

## Introduction

Insular gliomas are challenging tumors to surgically resect due to the anatomy surrounding them. This study evaluates the role of extent of resection (EOR) and molecular markers on surgical outcome and survival for insular gliomas.

## Methods

Seventy-four patients who had undergone an initial resection for an insular glioma by the same surgeon from 2006 to 2016 were analyzed. Low (grade II) and high (grade III/IV) grade gliomas were analyzed for the prognostic role of volumetric EOR and molecular markers (IDH1 mutation, 1p/19q codeletion) on patient survival outcomes.

## Results

The cohort includes 25 low grade gliomas (LGGs) patients (33.8%), and 49 high grade glioma (HGGs) patients (66.2%). The median EOR was 91.7% (range 10-100%). New permanent postoperative deficits were found in 2.7% of patients. LGG patients with a  $\geq 90\%$  EOR had a 5-year survival rate of 100% and patients with a  $< 90\%$  EOR had 5-year survival of 80%. HGG patients with a  $\geq 90\%$  EOR had a 2-year survival rate of 83.7%, and patients with a  $< 90\%$  EOR had 2-year survival of 43.8%. For LGGs, accounting for EOR, IDH1 mut, 1p/19 codeletion, the EOR was predictive of OS ( $p=0.017$ ), progression free survival (PFS,  $p=0.039$ ), and malignant progression free survival (MPFS,  $p=0.014$ ), while the 1p/19q co-deletion was predictive for PFS ( $p=0.014$ ). For HGGs, the EOR was predictive of OS ( $p=0.020$ ) and PFS ( $p=0.024$ ). Preoperative tumor volume was a factor that most significantly affected the EOR for insular gliomas ( $R^2=0.053$ ,  $p=0.048$ ).

## Conclusions

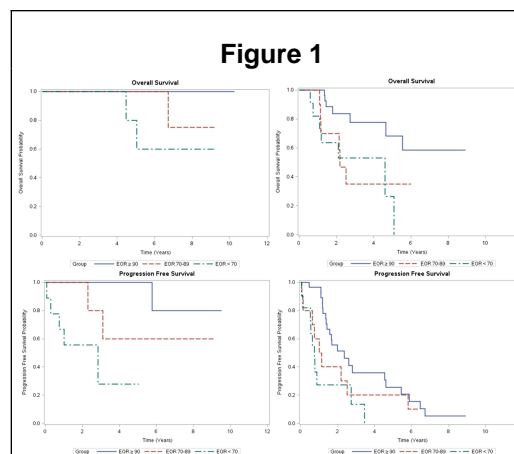
Extensive resections of insular gliomas can be achieved with low morbidity and can improve OS and PFS. In this series of low-grade gliomas, EOR was associated with longer MPFS, and the 1p/19q co-deletion was predictive of PFS.

## Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the importance of extent of resection for insular gliomas, 2) Understand the prognostic implications of molecular markers for insular gliomas and their role with extent of resection

## References

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- Wang Y, Wang Y, Fan X, et al. Putamen involvement and survival outcomes in patients with insular low-grade gliomas. *J Neurosurg*. 2016;1-7.
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Kaplan-Meier curves showing the overall survival in patients with Grade II (top left) and Grade III/IV (top right) insular gliomas, stratified by Extent of resection (EOR).

Kaplan-Meier curves showing the progression free survival in patients with Grade II (bottom left) and Grade III/IV (bottom right) insular gliomas, stratified by Extent of resection (EOR). For the purposes of visual display, patients were grouped by EOR 90, 70-89%, and less than 70%.

**Table 1-3**

**Table 1:** Univariate analyses of survival outcomes in patients with insular low grade gliomas\*. EOR, IDH1 mutation, and 1p19q codeletion are significant factors for OS and PFS.

Factor	p Value, PFS	p Value, OS	p Value, MPFS
Extent of resection	<b>0.028</b>	<b>0.054</b>	<b>0.014</b>
Age	0.349	0.278	0.919
Sex	0.627	0.597	0.932
Preoperative seizures	0.354	0.922	0.896
Preoperative KPS	0.863	0.556	0.914
Left Side-tumor	0.212	0.811	0.375
Preoperative Tumor Volume	0.598	0.176	0.314
Putamen involvement	0.308	0.715	0.185
IDH1 mutation	<b>0.076</b>	<b>0.093</b>	0.548
1p19q codeletion	<b>0.039</b>	<b>0.095</b>	0.261

**Table 2:** Multivariate analysis (Cox proportional hazards model) of survival outcomes for low grade gliomas\*. EOR and 1p19q codeletion are significant factors for PFS in the multivariable analysis, while EOR is a significant factor for OS in the multivariable analysis.

Factor	PFS			OS		
	p Value	HR	95% CI	p Value	HR	95% CI
Extent of Resection	<b>0.017</b>	0.949	0.900-0.991	<b>0.039</b>	0.882	0.783-0.994
IDH1 mutation	0.081	0.163	0.021-1.251	0.738	0.088	0.054-1.531
1p19q codeletion	<b>0.014</b>	0.029	0.002-0.491	0.546	1.602	0.091-1.993

**Table 3:** Univariate analyses of survival outcomes in patients with insular high grade gliomas\*. EOR is a significant factor for PFS and OS.

Factor	p Value, PFS	p Value, OS
Extent of resection	<b>0.024</b>	<b>0.020</b>
Age	0.412	0.287
Sex	0.577	0.316
Preoperative seizures	0.804	0.826
Preoperative KPS	0.394	0.229
Left Side-tumor	0.811	0.385
Preoperative Tumor Volume	0.913	0.936
Putamen involvement	0.723	0.360
Oligodendroglioma	0.702	0.882

KPS, Karnofsky Performance Status, \*Red indicates significance ( $p < 0.15$  univariate,  $< 0.05$  multivariate)

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