Background: Several studies have investigated the prognostic value of pre-operative volumes of abnormal FLAIR signal, tumor enhancement and necrosis in the prediction of patient survival. We seek to explore the role of abnormal FLAIR signal as a prognostic biomarker in immediate post-resection Magnetic Resonance Imaging (MRI) scans.

Methods and Materials: We obtained pre-operative and immediate post-operative MRI of 60 GBM patients available on The Cancer Imaging Archive (TCIA) and in our institution's imaging archive. We used 3D Slicer 4.3.1 software for volumetric quantification of tumor compartments. Two trained neuroradiologists delineated peritumoral edema/invasion using T2 FLAIR sequence. Pre-operative tumor enhancement and necrosis were segmented using post-contrast T1 Weighted Images (T1WI). Post-operatively, we used immediate post-operative T2 FLAIR sequence (24-72 hours post-resection) for volume quantification of pericavitary edema/invasion. We used Kaplan-Meier curves for survival analysis. We included the volumes of pre-operative and post-operative scans independently and in groups and subgroups. The association between the quantitative variables and patient survival were performed using multivariate Cox regression analysis.

Results: Post-operative absolute volumes and ratios of pre-operative to post-operative volumes are correlated with patient overall survival and progression-free survival.

Conclusion: Immediate post-operative volume of abnormal FLAIR signal can be used as a prognostic imaging biomarker.