Today, the treatment of choice for high- and low-grade gliomas requires primarily surgical resection to achieve the best survival and quality of life. Nevertheless, many gliomas within highly eloquent cortical regions, e.g., insula, rolandic, and left perisylvian cortex, still do not undergo surgery because of the impending risk of surgery-related deficits at some centers. However, pre and intraoperative brain mapping, intraoperative neuromonitoring (IOM), and awake surgery increase safety, which allows resection of most of these tumors with a considerably low rate of postoperatively new deficits. Between 2006 and 2012, we resected 47 out of 51 supratentorial gliomas (92%), which were primarily evaluated to be non-resectable during previous presentation at another neurosurgical department. Out of these, 25 were glioblastomas WHO grade IV (53%), 14 were anaplastic astrocytomas WHO grade III (30%), 7 were diffuse astrocytomas WHO grade II (15%), and one was a pilocytic astrocytoma WHO grade I (2%). All data, including pre and intraoperative brain mapping and monitoring (IOM) by motor evoked potentials (MEPs) were reviewed and related to the postoperative outcome. Awake surgery was performed in 8 cases (17%). IOM was required in 38 cases (81%) and was stable in 18 cases (47%), whereas
MEPs changed the surgical strategy in 10 cases (26%). Thereby, gross total resection was achieved in 35 cases (74%). Postoperatively, 17 of 47 patients (36%) had a new motor or language deficit, which remained permanent in 8.5% (4 patients). Progression-free follow-up was 11.3 months (range: 2 weeks - 64.5 months) and median survival was 14.8 months (range: 4 weeks - 20.5 months). Median Karnofsky Performance Scale was 85 before and 80 after surgery. In specialized centers, most highly eloquent gliomas are eligible for surgical resection with an acceptable rate of surgery-related deficits; therefore, they should be referred to specialized centers.