Survival Analysis of Patients with Diffuse Gliomas in Latvia

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Introduction. Grade is the most relevant prognostic factor of gliomas. Patients with glioblastoma (GBM), which is grade IV glioma, have one of the worst prognoses among all cancer cases. Those who survive three and more years after initial diagnosis of GBM are referred to as long-term survivors. Only 2–5% of patients become long-term survivors. Median overall survival (OS) in all GBM patients ranges from 9.7 to 13.6 months. In contrast, diffuse astrocytomas (DAs), known as grade II gliomas, have more indolent behaviour with median overall survival of 5–8 years. Due to widely infiltrative growth of DAs, they typically relapse and can progress to high-grade gliomas over time course.

Aim, Materials and Methods. The aim of the present study was to evaluate survival characteristics in local patients with GBMs and DAs.

The cases were identified by archive search for all consecutive cases (2009–2014) who were subjected to neurosurgical treatment. By this approach, 135 patients diagnosed with glioblastoma (GBM) and 25 patients affected by diffuse astrocytoma (DA) were enrolled in the study. Descriptive statistical analysis was performed including calculation of 95% confidence interval (CI) by CIA software, according to Altman et al., 2000. Survival was evaluated by Kaplan-Meier analysis and log-rank test. In addition, clinical data such as patient's age and tumour's size by magnetic resonance imaging were analysed.

Results. At the conclusive stage of the study, 2/135 (1.5%; 95% CI = 0.0–5.2) patients with GBM were alive, but 133/135 (98.5%; 95% CI = 94.8–99.6) had died during the observation period. The overall median survival time for patients with GBMs was 7.9 months (95% CI = 6.8–9.0). One-year, two-year and three-year survival rate for patients affected by GBM was 36.3%, 9.6% and 1.5%, correspondingly. At the end of the study, 14/25 (56.0%; 95% CI = 37.0–73.3) patients with DAs were alive, but 11/25 (44.0%; 95% CI = 26.6–62.9) had died during the observation period. Because of the small-size study group and a few death cases, the statistical analysis was limited, and overall median survival time could not be calculated for patients with DAs. Within the first year after surgical operation, all patients with DAs were alive (25/25). Two years after the surgery, 3/25 (12.0%; 95% CI = 4.2–29.9) patients had died, but 22/25 (88.0%; 95% CI = 70.0–95.8) were alive. Three years after operation, 5/25 (20.0%; 95% CI = 8.8–39.1) patients had died, but 20/25 (80.0%; 95% CI = 60.9–91.1) were alive. For patients with GBMs, there was statistically significant difference of OS regarding the patient's age (log-rank, $p < 0.001$) and the size of tumour (log-rank, $p = 0.018$). Thus, median OS of patients being ≤ 65 years old was 11.7 (95% CI = 8.1–15.3) months, while median OS of older patients was only 5.0 (95% CI = 3.2–6.8) months. Median OS in patients with tumours < 4 cm and ≥ 4 cm were 11.8 (95% CI = 8.1–15.5) months and 6.8 (95% CI = 4.7–8.8) months, respectively.

Conclusions. GBM patients were characterised by poor prognosis reflected by median overall survival of 7.9 months, which is slightly below the survival time reported in other countries. Only 1.5% of GBM patients are long-term survivors in Latvia. It must be admitted that DA patients had significantly better prognosis. However, at the end of the study, 44% of the observed patients had died. In GBMs, patient's age and size of tumour showed an association with the median OS. Older patients may also have decreased ability to cope with neurological damage caused by glioma, surgery or adjuvant therapy.