RE: Differential Diagnosis of Axillary Inflammatory and Metastatic Lymph Nodes in Rabbit Models by Using Diffusion-Weighted Imaging: Compared with Conventional Magnetic Resonance Imaging

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We have read an interesting article by Wang et al. (1), named "Differential Diagnosis of Axillary Inflammatory and Metastatic Lymph Nodes in Rabbit Models by Using diffusion-weighted imaging (DWI): Compared with Conventional Magnetic Resonance Imaging," which was published in the Jul/Aug 2012 issue of the journal. The study included fairly important information that was very useful for us. However, we would like to make a few contributions.

We performed studies to determine the value of DWI to using the value of apparent diffusion coefficient (ADC) in thyroid nodules and masses of breasts and testicular (2-5).

In these studies, DWI provided a significant contribution to the diagnosis. However, accuracy rates were not as we desired. As mentioned in this article, if evaluation is done by using the value of the relative ADC, we think it may improve the accuracy of previous works.

The author mentioned that lymph nodes were homogeneous. However, if the lymph nodes contain calcification, it can create differences in the ADC values. Therefore, ADC measurements should be avoided in areas of calcification (6). These calcifications can be seen more clearly on ultrasound examination than MRI examination. In this article, even without ultrasound correlation, it was able to indicate that the lesions did not include calcifications.

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Response

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We have read the comments elaborated by Dr. Sivrioglu regarding our article named "Differential Diagnosis of Axillary Inflammatory and Metastatic Lymph Nodes in Rabbit Models by Using Diffusion-Weighted Imaging: Compared with Conventional Magnetic Resonance Imaging," which was published in the Jul/Aug 2012 issue of the journal.

We would like to add a few points concerning the comments. We have carefully read the top quality and interesting papers written by Dr. Sivrioglu et al. (1-3).

The animal model in our study is a moderately differentiated squamous carcinoma cell line, which shows a high potential for metastasizing to the regional lymph nodes. Gross pathological results confirmed that all the selected axillary inflammatory and metastatic lymph nodes were homogeneous without visible necrosis, cystic degeneration or calcification.

However, just like Dr. Sivrioglu said, if the lymph nodes contain calcification, necrosis and cystic degeneration, it can create differences in the apparent diffusion coefficient (ADC) values. We would like to share some experience with you on how to avoid areas of calcification, necrosis and cystic degeneration. Generally, the ADC values of the tissues contained calcification, liquefactive necrosis, and cystic degeneration are much lower than those of the solid parts. Though relative ADC (rADC) calculated by the formula $\text{ADC}_{\text{lesion}}/\text{ADC}_{\text{reference site}}$ may decrease the variance of ADC, which is dependent on various factors, such as MR acquisition parameters, magnetic field, location and area of regions of

interest (ROI), patient age, and body temperature, it can't avoid non-solid parts of the tissue. Moreover, we found that not all metastatic lymph nodes were entirely replaced by cancer cells; some of them were partially replaced by cancer cells, resulting in metastatic areas with lower ADC and non-metastatic areas with higher ADC. In this case, we can use another ADC-based criterion (minimum rADC). We assumed that analyzing the "hot spots" with minimum rADC would be more beneficial for detecting malignant nodes, which had only focal infiltration with cancer nests, but the precondition is that we can exclude the regions with minimum rADC is not coagulative necrosis, which usually has restrictive diffusivity and relatively low ADC value. In fact, we think that the norm is applying contrast-enhanced MR, which can precisely determinate the solid part of the tissue, then solid area of ROI of ADC value can be delineated easily according to the contrast-enhanced MR. Taking this path, it can totally avoid visible necrosis, degeneration and calcification, and the measurement of ADC value is more accurate, which may improve the accuracy for discriminating between malignant and benign tumors.

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