Supplementary Materials 3

Image Analysis

The parametric maps derived from DCE and DSC MRI were overlaid (coregistered) with the structural images (e.g., FLAIR and CE T1WI). Subsequently, two reviewers (with 6 and 16 years of experience in neuroradiology, respectively), blinded to the clinical data, manually determined the volume of interest (VOI) for the FLAIR images, which consisted of the contrast-enhancing portion and the non-enhancing, T2-high-signal-intensity (HSI) lesions of the tumor, including the peri-enhancing T2-HSI areas and necrotic (or cystic) regions. The same reviewers manually defined another VOI for the CE T1WI, which also covered the contrast-enhancing areas and necrotic (or cystic) regions. The adjacent non-tumor vessels were meticulously excluded by the reviewers from all VOIs for the FLAIR and CE T1WI. The final VOI, consisting strictly of peritumoral non-enhancing, T2-HSI lesions without necrotic (or cystic) portions, was obtained by subtracting the VOI of the CE T1WI from the VOI of the FLAIR images. To minimize interobserver variability, we performed these manual steps in consensus.

For all axial images, the permeability and perfusion parameters were extracted from the final VOI and aggregated to obtain the sum of all parametric values from the pixels.

Ultimately, for each tumor, the total value of the parameters for the whole non-enhancing, T2-HSI lesions were acquired.