

**Diagnosis of Graft-Versus-Host Disease after Bone Marrow Transplantation  
by *in vivo* Proton MR Spectroscopy of the Liver :  
Correlation with Pathologic Results**

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**목적** : To know the differences of the proton MR spectroscopic features of the liver between the patients with graft-versus-host disease (GVHD) and without GVHD (non-GVHD) after bone marrow transplantation (BMT), and to evaluate the possibility to discriminate GVHD from non-GVHD by analysis of the *in vivo* proton MR spectra.

**대상 및 방법** : We evaluated the *in vivo* proton MR spectra from the livers of 37 patients who underwent BMT. Our series included 14 cases with GVHD and 23 without GVHD in the liver. Nineteen men and 18 women were included in our series. All cases of GVHD and 2 of non-GVHD were confirmed by liver biopsy and remaining of non-GVHD by evaluation of clinical follow up. Proton MR spectroscopy (<sup>1</sup>H-MRS) was performed at 1.5T GE Signa Horizon (GE Medical System, Milwaukee, USA) system using localized proton STEAM sequence and body coil in all cases with subjects were located in supine position. No respiratory interruption was required during the spectroscopic signal acquisition. Parameters used in MRS were: TR = over 3000ms, TE = 30ms, number of scans = 128, voxel size = (2x2x2)cm<sup>3</sup>, and one NEX. We evaluated the spectra with an attention to the differences of patterns of the peaks between GVHD and non-GVHD groups. The ratio of peak area of peaks at 1.6-4.1ppm to lipid (0.9-1.6ppm) [P(1.6-4.1ppm)/P(0.9-1.6ppm)] was calculated in GVHD and non-GVHD group, and compared the results between these groups. We also evaluated the sensitivity and specificity for discriminating GVHD from non-GVHD by analysis of <sup>1</sup>H-MRS.

**결과** : The proton MR spectra of the liver with GVHD showed significantly increased amount of metabolites at 1.6-4.1ppm as compared with that of non-GVHD. The ratio of P(1.6-4.1ppm)/P(0.9-1.6ppm) in GVHD group was much higher than that of non-GVHD group with a statistical significance (p<0.05) due to increased area of the peaks at 1.6-4.1ppm. Mean±standard deviation of P(1.6-4.1ppm)/P(0.9-1.6ppm) in GVHD and non-GVHD group were 2.19±2.07 and 0.29±0.13, respectively. With a cut-off value of 0.42 for discriminating GVHD from non-GVHD, the sensitivity was 85.7% (12/14) and the specificity was 82.6% (19/23).

**결론** : GVHD can be distinguished from non-GVHD by analysis of *in vivo* proton MR spectroscopic features, so the *in vivo* <sup>1</sup>H-MRS of the liver can be a useful method for the diagnosis of GVHD in patients who underwent BMT.