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A proposed classification system that projects outcomes based on preoperative variables for adult patients with glioblastoma multiforme.

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Object Glioblastoma multiforme (GBM) is the most common and aggressive type of primary brain tumor in adults. Although the average survival is ~ 12 months, individual survival is heterogeneous. The ability to predict short- and long-term survivors is limited. Therefore, the aims of this study were to ascertain preoperative risk factors associated with survival, develop a preoperative prognostic grading system, and evaluate the utility of this grading system in predicting survival for patients undergoing resection of a primary intracranial GBM. **Methods** Cases involving adult patients who underwent surgery for an intracranial primary (de novo) GBM between 1997 and 2007 at The Johns Hopkins Hospital, an academic tertiary-care institution, were retrospectively reviewed. Multivariate proportional hazards regression analysis was used to identify preoperative factors associated with survival, after controlling for extent of resection and adjuvant therapies. The identified associations with survival were then used to develop a grading system based on preoperative variables. Survival as a function of time was plotted using the Kaplan-Meier method, and survival rates were compared using Log-rank analysis. Associations with $p < 0.05$ were considered statistically significant. **Results** Of the 393 patients in this study, 310 (79%) had died as of most recent follow-up (median time from surgery to death 11.9 months). The preoperative factors, independent of extent of resection and adjuvant therapies (carmustine wafers, temozolomide, and radiation), found to be negatively associated with survival were: age > 60 years ($p < 0.0001$), Karnofsky performance status score ≤ 80 ($p < 0.0001$), motor deficit ($p = 0.02$), language deficit ($p = 0.001$), and periventricular tumor location ($p = 0.04$). Patients possessing 0-1, 2, 3, and 4-5 of these variables were assigned a preoperative grade of 1, 2, 3, and 4, respectively. Patients with a preoperative grade of 1, 2, 3, and 4 had a median survival of 16.6, 10.2, 6.8, and 6.1 months, respectively. **Conclusions** The present study found that older age, poor performance status, motor deficit, language deficit, and periventricular tumor location independently predicted poorer survival in patients undergoing GBM resection. A grading system based on these factors was able to identify 4 distinct groups of patients with different survival rates. This grading system, based only on preoperative variables, may provide patients and physicians with prognostic information that may guide medical and surgical therapy before any intervention is pursued.

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