Strong adverse prognostic impact of hyperglycemic episodes during adjuvant chemoradiotherapy of glioblastoma multiforme.

Abstract:
In comparison to normal brain tissue, glioblastomas exhibit significantly increased glucose uptake. Brain edema is a common complication during adjuvant chemoradiotherapy, leading to a requirement for glucocorticoid treatment. Glucocorticoid treatment frequently causes considerable deregulation of blood glucose levels. Therefore, episodes of hyperglycemia may contribute to radio- and/or chemoresistance. This study comprises a retrospective analysis of the influence of hyperglycemic episodes (HEs) during adjuvant therapy on the overall survival of 106 glioblastoma multiforme patients. The occurrence of one or more deregulated blood glucose value(s) > 10 mM is associated with a reduction in median overall survival from 16.7 to 8.8 months. A significantly poorer overall survival of patients with hyperglycemia could also be detected in subgroup analyses of patients with complete tumor resection and complete treatment according to the EORTC 22891/26891 trial protocol, as well as in a multivariate Cox proportional hazards analysis. A history of diabetes mellitus had no influence on prognosis. Our data suggest that the observed negative impact of elevated blood glucose levels on overall survival may not solely be explained by the patients’ poorer general condition; the elevated blood glucose concentration itself may...
play a pathogenetic role. This could be due to increased activity of antioxidant systems, elevated expression of DNA damage response proteins and protection of hypoxic tumor cells against apoptosis combined with hypoxia-mediated radioresistance. A possible prognostic impact of elevated blood glucose levels during the period of adjuvant (chemo-) radiotherapy of glioblastoma should be evaluated in a prospective clinical trial.