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Multiinstitutional validation of the University of California at San Francisco Low-Grade Glioma Prognostic Scoring System.

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Object Medical and surgical management of low-grade gliomas (LGGs) is complicated by a highly variable clinical course. The authors recently developed a preoperative scoring system to prognosticate outcomes of progression and survival in a cohort of patients treated at a single institution (University of California, San Francisco [UCSF]). The objective of this study was to validate the scoring system in a large patient group drawn from multiple external institutions. Methods Clinical data from 3 outside institutions (University of Utah, Toronto Western Hospital, and University of California, Los Angeles) were collected for 256 patients (external validation set). Patients were assigned a prognostic score based upon the sum of points assigned to the presence of each of the 4 following factors: 1) location of tumor in presumed eloquent cortex, 2) Karnofsky Performance Scale (KPS) Score </= 80, 3) age > 50 years, and 4) maximum diameter > 4 cm. A chi-square analysis was used to analyze categorical differences between the institutions; Cox proportional hazard modeling was used to confirm that the individual factors were associated with shorter overall survival (OS) and progression-free survival (PFS); and Kaplan-Meier curves estimated OS and PFS for the score groups. Differences between score groups were analyzed by the log-rank test. Results The median OS duration was 120 months, and there was no significant difference in survival between the institutions. Cox proportional hazard modeling confirmed that the 4 components of the UCSF Low-Grade Glioma Scoring System were associated with lower OS in the external validation set; presumed eloquent location (hazard ratio [HR] 2.04, 95% CI 1.28-2.56), KPS score </= 80 (HR 5.88, 95% CI 2.44-13.7), age > 50 years (HR 1.82, 95% CI 1.02-3.23), and maximum tumor diameter > 4 cm (HR 2.63, 95% CI 1.58-4.35). The stratification of patients based on scores generated groups (0-4) with statistically different OS and PFS estimates ($p < 0.0001$, log-rank test). Lastly, the UCSF patient group (construction set) was combined with the external validation set (total of 537 patients) and analyzed for OS and PFS. For all patients, the 5-year survival probability was 0.79; the 5-year cumulative OS probabilities stratified by score group were: score of 0, 0.98; score of 1, 0.90; score of 2, 0.81; score of 3, 0.53; and score of 4, 0.46. Conclusions The UCSF scoring system accurately predicted OS and PFS in an external large, multiinstitutional population of patients with LGGs. The strengths of this system include ease of use and ability to be applied preoperatively, with the eventual goal of aiding in the design of individualized treatment plans for patients with LGG at diagnosis.

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