World Academy of Science, Engineering and Technology
International Journal of Biomedical and Biological Engineering
Vol:9, No:11, 2015

MRI R2* of Liver in an Animal Model

Authors : Chiung-Yun Chang, Po-Chou Chen, Jiun-Shiang Tzeng, Ka-Wai Mac, Chia-Chi Hsiao, Jo-Chi Jao

Abstract : This study aimed to measure R2* relaxation rates in the liver of New Zealand White (NZW) rabbits. R2* relaxation rate has been widely used in various hepatic diseases for iron overload by quantifying iron contents in liver. R2* relaxation rate is defined as the reciprocal of T2* relaxation time and mainly depends on the composition of tissue. Different tissues would have different R2* relaxation rates. The signal intensity decay in Magnetic resonance imaging (MRI) may be characterized by R2* relaxation rates. In this study, a 1.5T GE Signa HDxt whole body MR scanner equipped with an 8-channel high resolution knee coil was used to observe R2* values in NZW rabbit's liver and muscle. Eight healthy NZW rabbits weighted 2 ~ 2.5 kg were recruited. After anesthesia using Zoletil 50 and Rompun 2% mixture, the abdomen of rabbit was landmarked at the center of knee coil to perform 3-plane localizer scan using fast spoiled gradient echo (FSPGR) pulse sequence. Afterward, multi-planar fast gradient echo (MFGR) scans were performed with 8 various echo times (TEs) (2/4/6/8/10/12/14/16 ms) to acquire images for R2* calculations. Regions of interest (ROIs) at liver and muscle were measured using Advantage workstation. Finally, the R2* was obtained by a linear regression of ln(SI) on TE. The results showed that the longer the echo time, the smaller the signal intensity. The R2* values of liver and muscle were 44.8 □ 10.9 s-1 and 37.4 □ 9.5 s-1, respectively. It implies that the iron concentration of liver is higher than that of muscle. In conclusion, R2* is correlated with iron contents in tissue. The correlations between R2* and iron content in NZW rabbit might be valuable for further exploration.

Keywords : liver, magnetic resonance imaging, muscle, R2* relaxation rate
Conference Title : ICBE 2015 : International Conference on Biomedical Engineering
Conference Location : Kyoto, Japan
Conference Dates : November 12-13, 2015