



# Research Week 2020

## MEG as a predictor of the epileptogenic zone in patients being evaluated for epilepsy surgery

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### Keywords

MEG, Magnetoencephalography, epilepsy

### Abstract

#### Background

Magnetoencephalography (MEG) measures cortically-generated magnetic fields and creates a map of current dipoles that is overlaid on Magnetic Resonance Imaging (MRI) images of the brain in order to predict the epileptogenic zone. It is a part of the armamentarium of diagnostic tests available in the presurgical workup in patients with pharmaco-resistant focal epilepsy. Its efficacy and reliability in providing results concordant with other diagnostic studies and identifying additional epileptogenic foci is well-described in the literature. OHSU does not currently possess MEG as a diagnostic tool, requiring patients recommended for MEG evaluation to travel to out-of-state medical centers, often at significant personal cost.

#### Objective

To determine whether the spatial distribution of spike sources determined by MEG provides reliable information compared to intracranial electroencephalography (EEG) for planning surgery and predicting outcomes in patients with medically refractory epilepsy at OHSU.

#### Methods

8 adult patients with medically refractory epilepsy treated at OHSU who had undergone MEG were retrospectively identified and included in this analysis. The results from MEG were compared to intracranial EEG (iEEG) results to determine if MEG studies predicted the seizure onset zone, which was subsequently confirmed with iEEG studies conducted for surgical planning.

#### Results

MEG predicted epileptogenic foci in 6 of 8 patients evaluated. 1 patient did not undergo iEEG due to lack of definitive localization from various noninvasive imaging studies

(including MEG). 1 additional patient did not have any detectable epileptiform activity during MEG.

#### Conclusion

MEG is a useful, non-invasive imaging modality that has potential to aid in localization of epileptogenic foci. This case series presents MEG's efficacy in aiding the localization of epileptogenic foci in a limited cohort of patients. Utilization of MEG technology increases OHSU's diagnostic capabilities and has the potential to improve chances of definitive epilepsy therapy.

