

AbstractID: 7046 Title: Using fast MR imaging techniques to evaluate T1 changes after hyperoxygenation of brain tumor;preliminary result

Purpose: Use fast MR imaging techniques to evaluate T1 changes after hyperoxygenation of brain tumor.

Method and Materials: This study is proceeded on an 1.5 Tesla MRI scanner (Intera, Philips, Netherlands) . A fast spin echo (echo-train-length = 13) inversion recovery MR imaging technique (TR/TE = 5000/90 ms) is used to record the signal changes according to various inversion time (TI = 100, 500, 1000, 1500, 2000 ms) . Each individual scan takes 145 seconds with multiple signal averaged (NSA = 2) , and all five scans require 725 seconds. Obtained images are transferred to a PC-based workstation in DICOM format, and quantitative analysis is performed by self-coded program. Determination of the T1 value of individual pixel is based on the result of iterative nonlinear curve fitting algorithm. For better estimation, the maximum number of iterations is set to 3000, and the computation time is about 30 minutes to complete a T1 map of a single slice of body part. In this preliminary study, one patient with recurrent glioblastoma multiform (GMB) in right temporal lobe underwent open surgery for tumor removal, radiosurgery and chemotherapy is tested using this proposed T1 measurement method twice prior and after 15 minutes oxygen inhalation.

Results: Subtraction of calculated T1 maps shows that T1 values are shortened observed in the area adjacent to post radiosurgery area and prolonged in external side of brain parenchyma.

Conclusion: In this preliminary study, an effectively quantitative technique is established and applied to a patient with recurrent brain tumor. Considerable changes of longitudinal magnetization in multiple areas are observed in subtracted map reflecting the hyperoxygenation procedure. More evidences and related studies are investigated and might provide more information about tissue oxygenation level in the future.