Poster PE-9

The Determination of Take-Off Time in Iteration on Dynamic Susceptibility Contrast Agent MR Perfusion Imaging

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목적 : In existing method, the threshold has determined the points to be used in extrapolation and only pre-peak points were used to find t0. However, to reduce error in using this fitting method, in this study, finding t0is considered the correlation between fitting result and each profile in using iteration method. And the proposed method is compared with the existing method.

대상 및 방법 : MRI perfusion experiments were performed on a 1.5T Magnum (Medinus Co., Ltd) scanner. Five healthy volunteers participated in this study. Spin-echo EPI pulse was used (TR/TE = 2000ms/80 ms, FOV = 260 x 260 mm, matrix = 92x128). Concentration-time curve was assumed to be gamma-variate function of Eq. [1]. If we can find the take-off time, t0, graphically, then the model becomes Eq. [2]. When log transformed to, Eq. [3] can be used to fit (log-transformed) data via non-iterative multiple linear regression. In this process, ln(K), b, a are estimated. The take-off time, t0 is found by extrapolating from near-threshold points back to baseline. Then, the most correlated t0value for original data and fitting value was found. Finally this value was applied to fitting algorithm.

$$G = K(t-t0)be-a(t-t0) \text{ or } G = G(K,t,a,b) \quad [1]$$

$$G = K() \ be-a() \quad [2]$$

$$\ln G = \ln K + b\ln()-a() \quad [3]$$

결과 : Figure 1 is the result at white matter. Figure 1 (c) shows standard deviation of errors between existing method and the one proposed from this study at each point. Comparing after t0, each standard deviation of (b) when it is optimal is lower than standard deviation of (a). However, from the result comparison at gray matter, Figure 2 (c) tells that standard deviations of (b) when it is optimal and(a)likewise

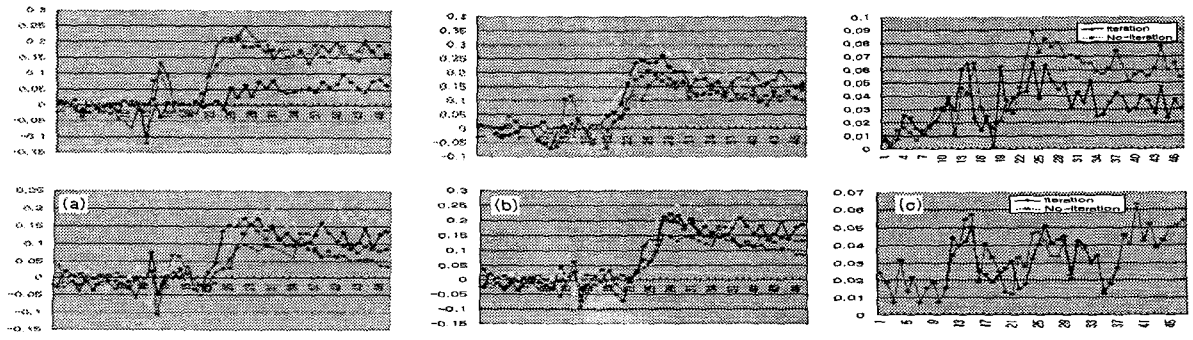

Figure 1. The difference from fitting results at white matter; (a) find t0 with thresholding, (b) find t0 with optimal way, (c) standard deviation of (a) and (b)
Figure 2. The difference from fitting results at gray matter; (a) find t0with thresholding, (b) find t0 with optimal way, (c) standard deviation of (a) and (b)

결론 : To make perfusion parameter maps fixed, two kinds of methods were applied. By comparing those two results, error boundary calculated by the optimal method less error than that of the existing method in white matter. Therefore, optimal method to find t0 could be a good quantification method to make perfusion parameter maps.