Characterization of the Supplementary Motor Area Syndrome and Seizure Outcome Following Medial Frontal Lobe Resections in Pediatric Epilepsy Surgery

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Introduction

Surgery remains a cornerstone of multimodal management of children with medically intractable epilepsy. In adults, resection in the medial frontal lobe has been shown to result in the Supplementary Motor Area (SMA) syndrome, a disorder characterized by transient motor impairment. Studies examining the development of SMA syndrome in children, however, are wanting.

Methods

39 patients who underwent surgery in the region of the medial frontal lobe for medically intractable epilepsy at St. Louis Childrens Hospital and Cincinnati Childrens Hospital Medical Center were retrospectively reviewed. The progression of neurological impairment and seizure outcome following surgery was recorded, and the extent of cortex resected was analyzed based on radiographic studies pre- and post-operatively.

Results

Following surgical resection in the medial frontal lobe, 17 (44%) patients developed SMA syndrome. No neurological impairment was found following surgery in 16 (41%) patients. The majority (82%) of patients who developed SMA syndrome had resolution of their symptoms by 1-month postoperatively. Resolution of SMA syndrome was not significantly related to patient demographics, clinical profile, pathology found, use of invasive monitoring, or surgery type. Preoperative MRI finding of lesional cases was found to be associated with a significantly decreased likelihood of developing SMA syndrome. Seizure outcome was favorable (Engel class I/II) following surgery in most patients (90%) and remained largely unchanged over the follow-up period.

Conclusions

Surgery for medically intractable epilepsy in the region of the medial frontal cortex is effective and associated with reversible neurological impairment in children.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the natural history of SMA syndrome in post-operative pediatric patients, and 2) Identify more accurately patients at high risk of post-operative SMA syndrome.