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ECG GATED MRI FOR MYOCARDIAL INFARCTION AND HYPERTROPHIC CARDIOMYOPATHY.

J. Nishikawa, T. Ohtake, K. Yoshikawa, K. Machida, M. Iio, N. Yoshimoto and T. Sugimoto Tokyo University Hospital, Tokyo.

The purpose of this paper is the comparison of two machines in the diagnosis of myocardial infarction (MI) and hypertrophic cardiomyopathy (HCM). We used 0.35 T MR machine last year, and we have been using 1.5 T MR machine since this March. The advantage of our .5 T machine is in the capability of shortening of scan time and taking oblique images. The patient population is 3 vs 10 of MI, 8 vs 4 of HCM. (The former is patient by 0.35 T one.) The lesion of recent MI is shown as prolonged T2 relaxation time by two machines. T2 relaxation time of various sites of LV wall in the patients with HCM is no significant difference. T2 relaxation time of each area of recent MI, non-infarcted myocardium and the myocardium of HCM by 0.35 T one was 61.7, 40.3, 41.7 msec and those by .5 T machine was 42.9, 30.4, 32.0 msec. The difference of T2 relaxation time between two machines is significant, but in phantom study T2 relaxation time between two machines is almost the same. We consider the major cause of this difference is due to the inhomogeneity of RF in patient's body, and the iron in the myocardium.

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APPLICATION OF IN VIVO 19F-NMR TO THE BIOLOGICAL SYSTEMS.

T. Higuchi, S. Naruse, Y. Horikawa, C. Tanaka and K. Hirakawa. Kyoto Prefectural University of Medicine, Kyoto.

Using in vivo 19F-NMR, changes of exogenous fluorine compounds content in physiological and pathological tissues were examined sequentially. Spectra were measured using a surface coil method with a SCM-200 spectrometer (JEOL Japan: 4.8 tesla). 1) After 0.5% halothane was administered to Wistar rat, in vivo 19F-NMR spectra were obtained sequentially from the brain and the liver. A peak of halothane was detected in both organs soon after inhalation and it increased continuously during inhalation. The peak decreased immediately after the cessation of inhalation. 2) Perfluorochemical (PFC) administered i.v. to Wistar rat was used as an indicator of the blood circulation in the brain and the liver. Accumulation of PFC was observed in the liver 24 hours after injection, when the signal intensity from the brain had already decreased. 3) After PFC was administered i.v. to the cerebral ischemic model in Mongolian gerbils, in vivo 19F- and 31P-NMR spectra were measured sequentially. The 19F signal intensity of PFC in ischemic brain decreased to about 60% of that of normal brain. 31P-NMR spectrum obtained simultaneously showed complete ischemic pattern. In vivo 19F-NMR spectroscopy is useful for the analysis of the dynamics of exogenous fluorine compounds in biological systems.

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CLINICAL APPLICATION OF 31P-NMR SPECTROSCOPY FOR MYOPATHY.

M. Itoh, S. Aoki, M. Minami, K. Ohtomo, K. Yoshikawa, J. Nishikawa, M. Iio, M. Kawai, M. Kunimoto, and H. Nakase* Department of Radiology and Department of Neurology* Faculty of Medicine, University of Tokyo, Tokyo.

Patients with muscle diseases have been examined by 31P-NMR spectroscopy using a superconductive MR system operating at 1.5T (MAGNETOM, Siemens).

Significant changes have been observed in the PCr/Pi signal ratio and pH in the spectra of the femoral muscle of some of the patients measured before and after exercise. Depending on the kind or the stage of the disease, the recovery process after exercise has been found to be distinctly different. In cases who are from the deficiency of certain enzymes, the change of the PCr/Pi ratio with time reflects the recovery of the muscle from exercise. On the other hand, M.G. has no abnormality in the muscle itself, but instead a disease of the neuromuscular junction.

In vivo 31P-spectroscopy may therefore open the way to quantitative evaluation of the stage of such diseases and the effect of treatment.

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THE STUDIES OF PARAMAGNETIC ION AND ITS COMPOUND AS A NMR CONTRAST ENHANCEMENT AGENT T. Yamane, H. Ikehira, N. Fukuda, S. Torii, S. Shibata and Y. Tateno. National Institut of Radiological Sciences, Chiba

The gadolinium-DTPA as contrast enhancement agent for NMR generally use to biomedical studies but also useful another paramagnetic ion compound depending on the purpose. In this time were compared of spin relaxation time (T1) used some of chlorinate paramagnetic ion and its chelate compounds in phantom and animal with tumor.

The determination of T1 were measured using Asahi Mark-J 0.1T resonance frequency for hydrogen of 4.5 MHz, the receiver coil was 24cm in diameter.

These results suggest the Iron and Manganese chelate compounds are useful as NMR contrast enhancement agent, but paramagnetic ion has many toxic problems, we have to study furthermore about paramagnetic ion chelate compounds.