Focal cortical dysplasia treatment

- Focal Cortical Dysplasia in an Infant With Aplasia Cutis Congenita: A Case Report
- Stereoelectroencephalography-guided radiofrequency thermocoagulation for drug-resistant epilepsy: A meta-analysis
- Imaging Epilepsy: Past, Passing, and to Come
- Malformations of cortical development: Embryology and epilepsy
- Ablation of dysmorphic neurons is a safe and effective treatment for focal cortical dysplasia II
- Clinical Findings in Temporal Lobe Epilepsy Associated With Isolated Amygdala Enlargement
- mTORopathies in Epilepsy and Neurodevelopmental Disorders: The Future of Therapeutics and the Role of Gene Editing
- Magnetic Resonance-guided Laser interstitial thermal therapy (MR-gLiTT) in Pediatric Neurosurgery: italian perspective and literature review

---

A leading cause of surgically remediable, drug-resistant focal epilepsy is focal cortical dysplasia (FCD).

Proof of a specific effect of antiepileptic drugs (AEDs) in Focal cortical dysplasia (FCD) is lacking. Pathogenic mutations recently described in mammalian target of rapamycin (mTOR) genes in FCD have yielded important insights into novel treatment options with mTOR inhibitors, which might represent an example of personalized treatment of epilepsy based on the known mechanisms of disease. The ketogenic diet (KD) has been demonstrated to be particularly effective in children with epilepsy caused by structural abnormalities, especially FCD. It attenuates epigenetic chromatin modifications, a master regulator for gene expression and functional adaptation of the cell, thereby modifying disease progression. This could imply the lasting benefit of dietary manipulation. Neurostimulation techniques have produced variable clinical outcomes in FCD. In widespread dysplasias, vagus nerve stimulation (VNS) has achieved responder rates >50%; however, the efficacy of noninvasive cranial nerve stimulation modalities such as transcutaneous VNS (tVNS) and noninvasive (nVNS) requires further study [1)].

Surgery

Focal cortical dysplasia surgery.

Non-invasive treatment

Experiments conducted with mammals detailing rapamycin gene mutations in FCD have produced vital information for exploring treatment options using mTOR inhibitors. Of note is the importance of KD in children with FCD. This diet has been shown to modify disease progression by attenuating chromatin modification, a master regulator for gene expression and functional adaptation of the cell. FCD has also been studied widely with neurostimulation techniques. The outcomes of these techniques have been found to be variable. For widespread dysplasias, VNS has been shown to produce responder rates of >50%. Nevertheless, non-invasive cranial nerve stimulation techniques such as transcutaneous VNS and non-invasive VNS are gaining better patient compatibility, albeit

their efficacy remains to be established [2].

Outcome

MR-negative and positive FCD patients had a comparable surgical prognosis, suggesting that comprehensive presurgical evaluations, including multimodal neuroimaging studies, are crucial for obtaining excellent surgical outcomes even in epilepsy patients with MR-negative FCD [3].

1)
Guerrini R, Duchowny M, Jayakar P, Krsek P, Kahane P, Tassi L, Melani F, Polster T, Andre VM, Cepeda C, Krueger DA, Cross JH, Spreafico R, Cosottini M, Gotman J, Chassoux F, Ryvlin P, Bartolomei F, Bernasconi A, Stefan H, Miller I, Devaux B, Najm I, Giordano F, Vonck K, Barba C, Blumcke I. Diagnostic methods and treatment options for focal cortical dysplasia. Epilepsia. 2015 Nov;56(11):1669-86. doi: 10.1111/epi.13200. Epub 2015 Oct 5. PMID: 26434565.
2)
Wang TT, Zhou D. Non-invasive treatment options for focal cortical dysplasia. Exp Ther Med. 2016 May;11(5):1537-1541. Epub 2016 Feb 22. PubMed PMID: 27168769; PubMed Central PMCID: PMC4840718.
3)
Seong MJ, Choi SJ, Joo EY, Shon YM, Seo DW, Hong SB, Hong SC. Surgical outcome and prognostic factors in epilepsy patients with MR-negative focal cortical dysplasia. PLoS One. 2021 Apr 14;16(4):e0249929. doi: 10.1371/journal.pone.0249929. PMID: 33852634.