

Are You Awake? An Assessment of Intraoperative Wakefulness During Awake Craniotomy and Predictors of Language Deterioration

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#### Introduction

Glioma resection in functional areas via awake craniotomy leads to improved survival while preserving HRQoL. However, successful completion of the most commonly used asleepawake-asleep approach is at times complicated by the lingering effects of IV anesthetic agents. There are no objective measures of wakefulness following complete removal of all anesthetic drugs outside of clinical observations. In this study we examine completion of a brief cognitive battery assessing wakefulness and determine associations between wakefulness and intraoperative language task performance.

### Methods

Twenty-five patients with dominant hemisphere low and high-grade gliomas received a baseline training set of five wakefulness and two language tasks (picture naming and text reading) 24 hours prior to surgery. These tasks were then repeated the following day during awake craniotomy after fifteen minutes of stoppage of any anesthetic drugs. The Quick Aphasia Battery was used to score all language trials. Nonparametric statistical analysis was performed to assess for any fluctuations in task performance and the relationship between intraoperative wakefulness task performance and linguistic functioning.

## Results

The complete wakefulness battery was completed over a mean 3.2 minutes after sedation was discontinued for a mean 22.7 minutes. Patient self-reporting of level of arousal revealed no differences between baseline and intraoperative assessments (4.71 vs. 5.38, p>.05). Wakefulness task performance declined intraoperatively across domains including button pressing (19.3 vs 14.0 presses, p<.01), counting (8.0 vs 10.1 seconds to completion, p<.01), and vigilance (89.8% vs 77.9% accuracy, p<.05). Both picture naming (3.70 vs 3.30, p<.05) and text reading (3.98 vs 3.87, p<.05) performance declined in the intraoperative sessions. Rapid counting independently predicted a decline in intraoperative language task performance from baseline (p < .05, r-squared = 0.31).

# Conclusions

Subjective arousal ratings (the current standard) are not reliable indicators of wakefulness during awake craniotomy. Wakefulness assessments such as rapid counting are more accurate predictors of intraoperative performance.

## **Learning Objectives**

1. To assess the reliability of self-reported arousal ratings in predicting wakefulness

2. To determine if language is persistently depressed during awake craniotomy

3. To assess the ability of a brief cognitive battery to predict changes in linguistic functioning

### References

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