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Evaluating Amide Proton Transfer Imaging for Improved Glioma Assessment: Implications for RANO 2.0 Criteria

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Abstract

Objectives: The updated RANO 2.0 criteria acknowledge the limitations of conventional MRI in distinguish tumour progression (TP) from pseudoprogression (PsP) after surgery. Advanced imaging techniques, such as Amide Proton Transfer (APT) imaging, further validating its integration into the RANO 2.0 framework to enhance assessment accuracy.

Methods: This study retrospectively analyzed 75 patients with high-grade gliomas who underwent MRI, including APT imaging. APT imaging was assessed for its ability to differentiate true tumor recurrence from PsP, using various regions of interest (ROIs) to analyze APT signal variations.

Results: APT imaging significantly improved the diagnostic accuracy in distinguishing glioma TP from PsP when compared to conventional MRI alone. Metrics such as APTmax and APTmean demonstrated higher sensitivity and specificity compared to APTmin, validating the integration of APT imaging into the RANO 2.0 criteria by providing valuable insights into tumor metabolism and the microenvironment.

Conclusions: APT imaging is a valuable addition to conventional MRI for postoperative glioma evaluation. supporting its integration into the RANO 2.0 criteria for a more accurate assessment of tumor status and potentially guiding better patient management. Further research is needed to confirm these findings and establish clinical protocols.

Advances in knowledge: This study highlights the potential of APT imaging in enhancing the diagnostic accuracy for distinguishing TP from PsP, demonstrates that APT imaging, particularly when integrated with multimodal MRI (T1WI, T2WI, T2-FLAIR and contrast-enhanced T1WI), improves the sensitivity and specificity of diagnosis.

Keywords: APT Imaging; Multimodal MRI; Pseudoprogression; RANO Criteria; tumour progression.