Mapping of liver function in thioacetamide-induced rat acute liver injury using an empirical mathematical model and dynamic contrast-enhanced MRI with Gd-EOB-DTPA

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INTRODUCTION

Various liver-specific contrast agents for magnetic resonance imaging (MRI) have been introduced to increase the accuracy of liver imaging [1]. Gadolinium ethoxybenzyl diethylenetriamine pentaacetic acid (Gd-EOB-DTPA), a hepatocyte-targeted contrast agent, has been used recently for diagnosis of liver diseases [2][3]. Our purpose of this study was to evaluate thioacetamide (TAA)-induced acute liver injury in rats using an empirical mathematical model (EMM) and dynamic contrast-enhanced magnetic resonance imaging (DCE-MRI) with gadolinium ethoxybenzyl diethylenetriamine pentaacetic acid (Gd-EOB-DTPA).

MATERIALS AND METHODS

Eighteen rats were divided into 3 groups [normal control (n = 6), TAA (140) (n = 6), and TAA (280) groups (n = 6)]. The rats of the TAA (140) and TAA (280) groups were intravenously injected with 140 and 280 mg/kg body weight (BW) of TAA, respectively, while those of the normal control group were intravenously injected with the same volume of saline. DCE-MRI studies were performed using Gd-EOB-DTPA (0.025 mmol Gd/kg; 0.1 mL/kg BW) as the contrast agent, 48 hours after TAA or saline injection. After the DCE-MRI study, blood was sampled and serum aspartate aminotransferase (AST) and alanine aminotransferase (ALT) were measured. We calculated the rate of contrast uptake (α), the rate of contrast washout (β), the elimination half-life of relative enhancement (RE) (T1/2), the maximum RE (REmax), and the time to (REmax) (Tmax) from time-signal intensity curves using EMM.

RESULTS and DISCUSSION

CONCLUSION

In conclusion, this study demonstrated that the EMM is useful for the assessment of TAA-induced rat acute liver injury using DCE-MRI with Gd-EOB-DTPA.

REFERENCES