

## Resection of Gliomas Initially Deemed to be Inoperable

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### Introduction

Surgeons and referring physicians may, on the basis of radiologic studies alone, assume a glioma to be unresectable. Because imaging studies, including functional MRI, may not localize eloquent areas with high fidelity, this simplistic approach excludes some patients from what could be a safe resection. Intraoperative direct electrical stimulation (DES) accurately localizes functional areas, thereby enabling maximal resection of tumors. Here we describe the extent of resection and functional outcomes following resections of tumors deemed inoperable at outside hospitals.

### Methods

We retrospectively examined the cases of 58 adult patients who underwent glioma resection within six months of undergoing a brain biopsy of the same lesion at an outside hospital. All patients exhibited unifocal, supratentorial disease, and pre-operative Karnofsky Performance Scale scores = 70. We characterized the extent of resection and six-month functional outcomes for this population.

### Results

Intraoperative DES mapping was performed on 96.6% of patients (56 of 58). Overall, the mean extent of resection was 87.6%  $\pm$  13.6% (range, 39.0% to 100%). Gross total resection (resection of >99% of the pre-operative tumor volume) was achieved in 29.3% of patients (17 of 58). Sub-total resection (95-99% resection) and partial resection (<95% resection) were achieved in 12.1% (7 of 58) and 58.6% of patients (34 of 58), respectively. Six months after surgery, no patient exhibited a new post-operative neurologic deficit. Most patients (87.9%, 51 of 58) were free of neurologic deficits both pre- and post-operatively. The remainder of patients exhibited either residual but stable deficits (5.2%, 3 of 58), or complete correction of pre-operative deficits (6.9%, 4 of 58).

### Conclusions

The use of DES enabled maximal safe resections of gliomas deemed inoperable by referring neurosurgeons. With rare exceptions, tumor resectability cannot be determined solely by radiologic studies.

### Learning Objectives

To understand 1) concept of glioma resectability, and, 2) use of direct electrical stimulation for aiding glioma resection.

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