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The Impact of Extent of Resection on IDH1 Wild-Type or Mutant Low-Grade Gliomas

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Introduction

Accumulating evidence suggests that maximizing extent of resection (EOR) improves outcomes for patients with WHO grade II low-grade gliomas (LGG). However, recent studies demonstrate that LGGs bearing a mutation in the isocitrate dehydrogenase 1 (IDH1) gene are a distinct molecular and clinical entity. It remains unclear whether maximizing EOR confers an equivalent clinical benefit in IDH mutated (mtIDH) and IDH wild-type (wtIDH) LGGs. To answer this question, we evaluated a cohort of patients with surgically-resection WHO grade II gliomas and known IDH1 mutation status, to assess the impact of EOR on malignant progression-free survival (MPFS) and overall survival (OS).

Methods

We performed a retrospective review of 74 patients with WHO grade II gliomas and known IDH mutational status undergoing surgical resection at a single institution. EOR was assessed with quantitative three-dimensional volumetric analysis. The effect of predictor variables on MPFS and OS was analyzed with Cox regression models and the Kaplan-Meier method.

Results

52 (70%) mtIDH patients and 22 (30%) wtIDH patients were included. Median pre-operative tumor volume was 37.4 cm3 (range: 0.9-190.2 cm3). Median EOR was 57.6% (range: 0.08% – 99.3%). Median follow-up was 44.4 months. Malignant progression was identified in 31 patients and 17 patients died. Univariate Cox regression analysis confirmed EOR as a prognostic factor for the entire cohort. However, Cox regression analysis stratified by IDH status demonstrated that a greater EOR independently prolonged MPFS and OS for wtIDH patients (HR = 0.002 [95% CI 0.000 - 0.074] and HR = 0.001 [95% CI 0.00 - 0.108], respectively), but not for mtIDH patients (HR = 0.84 [95% CI 0.17 - 4.13] and HR = 2.99 [95% CI 0.15 - 61.66], respectively).

Conclusions

Increasing EOR confers oncologic and survival benefits in IDH1 wild-type LGGs. However, the impact of EOR on IDH1 mutant LGGs is less significant and requires further study.

Learning Objectives

By the conclusion of this session, participants should be able to:

1) Understand the prognostic implications of an IDH mutation in low-grade gliomas

2) Describe the role of surgery for low-grade gliomas

3) Discuss the nuances in surgical management of IDH mutated vs. IDH wild-type LGGs

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