

# 207 – Poster presentation

**An Assessment of the Influence of Lesion Volume, Perilesional Resection Volume and Completeness of Resection on Seizure Outcome Following Surgery for Resection of Cortical Dysplasia in Children**

*Chima Oluigbo, John S. Myseros, Suresh N. Magge, Robert F. Keating, W.D. Gaillard*  
Washington, DC

Introduction

Focal cortical dysplasia (FCD) is one of the most common causes of intractable epilepsy leading to surgery in children. The predictors of seizure freedom following surgical management for FCD are still unclear. The objective of this study is a volumetric analysis of factors in the pre and post resection brain MRI scans of patients who had undergone resective epilepsy surgery for cortical dysplasia and the influence of these factors on seizure outcome

Methods

The medical records and brain imaging scans of forty three consecutive patients who had undergone surgical treatment for refractory epilepsy with focal MRI abnormalities and pathological diagnosis of FCD were reviewed. Preoperative lesion volume and postoperative resection volume were calculated by manual segmentation using Osirix-Pro software.

Results

Forty three patients underwent first time surgery for resection of cortical dysplasia. The age range at the time of surgery was 2 months to 21.8 years with a mean age of 7.3 years. Median duration of follow-up was 20 months. Mean age of onset was 31.6 months and a range of 1 day to 168 months. Complete resection of the area of focal cortical dysplasia as adjudged from the postoperative brain MRI scan was significantly associated with seizure control ( $p = 0.0005$ ). Seizure control was not significantly associated with lesion volume ( $p = 0.46$ ) or peri-lesional resection volume ( $p = 0.86$ )

Conclusions

Completeness of resection of radiological abnormality is a significant predictor of seizure freedom following resection of FCD in children. Lesion volume or further resection of perilesional tissue are not predictive of seizure freedom.

# 208 – Poster presentation

**Precision of Robotic Depth Electrode Placement for Stereotactic EEG**

*Nitin Tandon*  
Houston, TX

Introduction

Stereo-electroencephalography (SEEG) is a minimally invasive, robust and precise method of localizing focal medically intractable epilepsy. Recently, a robot specifically designed for stereotaxis, has been available for SEEG electrode placement in the USA. The accuracy of this system in the clinical environment has never previously been validated.

Methods

The SEEG implantation plan was arrived at after a comprehensive review of the non-imaging data and after an in-depth discussion of the hypothesized region/s of seizure onset. Pre-operatively, T1 weighted MRI scans with contrast with 1x1x1 resolution were obtained. Planning of entry and target points was performed using robotic stereotactic software (ROSANNA). 5 skull fiducials were placed in each patient and a volumetric contrasted CT scan was obtained and co-registered with the MRI scan. The ROSA robot was registered to the skull fiducials and SEEG electrodes (PMT) were implanted. A volumetric CT scan was obtained post implantation and also registered to the planning MRI scan to measure deviations from the plan. The lateral deviation of each electrode at the entry point and at the target point was measured and compiled. The surgical time of electrode placement was also computed.

Results

Over 9-months, 200 SEEG electrodes were placed in 16 patients. There were no complications associated with electrode placement. Close review of the post-op imaging did not show any hemorrhages. The mean lateral error at the entry point was 0.64 mm (stdev 0.54) and at the target it was 1.10 mm (stdev 0.97). In all but 15 electrodes (7.5%), the error at the target was less than 2.5 mm. Average time for implanting each electrode was just under 9 minutes.

Conclusions

Robotic SEEG is a precise and rapid strategy for implanting electrodes for intracranial monitoring to pinpoint seizure foci. The use of skull fiducials may enable more precise placement than other registration techniques.