

The Relationship Between Repeat Resection and Overall Survival in Glioblastoma Multiforme Patients: A Time-Dependent Analysis

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Introduction

The relationship between repeat resection and overall survival (OS) in glioblastoma multiforme (GBM) patients has been the subject of multiple studies. But most investigations ignored timing of repeat resection and may have led to biased conclusions. Statistical methods which take time into account are well-established and applied consistently in other medical fields. Our goal was to illustrate the change in the effect of repeat resection on OS in GBM patients once timing of resection is incorporated.

Methods

We conducted a retrospective study of patients initially diagnosed between January 2005 and December 2014 with GBM treated at our institution. Patients underwent at least one craniotomy with both pre- and post-operative MRI data available. The effect of repeat resection on OS was assessed with time-dependent Cox proportional hazards regression controlling for extent of resection, initial KPS, gender, age, multifocal status, eloquence, and postoperative treatment.

Results

Eighty nine of 163 patients (55%) had repeat resection with a median time between resections of 7.7 months (range:0.5-50.8). Median OS was 18.8 months (95%CI: 16.3-20.5) from initial resection. When timing of repeat resection was ignored, repeat resection was associated with a lower risk of death (HR:0.62, 95%CI: 0.43-0.90,p=.01); however, when timing was taken into account, repeat resection was not associated with improved survival and in fact patients had a higher risk of death (HR:2.19, 95%CI: 1.47-3.28,p<.001).

Conclusions

In our study, accounting for timing of repeat resection reversed its protective effect on OS, suggesting repeat resection may not benefit patients' OS. While caveats pertaining to retrospective studies apply, our findings emphasize the need to account for timing using time-dependent methods in the evaluation of repeat resection on OS.

Learning Objectives

The participant will learn about time-dependent statistical methods and the role of repeat resection of recurrent glioblastoma tumors

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