

1H MR Spectroscopy of the breast cancer at 3.0-Tesla: Comparison between pre- and post- contrast administration.

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Introduction

Proton (1H) MR Spectroscopy (MRS) of the breast cancer has been reported to be useful for the diagnosis and the assessment of treatment response to chemotherapy (1). In most reports, MRS was obtained after dynamic contrast-enhanced MRI, since voxel of interest (VOI) for MRS could be located easily referring to contrast-enhanced MRI. However there are some reports that MRS was affected by the Gadolinium contrast agents (2, 3). The purpose of this study was to assess whether VOIs of MRS were located properly with non-contrast MRI and to compare the variability between pre- and post-contrast spectroscopic measurements at 3T-MRI.

Material and Method

Single-voxel MRS were performed in 92 breast cancer lesions. All scan was obtained at 3T scanner using 4ch breast array coil. In 52 lesions, MRS was obtained before and after contrast-enhanced MRI. The point-resolved spectroscopy sequence (PRESS) MRS with 100msec echo time was obtained using dual band-selective inversion with gradient dephasing (BASING) for spectral suppression. VOIs of MRS were placed with diffusion weighted imaging and fat-suppression T2 weighted imaging as reference. Gadopentetate dimeglumine (Gd-DTPA) was used for the dynamic study. One radiologist evaluated the all images and graded the location of VOI subjectively. Using the dynamic contrast-enhanced MRI as a reference, the location was graded as follows: 4 (VOI with pre-contrast study was located in the lesion as same as that with all images including dynamic study), 3 (More than half of the VOI with pre-contrast study was in the lesion defined by all images), 2 (Less than half of the VOI with pre-contrast study was in the lesion), 1 (VOI with pre-contrast study was out of the lesion). Integral values of choline peak were compared between pre- and post-contrast MRS.

Results

VOI were located in the lesion properly (score 4 or 3) in 74 out of 92 breast cancers. In 52 lesions those with pre- and post contrast MRS, VOI were located properly in 46 lesions. The integral value of choline peak in pre- and post-contrast MRS was 11.98+/-16.06, 7.99+/-20.01, respectively, and decreased significantly in post-contrast MRS compared to in pre-contrast MRS ($p<0.001$).

Conclusion

MRS should be obtained before contrast administration not to be affected by Gadolinium contrast agents, however in some lesions localization of VOI on pre-contrast MRI was difficult.

References

- (1) Tozaki M et al. J Magn Reson Imaging 2008; 28: 420-427.
- (2) Sijens PE et al. Magn Reson Imaging 1998; 16: 1273-1280.
- (3) Joe BN et al. Invest Radiol 2005; 40: 405-411.