Transmantle sign (TMS) in cortical dysplasia: a unique radiologic entity with excellent prognosis for seizure-control

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Introduction

Focal Cortical Dysplasia (FCD) represents a spectrum of developmental cortical abnormalities and is one of the most common causes of intractable epilepsy in children and young adults. Outcomes after surgery for FCD are highly variable, and prognosticators of seizure freedom are unclear. In some FCDs, a transmantle sign (TMS) can be observed on imaging to focally span the entire cerebral mantle from the ventricle to the cortical surface.

Methods

We report 14 patients with TMS who underwent epilepsy surgery for medically refractory epilepsy. 13 patients underwent resective surgery and one had multiple subpial transections (MST) with vagus nerve stimulator insertion (VNS). Patient demographics, magnetic resonance imaging (MRI), electroencephalography (EEG), intraoperative electrocorticography (ECoG) and pathology were reviewed.

Results

All patients had childhood seizure onset, and concordant MRI and ECoG findings. The primary MRI findings associated with TMS include grey-white junction blurring, appearance of cortical thickening, T2 or FLAIR abnormality, and bottom-of-the-sulcus dysplasia. The TMS was usually a focal finding, usually confined to one or several gyri with well-circumscribed epileptic tissue. ECoG sensitivity detects abnormal tissue which sometimes extends beyond the MRI lesion. Correlation to FCD histopathological subtypes was variable and inconclusive. Patients who had complete resection of MRI and ECoG abnormalities (12/13 patients) became seizure-free. Patient who underwent MST and VNS did not achieve seizure-freedom. Comparison to our previously-published series on surgery for FCD patients showed that resective surgery for FCD with TMS have significantly improved seizure-free outcomes (p=0.045).

Learning Objectives

By the conclusion of this session, participants should be able to: 1) describe the features of the transmantle sign on MRI, 2) understand its prognostic value in epilepsy surgery, and 3) recognize that complete resection of radiographic and electrographic areas of abnormality in TMS is highly predicative of seizure control.

Conclusions

The transmantle sign is a unique feature seen in cortical dysplasias, and is particularly amenable to surgical treatment with highly favorable seizure control outcomes.