

# Differentiation of pseudoprogression and tumor recurrence of glioblastoma using amide proton transfer (APT) imaging at 3 Tesla

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## INTRODUCTION:

Pseudoprogression is a major challenge in response assessment of glioblastoma (GBM). Conventional MRI (including FLAIR/T2 and T1 (pre-/post-contrast) images) does not allow a reliable differentiation of pseudoprogression from tumor recurrence [1]. Amide proton transfer weighted (APTw) imaging might help differentiate between pseudoprogression and tumor recurrence in glioblastoma [2].

## METHODS:

28 patients (IDH wildtype GBM) with available APTw imaging in 3T MRI (Philips Achieva) and suspected progressive glioblastoma versus pseudoprogression according to the Response Assessment in Neuro-Oncology (RANO) 2.0 were evaluated [3]. Contrast-enhancing tissue were automatically 3D-segmented on gadolinium enhanced T1w images using the automated segmentation tool "HD-GLIO" [4, 5].

Mean APT signal intensities in the volumes of interest were compared for the groups of patients with pseudoprogression versus patients with tumor recurrences using unpaired t-tests. Evaluation of ground truth (tumor progression vs. pseudoprogression) was assessed via clinical follow-up in accordance with the RANO 2.0 criteria.

## RESULTS:

16 patients with pseudoprogessions and 12 patients with tumor recurrences were identified according to RANO 2.0 criteria. In patients with pseudoprogression the APTw signal was significantly decreased ( $1.79 \pm 0.60$ ) compared to patients with tumor recurrences ( $2.29 \pm 0.87$ ), ( $p = 0.044$ ).

## DISCUSSION:

Our findings are consistent with those of other studies demonstrating that APTw imaging is feasible in a clinical routine setting at 3.0T and can help distinguishing pseudoprogression from tumor recurrence in GBM [2]. As a next step, we aim to expand the study population.

## CONCLUSION:

First results of this ongoing study confirm the APTw imaging to help differentiate between pseudoprogression and tumor recurrence in follow-up examinations of glioblastoma at 3T. Prospective studies investigating the performance of APTw imaging in larger multi-center trials are needed.

## REFERENCES:

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