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THE ADVANTAGE AND DISADVANTAGE OF MR IMAGING IN CNS AND HEAD AND NECK

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The MR imager at our institution operates at 0.26 tesla superconducting magnet coil and its imaging method is 2-dimention Fourier transformation. For CNS,head and neck imaging head coil with 30-cm aperture was used. Our imaging technics were spin echo and inversion recovery sequences.

The absence of bone artifact is,particularly,value at the bace of the brain and in the posterior fossa to be seen.Partial-volume effect from bone are not a major problem with MR imaging.

However,it is impossible to determine the infiltrated area of many head and neck tumor,especially the maxillary sinus carcinoma.

The magnetic substances give a defect of the MR imaging,Sometimes,the artificial toos give the defect of imaging around them.

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CLINICAL EVALUATION OF T_1 VALUE BY NMR-CT.

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The present on going clinical study, which began last summer, utilizes an NMR-CT scanner with a resistive magnet providing a low static magnetic field.

The purpose of this trial is the utility of its T_1 value in differential diagnosis and detection of lesions.

The NMR-CT system used in this study is the Mark-J, which is based on four vertical coil air-core magnets operating at about 0.1 Tesla and giving a proton resonance frequency of 4.5 MHz.

It has been found effective to use calculated T_1 images to obtain normalized images for comparison with images from other patients as well as with those of follow-up studies.

Differential diagnosis of solid tumor, hemangioma and cystic disease can be performed through reference to their discrete T_1 values. The size and location of thrombi in the circulatory system can be determined easily and precisely due to their short T_1.

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VOLUME DETERMINATION OF ORGANS USING NMR-CT IMAGES, Basic investigations.

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Water phantoms with the volume of 10,50, 100,200 and 300ml surrounded by salad oil were made. The basic experiments were achieved with these phantoms to investigate the accuracy of volume determination and the influence of RF pulse series. NMR-CT employed was Asahi Mark-J. The magnetic field was 0.1 T. (conductive magnet). The slice thickness were 15mm. The contour of the phantoms was determined manually using truck-ball and/or automatically by an computer program developed by us. The volume was calculated by the summation of contour area multiplied by the slice pitch.

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THE KINETIC STUDY OF SATURATION RECOVERY IN BIOLOGICAL TISSUES.

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This saturation recorvery(SR)kinetics was examin to make bacik data of proton lattice reraxation in biological tissues. As a model of tissues were using sephadex gel which is with differents of water regain.

The time course of SR in the sephadex gel was measured with the 180-tau-90 method at 4.5 MHz. The parameters obteind uni-and bi-exponential fitting of relaxiation by simplex method. Accoding to our caluculation, in this case of sephadex gel were fited by uni-exponential model, these are two components with a fast relaxatin(Tl) and slow relaxation respectively.

The correlation of caluculated Tl values and water regain of sephdex geles were showes goodnes result(correlation coefficient was 0.96). This results, the sephadex gel is useful sa a cytoplasm model for kinetic study of proton lattice relaxation NMR image , because of these sephadex geles us to choose from their differrets G values like as sytoplasm.