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Time dependent risk factors for epileptic seizures in glioblastoma patients: A retrospective analysis of 520 cases

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Abstract

Objective: Epilepsy is a common comorbidity of glioblastoma. Seizures may occur in various phases of the disease. We aimed to assess potential risk factors for seizures in accordance with the point of time at which they occurred.

Methods: We retrospectively analysed medical files of adult patients with de novo glioblastoma treated at our institution between 01/2006 and 01/2020. We categorized seizures as preoperative seizures (POS), early postoperative seizures (EPS; before initiation of radio(chemo)therapy, RCT), seizures during radiotherapy (SDR; during or < 30 days after RCT) and post-therapeutic seizures (PTS; ≥ 30 days after completion of RCT). We addressed associations between patients' characteristics and their seizures.

Results: In the final cohort (N = 520), 292 patients experienced seizures. POS, EPS, SDR and/or PTS occurred in 29.6 % (154/520), 6.0 % (31/520), 13.8 % (70/509) and 36.1 % (152/421) of patients, respectively. POS occurred more frequently in patients with higher Karnofsky performance scores (odds ratio (OR) 3.27, p = 0.001) and tumour location in the temporal lobe (OR 1.51, P = 0.034). None of the parameters we analysed was related to the occurrence of EPS. SDR were independently associated with tumour location (parietal lobe, OR 1.86, P = 0.027) and POS, but not EPS, and were independent of RCT. PTS were independently associated with tumour progression (OR 2.32, P < 0.001) and with occurrence of SDR (OR 3.36, P < 0.001), and negatively correlated with temporal lobe location (OR 0.58, p < 0.014). In patients with tumours exclusively located in the temporal lobe, complete tumour resection was associated with a decreased risk of postoperative seizures.

Significance: Seizures in glioblastoma patients have various, time-dependent risk factors. Temporal lobe localisation was a risk factor for preoperative seizures; surgery may have had a protective effect in these patients. RCT did not have dose-dependent pro- or anticonvulsive effects. PTS were associated with tumour progression.