عنوان مقاله:

Evaluation of Maximum and Minimum Signal Intensity and the Linear Relationship between Concentration and Signal Intensity in Saturation Recovery T۱-weighted Images by use of a Turbo Fast Low-Angle Shot Sequence

محل انتشار:

مجله فیزیک و مهندسی پزشکی, دوره 10, شماره 4 (سال: 1399)

تعداد صفحات اصل مقاله: 10

نویسنده:

M Nazarpoor - *PhD, Associated Professor of Medical Physics, Department of Biomedical Engineering, Faculty of Health, Tehran Medical Sciences, Islamic Azad University, Tehran, Iran*

خلاصه مقاله:

Background: The relationship between the concentration of contrast agents and signal intensity (SI) are affected by some image parameters, phase-encoding scheme, magnetic field strength, image sequences, and iron oxide nanoparticles used and Gd-DTPA as MRI contrast agents. Objective: In this article, the effect of saturation times (TSs) on the maximum and minimum SI, and also the linear relationship between the concentration of the contrast agent and SI are evaluated. Additionally, we evaluated the concentration of contrast agent that results the minimum SI using a saturation recovery TurboFLASH sequence. Material and Methods: In this experimental study, a phantom was designed to hold vials with different concentrations of Gd-DTPA (۰–۱۹.۷۷mmol/L). The mean SI was acquired from the nine central pixels of every vial at various TSs. Results: This study shows that the maximum SI in an image is dependent on short TSs (up to ۴۰۰ms) and independent of long TSs (۴۰۰–۱۰۰۰ms). The result also shows that the concentration at which a maximum linear relationship between concentration and SI is maintained that gave an R۲ equal to ۰.۹۵ and ۰.۹۹ dependent on the TS. Moreover, the outcome demonstrates that as TS increases, the concentration of the contrast agent decreases. This causes SI to be minimized. Conclusion: This study demonstrated that the TS is a key parameter for measuring the maximum and minimum SI and also TS plays the role in determining the maximum linear relationship between the MRI contrast agent concentration and SI in an in vivo perfusion study.

کلمات کلیدی:

Magnetic Resonance Imaging, Saturation Recovery, T۱-weighted, Signal Intensity, Saturation Time, Perfusion, Gadolinium DTPA