Assessment of Surgeon's Attitude Regarding Resectabilty of Glioblastoma: A Pilot Study

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Introduction

Extent of resection (EOR) of glioblastoma correlates with outcome. Factors such as resection goal, presence and resectability of residual tumor might affect EOR. Resectability of residual tumor could influence outcome independently of the amount of residual. Nevertheless, these issues remain understudied.

Learning Objectives

In spite of the importance of extent of resection for glioblastoma, the surgeon's decision-making process regarding the goal of surgery, the assessment of presence and resectability of residual disease remain poorly understood. We developed and tested a novel approach to investigate determinants of resectability of glioblastoma.

Table 1

Anatomical Involvement	Left		Right	
	n	%	n	%
Basal ganglia/internal capsule	4	20%	5	25%
Brainstem	0	0%	1	5%
Calcarine visual cortex	1	5%	1	5%
Corpus callosum	3	15%	3	15%
Sensorimotor strip	1	5%	1	5%
Inferior frontal	3	15%	1	5%
Inferior parietal	1	5%	2	10%
Superior temporal	5	25%	3	15%
Thalamus	1	5%	3	15%
Middle cerebral artery	3	15%	1	5%
Frontal	5	25%	5	25%
Temporal	6	30%	7	35%
Parietal	1	5%	4	20%
Occipital	1	5%	1	5%

Patient anatomical characteristics.

Methods

Utilizing a novel software package we queried twelve academic tumor neurosurgeons to determine their surgical goal and assessment of EOR for patients with newly diagnosed glioblastoma. DICOM-formatted MRI and clinical vignettes were supplied for each patient, and answers to categorical questions were electronically obtained. Goal of surgery including gross total resection (GTR), subtotal resection (STR) or biopsy (Bx), and reasons for STR or Bx were investigated.


Figure 1
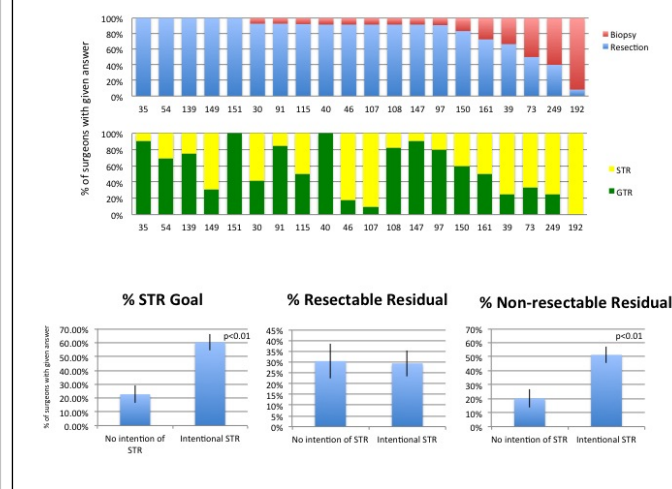
Presence and resectability of residual tumor were also explored. The highly selected patient cohort included 2 patients who underwent Bx, 8 who underwent intentional STR, and 10 patients who underwent planned gross total resection GTR (n=20) (Table 1 for radiographical patient characteristics). Inter-rater reliability was assessed with Fleiss' Kappa and intra-class correlation.

Results

In this highly curated data set, variation among surgeons' responses showed fair inter-rater reliability for goal of surgery (Kappa= 0.286,ICC=0.435) as well as presence and resectability of residual disease (Kappa= 0.291,ICC=0.446). STR goal predicted intraoperative decision of intentional STR documented on operative notes (T-test p<0.01), and non-resectable residual (T-test p<0.01), but not resectable residual (Figure 1). GTR goal correlated with the fraction of surgeons calling GTR or resectable residual on postoperative MRI (T-test p<0.01) (Figure 2).

Figure 2
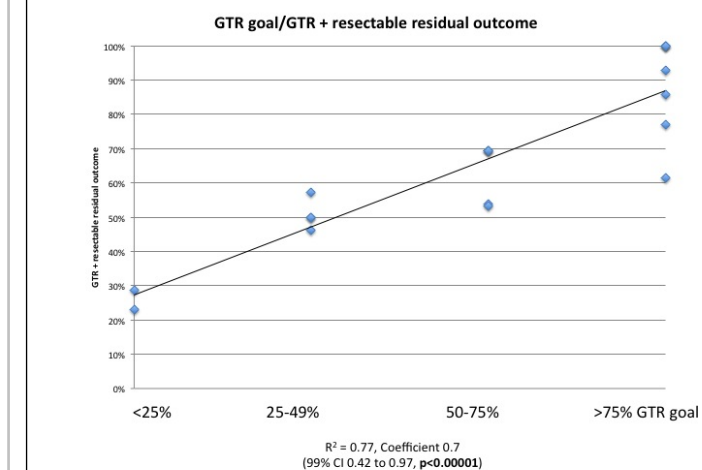
Conclusions

This pilot study demonstrates the feasibility of investigating factors influencing resectability and surgical goals for glioblastoma, as well as resectability of residual disease. In this highly curated dataset, surgeon's goals correlated well with intraoperative decisions of EOR, and EOR outcomes. Additional patients and surgeons might allow investigation EOR determinants and reproducibility of this surgery. This approach might prove useful for control/stratification of resectability-related confounders of clinical outcomes within clinical trials for glioblastoma.