

Delayed Ischemic Complications in Glioma Surgery: The Role of Modern Intra-operative Imaging Techniques

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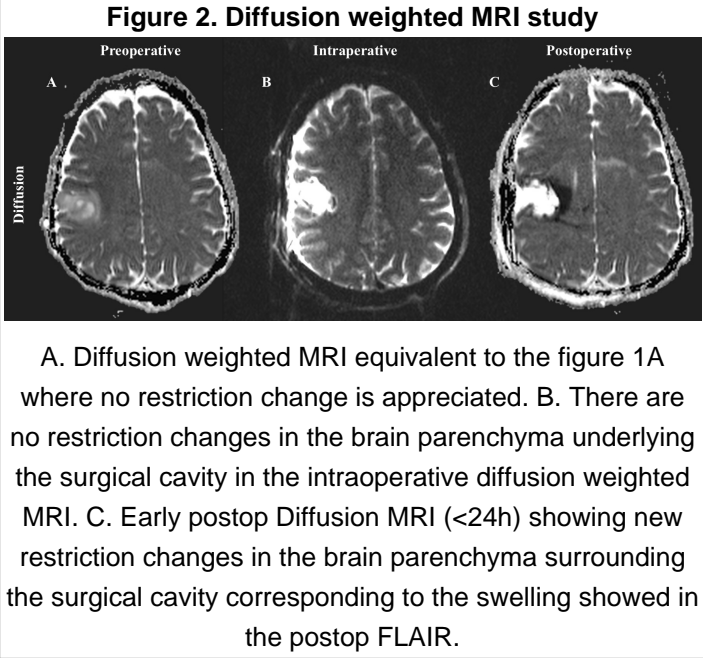
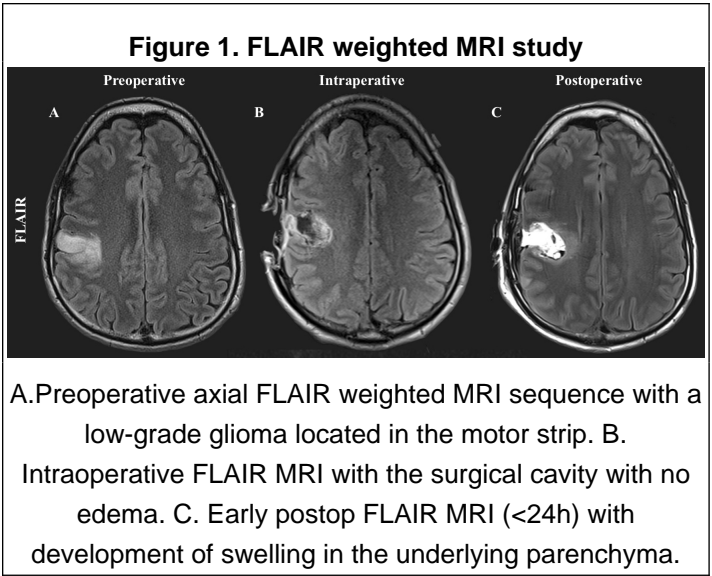
Introduction

Glioma surgery is often associated with evidence of perioperative areas of possible ischemia. These areas are best outlined by restricted diffusion in diffusion weighted magnetic resonance sequences (DW-MRI). These events may have been overlooked in the past as a possible cause of perioperative morbidity.

The introduction of the intraoperative magnetic resonance imaging (iMRI) into the neurosurgical practice has offered an additional tool for understanding etiologies of these events.

Methods

We present a series of glioma patients in which iMRI was obtained at the time of the tumor resection. Based on these patients, we performed a retrospective analysis of the findings related to presumed perilesional ischemia with DW-MRI.



Results

48 patients underwent glioma (20 WHO grade II, 17 grade III and 11 grade IV) resection surgery using iMRI. New restricted diffusion changes were seen in 3 patients (6%) at the iMRI and 23 patients (48%) at the immediate post-operative MRI (<48 hours of surgery). 25 patients had new clinical post-operative deficits and 11 (48%) both clinical and radiological simultaneous changes. Complete resolution of the radiological lesions at follow-up happened in 18 (78%) cases, with an average resolution time of 80 ± 52 days. Patients who received pre-operative chemotherapy had significantly more post-operative diffusion changes Vs the counterpart ($p=0.02$). There were no statistical differences between patients who developed restricted diffusion and those who did not in regards to age, sex, WHO grade, preop KPS, preop tumor volume, reoperation, side, use of brain retractors, Ojemann, and awake surgery.

Conclusions

Our data suggest that the iMRI is an important tool in not only assessing the radicality of tumor resection but can also predict the extent of the postoperative presumed ischemic changes around the surgical cavity. These events most often developed in a delayed fashion thus attesting to their likely venous-mediated mechanism. In addition, those are frequently transient.

Learning Objectives

By the conclusion of this session, participants should be able to recognize the relevance of intra-operative imaging sequences in understanding the mechanism of new post-operative ischemic areas after glioma surgery.

References

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