 8 patients we could measure the ejection fractions of the left ventricle on NMR images, and these results were satisfactory correlation with that of nuclear medicine study.

In 8 patients motions of the left ventricle could be evaluated on NMR images.

In the present state only axial tomography could be obtained by gated NMR-CT, therefor motion of inferior wall of the left ventricle could not be evaluated satisfactorily. In the future these evaluations should be performed on the NMR-CT images parallel to true axis of the heart.

CLINICAL UTILITY OF NMR-CT. N.Fukuda, H.Ikehira, Y.Tateno. National Institute of Radiological Sciences, Chiba.

Based on our clinical experiences of nuclear magnetic resonance imaging (NMR-CT) by Mark-J(1000 Gauss resistive magnent) we obtained the preliminary data base of in vivo spin-lattice relaxation time (T_1) as shown in the following table. The main advantage of NMR-CT are as follows,

1. Sagittaland frontal tomograms. 2. Discrimination of vascular structure without contrast enhancement. 3. Less bone artifacts compared with X-ray CT.

The potential of NMR to differentiate among different pathologic entities remains to be fully elucidated.

Table T1 data of N.I.R.S. NMR imaging system (0.1T)

Tissue and disease		T1 (m sec)
Brain	white matter	285±17.6
	gray matter	377±15.4
	tumor	472±69.6
	edema	499±48.5
Thyroid gland	normal	275±18.2
	hyper thyroidism	319±15.5
Liver	normal	211±14.2
	tumor	432±22.4
Muscle	normal	286±24.5
Fat	normal	186±19.5
Spleen	normal	425±45.5
Kidney	parenchyma	466±29.6