PROCEEDINGS

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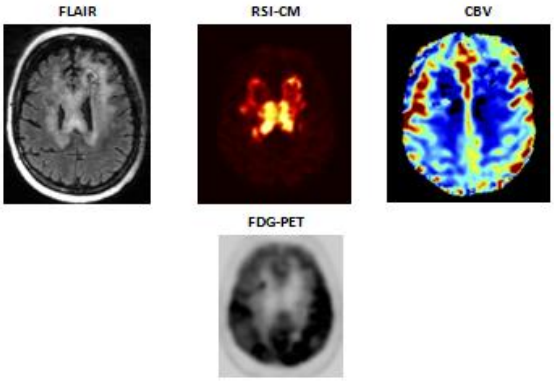
which to differentiate these lesions from viable tumor.
Materials & Methods
Five patients with high-grade glioma and one patient with brain metastasis from NSCLC who developed pseudostroke lesions after the initiation of bevacizumab were included in this study. Five presurgical, treatment-naïve controls with high-grade glioma also were included. Restriction-spectrum imaging (RSI), an advanced DWI technique, was used to create RSI-cellularity maps (RSI-CM) and these were coregistered with CBV maps. Within the pseudostroke lesions, mean RSI-CM intensity values and mean CBV values were calculated and compared to that of the presurgical high-grade gliomas as well as to that of the contralateral NAWM.
Results
Mean RSI-CM intensity values were significantly higher in patients with pseudostroke lesions compared to the treatment-naïve high-grade glioma controls ($p < .05$). Furthermore, mean CBV values were significantly lower in patients with pseudostroke lesions compared to the contralateral NAWM ($p < .01$). Of note, in one patient with a presumed nodule of viable tumor within a large pseudostroke lesion, there was focal increased CBV within this nodule. Histopathologic evaluation of one of the pseudostroke lesions demonstrated necrotic tissue as well as scattered inactive tumor cells.

Fig 1: 45 year old female with GBM who developed a "pseudostroke" lesion which persisted for 11 months after initiation of bevacizumab. Presumed nodule of viable tumor in the right frontal lobe within the pseudostroke lesion which demonstrates elevated CBV and FDG avidity.



Conclusion
When evaluating areas of restricted diffusion in patients with high-grade glioma or brain metastases treated with bevacizumab, one can utilize the RSI-CM intensity values and the CBV values in order to determine whether these areas represent predominantly necrotic tissue related to bevacizumab treatment or viable tumor. Bevacizumab-related restricted diffusion demonstrates RSI-CM intensity values greater than tumor and CBV values lower than the contralateral NAWM.

KEYWORDS: Neoplasm, Diffusion-weighted imaging, MR Perfusion

O-547 **2:19 PM - 2:27 PM**

High-Grade Gliomas and Solitary Metastases: Differentiation by Using Peritumoral Perfusion and Proton Spectroscopic MR Imaging

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Purpose
To evaluate whether peritumoral perfusion-weighted and proton spectroscopic MR imaging can be used in preoperative grading and differentiation of primary gliomas and solitary metastases.
Materials & Methods
Ten low-grade gliomas, eight high-grade gliomas, and five metastases were prospectively evaluated by MR imaging, dynamic susceptibility contrast-enhanced perfusion imaging and single-voxel proton MR spectroscopy before surgical resection or stereotactic biopsy. Normalized rCBV values from peritumoral areas were calculated by using regions of interest (ROIs) of 2cm2 drawn around the nonenhancing peritumoral T2 lesion and the contrast-enhancing lesion. Metabolite ratios were measured from peritumoral areas. Tumor grade determined with normalized rCBV values and MR spectroscopy from peritumoral areas was compared with that from histopathologic grading. A ROC analysis was performed to determine which parameters best increased diagnostic accuracy in grading and differentiation of primary gliomas and solitary metastases.
Results
The mean differences of rCBV values between low-grade gliomas and high-grade gliomas ($P < .001$); high-grade gliomas and metastases ($P < .001$); and low-grade gliomas and metastases ($P < .001$) were significant. A clear rCBV cutoff value of 2.6 was detected for differentiation of low-grade gliomas (1.6) versus high-grade gliomas (3.4). Cutoff rCBV values of 1.1 and 1.98 were quite effective in differentiation of metastases from low-grade gliomas and high-grade gliomas, respectively. The overall efficacy of rCBV was higher in grading than in differentiation. Choline to creatine ratio in the peritumoral regions of high-grade gliomas were significantly higher than they were in the metastases. NAA/Cr tumor ratio of <0.44 has the higher probability for a neoplasm to be a high-grade glioma.
Conclusion
Although conventional MR imaging characteristics of solitary metastases and primary gliomas may sometimes be similar, the peritumoral perfusion-weighted and spectroscopic MR imaging enable distinction between the two. Moreover perfusion-weighted imaging technique is complementary technique for glioma grading.

KEYWORDS: Glioma, Metastases, Perfusion MR Imaging, MR Spectroscopy