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# Physical performance decline during exercise therapy as a potential early indicator of glioblastoma recurrence: Preliminary observations from a prospective exercise trial

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Background:
Early detection of glioblastoma (GBM) recurrence remains challenging. In clinical practice, distiguishing true tumor progression from treatment-related changes such as radiation necrosis (pseudoprogression) is difficult. Therefore, complementary markers of early disease activity are of interest. Based on own experiences, we investigated systematically whether documented changes in physical performance during exercise therapy could serve as early indicators of GBM recurrence within a prospective oligocentric intervention trial (ClinicalTrials.gov: NCT05015543) in high-grade glioma (HGG) patients.

Methods:
Patients with HGG undergoing adjuvant chemotherapy participated in a 16-week exercise program. During each endurance training session, workload (W) and heart rate were documented at 2-minute intervals, and exercise intensity was adjusted and recorded accordingly. A preliminary analysis of the first 36 GBM participants assessed whether changes in physical performance patterns were associated with premature study termination due to recurrence.

Results:
7/36 (19%) discontinued the intervention early due to confirmed recurrence (MRI and/or neurosurgery). In 6/7 cases, deterioration in general condition and increasing fatigue preceded radiological relapse. Worsening of preexisting neurological symptoms was observed in 5/7 cases, while new neurological deficits occurred only once. Training documentation showed reduced exercise tolerance requiring downregulation of intensity (4/7 cases), or absence of expected performance improvements despite protocol adherence (2/7 cases). Only one case showed stable performance without symptomatic change prior to MRI-confirmed recurrence.

Conclusion:
Declining physical performance and subtle symptom deterioration during supervised exercise therapy may serve as early indicators of GBM recurrence und could support the challenging distinction between true progression and pseudoprogression. Systematic documentation by trained exercise professionals may facilitate timely clinical evaluation. Upon completion of data analyses, it will be examined thoroughly whether in recurrent GBM patients certain patterns of altered physical performance and symptomatology while exercising are distinct from stable GBM patients.

## Keywords

glioblastoma, exercise oncology, recurrence detection, physical performance

## Conflict of Interest & Ethical Approval

yes

## Abstract submitters declaration

yes

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