Predicting short-term recurrence and identifying key risk factors in elderly glioma patients: Insights from a retrospective cohort study

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Abstract

Background: Glioma, a prevalent cancer in the elderly, is highly malignant, with a poor prognosis and frequent recurrence, causing significant burden on individuals and society. We aimed to develop pre- and postoperative models for predicting short-term recurrence in elderly glioma patients and investigate associated risk factors.

Methods: Based on our largest known sample size, we retrospectively assessed in great detail patients with gliomas who underwent initial surgical resection and were aged over 60 between 2010 and 2018. Finally, two eligible study cohorts comprising 447 and 463 patients were recruited to develop Logistic regression models and Cox models for predicting short and long-term recurrence or death, respectively. Subgroup analyses were performed based on key molecular markers (MGMT promoter methylation and IDH mutation status) and the IDH-wild-type glioblastoma subgroup.

Results: Preoperative and postoperative predictive models for short-term recurrence or death achieved an accuracy of 0.70 and 0.82, respectively. By utilizing the preoperative model, we effectively classified patients into high, medium, and low short-term recurrence risk groups, with median progression-free survival (PFS) durations of 125, 224, and 370 days, respectively. Several risk factors for short recurrence were identified, including tumors infiltrating the corpus callosum, preoperative muscle weakness and TP53 mutation. Long-term recurrence risk was associated with symptoms such as drowsiness, numbness or tingling, and diminished enjoyment of life, as determined from the MDASI-BT questionnaire. Subgroup analyses revealed that risk factors for recurrence were highly subtype-specific.

Conclusion: Both pre- and postoperative models successfully predict short-term recurrence in elderly glioma patients. Key clinical risk factors, such as tumors infiltrating the corpus callosum and various tumor-related symptoms were identified. Additionally, certain common postoperative physical and psychological symptom changes in the MDASI-BT may be predictive markers for long-term relapse. A crucial finding is that the factors associated with recurrence are distinct across molecular subtypes, underscoring the need for subtype-specific risk management.

Keywords: Cox Proportional Hazards Models; Elderly; Glioma; Logistic Models; tumor recurrence.

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