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GADOLINIUM-HIDA : AS A MAGNETOPHARMACEUTICAL FOR QUANTITATIVE HEPATOBILIARY KINETIC FUNCTION STUDIES.

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Magnetic resonance imaging (MRI) has some very useful merits, especially it has better spetial resolution than the nuclear medicine technique and also it has better sensitivity to the contrast agents than the X-ray CT.

We already developed and reported the renal function analysis using Gd-DTPA which was labeled by ourselves on these ideas, and then we also produced the magnetophalmaceutical for the hepatobiliary metabolic function analysis, that is the Gd labeled iminodiacetic compound, Gd-HIDA (N-2,6-dimethylphenyl carbamoylmethyl-imino-diacetic acid). Gd-HIDA has the tightest stability constant which was about pk=10 in these iminodiacetic compounds, and also has a good relaxivity.

For the evaluation of the nomal in vivo kinetics of this tracer, the longitudinal relaxation rates (R1) of rats' livers were measured before and after intra venous administrations with some different doses (0.03 to 0.1 mmol/kg) and made the MRI hepatography using the calculated R1 image (1000/300/13) on the 0.1 Tesla Asahi-Mk-J.

Gd-HIDA had enough relaxivity and very useful behavior to evaluate the hepatocellular kinetic function using MRI.

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MRI OF RATS WITH FATTY LIVER USING GD-HIDA.

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Gd-HIDA (N-2,6-dimethylphenyl carbamoyl methyl-iminodiacetic acid) has a storong paramagnetic effect and low toxicity in animals.

This examination study was undertaken for kinetic analysis in liver using Gd-HIDA complex as a contrast agent of magnetic resonance imaging(MRI).

Animals were used wistar male rats which produced fatty liver by carbon tetrachlorid and normal.

T1 were measured by Asahi-MK-J 0.1T MR-CT(Tr=1000ms,Td=300ms) and the relaxation data were caluculated bi-exponential curves fitting.

This results, Gd-HIDA complex is useful MRI contrast agent, for a hepatobiliary metabolic function analysis.

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IRON-EHPG AS A HEPATOBILIARY MR CONTRAST AGENT; COMPAIRED WITH Gd-DTPA.

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Gadolinium diethylenetriaminepentaacetic acid (Gd-DTPA) has been expected as a potential MRI contrast agent. It is distributed exclusively extracellularly, and rapidly excreted into the urine.

On the other hand, iron(III) ethylene bis-(2-hydroxyphenylglycine) (Fe-EHDG) is an extremely stable complex with a formation constant of 10^{34} . This complex shows significant hepatocellular uptake, and appears to be excreted unaltered into the bile.

Intravenous administration of 0.3 mmol/kg of Fe-EHPG to rabbits produced a 40 % increase in the signal intensity of the normal liver, while Gd-DTPA yielded a 100 % increase, when using a T1 weighted partial saturation pulse sequence (TR/TE = 400/25) on a 1.5-T superconducting unit (GE: "Signa"). In the liver tumor models, both complexes provided clear discrimination between normal liver and implanted VX-2 tumor. However the degree of contrast enhancement by Gd-DTPA was higher than Fe-EHPG, Fe-EHPG demonstrated intrahepatic bile ducts and gall bladder and its effect increased with time and continued longer than that of Gd-DTPA.

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GADOLINIUM LABELED ANTIMYOSIN MONOCLONAL ANTIBODY, CONTRAST MATERIAL FOR MRI.

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To depict the lesion of myocardial infarction (MI) by MRI, we produced Gadolinium (Gd) labeled antimyosin monoclonal antibody (Ab) and tried it to experimental canine MI. We labeled Gd to Ab twice in different labeling conditions. Experimental MI was made by 6 hours' ligation of LAD, and MRI and tissue sampling were obtained 24 hours after Ab injection. Each in two trials, two dogs were used. At the first time, Ab was injected into one dog and Gd-DTPA into another. In the second trial, Ab was injected into one dog and none into another.
At the first time, MRI could not differentiate between MI and normal myocardium, but both could be differentiated by NMR spectroscopy. In the second trial Gd labeled Ab could shorten T1 and T2 relaxation time of the lesion of MI which was confirmed by NMR spectroscopy.
The results show us that properly labeled Ab accumulated in the lesion of MI and reduced T1 and T2 relaxation time.
The labeling condition from this study could be used to label Gd to antimalignant tumor antibody.