

Introduction

It is becoming well-established that increasing extent of resection with decreasing residual volume is associated with delayed recurrence and prolonged survival for patients with glioblastoma (GBM). These prior studies are based on evaluating the contrast-enhancing (CE) tumor and not the surrounding fluid attenuated inversion recovery (FLAIR) volume. It therefore remains unclear if resection beyond the CE portion of the tumor translates into improved outcomes for patients with GBM.

Methods

Adult patients who underwent non-biopsy resection of a primary glioblastoma at a tertiary care institution between January 1, 2007 and December 31, 2012 and underwent radiation and temozolomide chemotherapy were retrospectively reviewed. Pre- and postoperative MRI images were measured for CE tumor and FLAIR volumes. Multivariate proportional hazards were used to assess associations with both time to recurrence and death. Values with $p < 0.05$ were considered statistically significant.

Results

245 patients met the inclusion criteria. The median [IQR] preoperative CE and FLAIR tumor volumes were 31.9 [13.9-56.1] cm³ and 78.3 [44.7-115.6] cm³, respectively. Following surgery, the median [IQR] postoperative CE and FLAIR tumor volumes were 1.9 [0-7.1] cm³ and 59.7 [29.7-94.2] cm³, respectively. In multivariate analyses, the postoperative FLAIR volume was not associated with recurrence and/or survival ($p > 0.05$). However, the postoperative CE tumor volume was significantly associated with both recurrence [HR (95%CI); 1.026 (1.005-1.048), $p = 0.01$] and survival [HR (95%CI); 1.027 (1.007-1.032), $p = 0.001$]. The postoperative FLAIR volume was also not associated with recurrence and/or survival among patients who underwent gross total resection of the CE portion of the tumor as well as those who underwent supratotal resection.

Conclusions

In this study, the volume of CE tumor remaining after resection is more important than FLAIR volume in regards to recurrence and survival for patients with GBM.

Learning Objectives

- 1.) Understand the importance of imaging features for patient outcomes
- 2.) Describe the impact of FLAIR resection on recurrence and survival

References

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Figure 1.

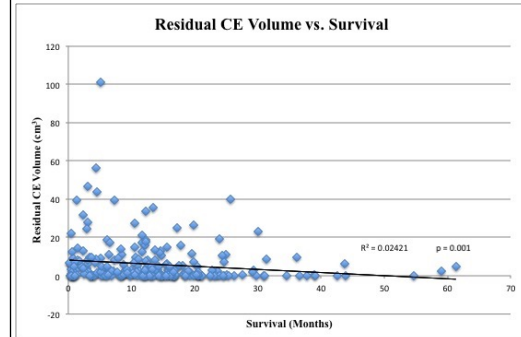


Figure 2.

