Early changes in tumor perfusion from dynamic contrast enhanced T1-weighted MRI following neural stem cell-mediated therapy of recurrent high grade glioma correlates with overall survival

SUPPLEMENTAL MATERIALS AND METHODS

MRI Scanning protocol

All patients underwent the same DCE-MRI scanning protocol as follows: repetition time/echo time (TR/TE):9.3/4.29ms; flip angle:15°; acquisition matrix 81 × 192; field of view (FOV) 192 × 280 (mm^2); slice thickness 5mm; number of slices 16; number of dynamic phase 50; temporal resolution 5s. At the fifth time point of the DCE-MRI data acquisition, 0.2 mmol/kg body weight of Gd-BOPTA (Multihance, Bracco, Italy) was administered intravenously with a power injector at a rate of 3.5 ml/s, followed by a bolus injection of a 30ml saline flush. Three different flip angle (2°, 5° and 10°) pre-contrast T1-weighted images were acquired for absolute quantification of T_1 relaxation time. The total acquisition time for dynamic scan was 4min 10sec.

Quantification of Perfusion Parameters

Pre-contrast T1 was measured by using pre-contrast T1-weighted images acquired at three different flip angles [1]. Contrast agent concentration time curves were computed voxel-wise using Signal intensity time DCE-MRI data and pre-contrast T1. Automatic arterial input function was extracted by using the algorithm described in [2]. A three-compartment pharmacokinetic leaky tracer kinetic model (LTKM) was fitted to the concentration time curve and fractional plasma volume (V_p), permeability (K^{trans}), leakage (λ^{tr}) were estimated as previously reported [3]. An in-house JAVA-based software was used for all DCE computations.

References

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