

The Semi-quantitative Comparison of Spectral Quality Between Multi-voxel and Single voxel 1H MRS

한봉수, 박현정, 장용민, 이상권, 김용선, 강덕식

경북의대 진단방사선과학교실

Purpose: Multivoxel MRS has several advantages over single voxel technique. For example, multivoxel MRS can reveal the extend of lesion, the study of multiple lesions. In this study, we assess the pros and cons of multivoxel 1H MRS technique comparing with single voxel 1H MRS.

Materials and Method: Multivoxel and single voxel 1H MR spectra were obtained from the spectroscopy phantom simulating human brain and human volunteers on a 1.5T imager/spectrometer (Vision Plus, Siemens, Erlangen, Germany). The volume of each voxel in multivoxel MRS was 1.5 cm³ and the voxel volume of the single voxel MRS was 8cm³. The PRESS pulse sequence (TR/TE = 1500/270 msec) was employed for both multivoxel and single voxel MRS. One average was taken for multivoxel MRS and the average number was 128 for single voxel MRS. From the spectra of both multivoxel and single voxel MRS, which obtained at the nearly same location, the NAA/Cr, NAA/Cho, and Cho/Cr ratios were calculated and compared. In addition, the spectral quality of each voxels inside FOV was also qualitatively estimated for 1H multivoxel MRS.

Results: For phantom, the ratios of NAA/Cr, NAA/Cho, and Cho/Cr were 1.18, 1.07, 1.10 for single voxel MRS and 1.22, 0.98, 1.24 for multivoxel technique. The ratios of NAA/Cr, NAA/Cho, and Cho/Cr in human brain were 2.62, 2.00, 1.31 for single voxel and 2.85, 1.52, 1.87 for multivoxel technique. The spectral quality of peripheral voxels in multivoxel MRS was degraded compared to other voxels. The number of degrading voxels were increased with selecting a larger FOV. This is believed due to the difficulty in shimming large FOV.

Conclusion: Multivoxel MRS showed high quality spectra from many voxels inside selected FOV except peripheral zone. Semi-quantitative analysis also showed that there is no significant difference between single and multivoxel techniques. By considering the advantages over single voxel technique, multivoxel 1H MRS is worth to be included in routine spectroscopic examination protocol.