

The New MR technique Using Deconvolution Analysis For Quantitative Evaluation of Liver Function

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목적(Purpose): To develop a direct, noninvasive technique to quantify hepatocyte function with deconvolution assessment of MR images obtained after administration of liver-specific MR agent, Gd-EOB-DTPA.

대상 및 방법(Materials and Method): Hepatic dysfunction was experimentally induced in adult New Zealand white rabbits (3.5-5.5 kg) with 20% carbon tetrachloride (CCl₄) p.o injection.

All MR studies were performed on a 1.5 T scanner (Vision Plus, Siemens) using human extremity coil. The animals were anesthetized with a single intramuscular injection of ketamine hydrochloride (35mg/kg) and xylazine (5mg/kg), and Gd-EOB-DTPA (0.01mmol/kg) was injected through ear vein. Turbo-FLASH sequence (TR/TE = 11/4.2 msec, flip angle 15°) was employed during the dynamic MR imaging. The time-intensity measurement was performed at the abdominal aorta and the parenchyma of liver. Using the time-intensity curve of the aorta as arterial input function, the deconvolution analysis was carried out at independent workstation basing on fast Fourier transform (FFT) algorithm. The slopes of the resultant response function from deconvolution analysis were measured and compared among normal (0 day), acute-injury (7 days), and chronic-injury (30 day) groups.

결과(Results): The slopes on each response function graphs were (0.8±0.4) in normal group, (6.0±0.7) in acute-injury group, and (12.0±0.6) in chronic condition group respectively. This results showed that the slope on output response function was increased in CCl₄-treated groups than that of normal control group. Also, there was a further increase in the slope as the level of hepatocyte function became worse.

결론(Conclusion): This result strongly suggest that the noninvasive MR technique with deconvolution analysis using liver-specific MR agent may have clinical importance in evaluating hepatic function quantitatively.