Issue 3

Atlas of MRI in Epilepsy

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Atlas of MRI in Epilepsy

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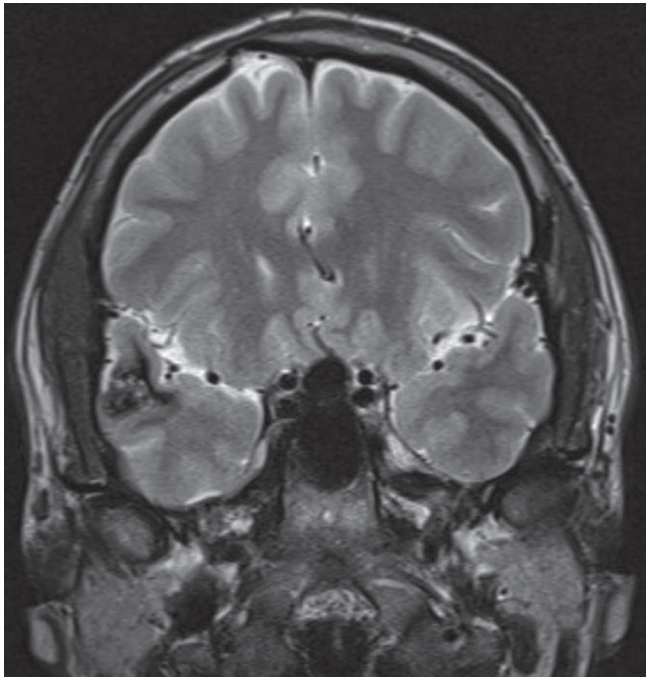
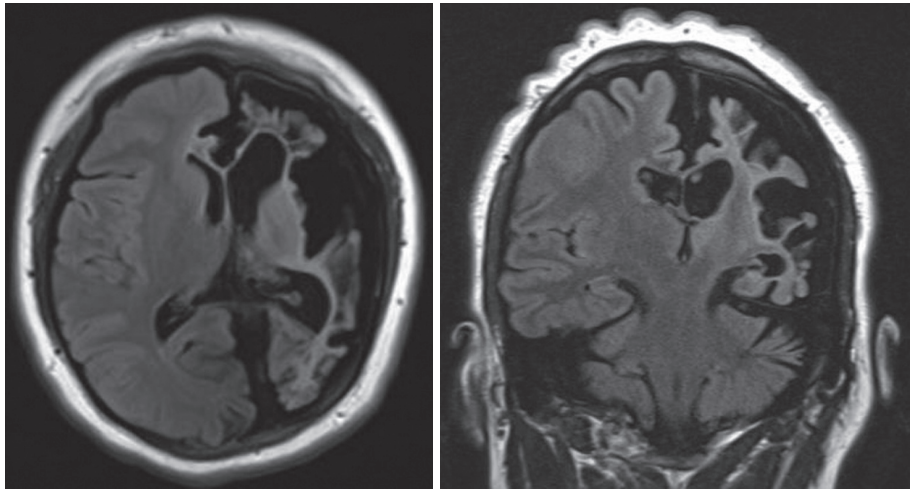
Case of a 30-year-old man with drug-resistant focal seizures



Magnetic resonance imaging (MRI) coronal T2 image of a 30-year-old man with a history of drug-resistant focal seizures with impaired awareness. Note right anterior temporal cavernoma with hypointense rim.

Authors: Sazgar M., Young M.G.
Title: Seizures and epilepsy
Book: Absolute Epilepsy and EEG Rotation Review
DOI: 10.1007/978-3-030-03511-2_2

Magnetic resonance imaging of a patient with drug-resistant focal epilepsy and history of congenital stroke



Magnetic resonance imaging (MRI) T1 axial (*left*) and coronal (*right*) images of a patient with drug-resistant focal epilepsy and history of congenital stroke. Note dilatation of the left lateral ventricle (ex-vacuo hydrocephalus) as a result of brain atrophy.

Authors: Sazgar M., Young M.G.
Title: Seizures and epilepsy
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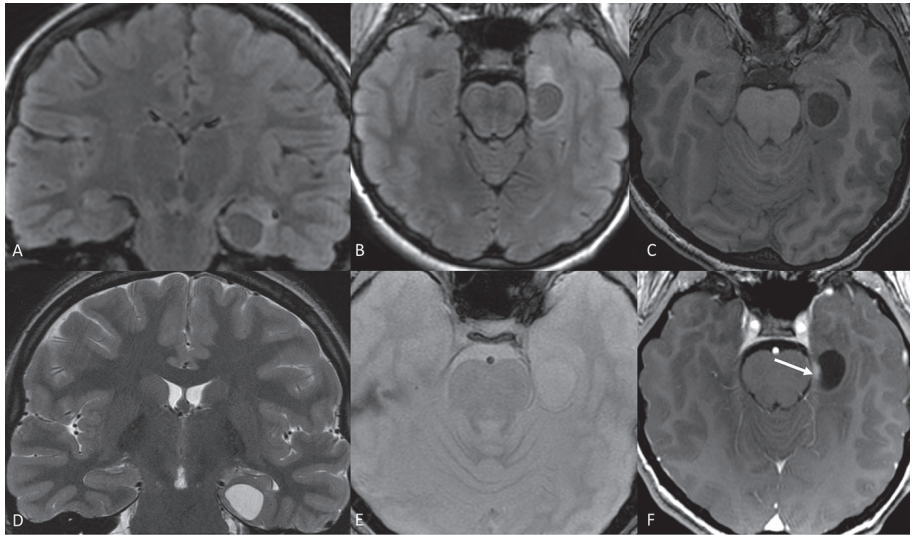
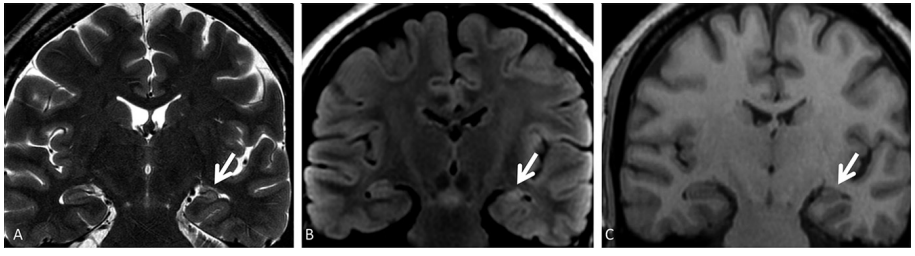
A 22-year-old male patient with left temporal epilepsy



A 22-year-old male patient with intractable left temporal epilepsy. Coronal and axial FLAIR (**A, B**), axial T1 (**C**), coronal T2 (**D**), T2* (**E**), and axial T1 with contrast media (**F**) show a mixed cystic and solid cortical mass. The nodular portion presents with mild enhancement (*arrow*).

Authors: Mellerio C., Chassoux F., Legrand L., *et al*.
Title: Epilepsy imaging
Book: The Neuroimaging of Brain Diseases: Contemporary Clinical Neuroscience
DOI: 10.1007/978-3-319-78926-2_6

Hippocampal sclerosis (HS) associated temporal lobe epilepsy



Hippocampal sclerosis (HS) is the most frequent lesion found in intractable temporal lobe epilepsy in adults.

Patient with left temporal lobe epilepsy. Coronal view perpendicular to the hippocampus long axis in T2 (**A**), FLAIR (**B**), and T1 (**C**) shows a left hippocampal atrophy, loss of the global architecture, and increased FLAIR signal in comparison to the right side, typical of HS.

Authors: Mellerio C., Chassoux F., Legrand L., *et al*.
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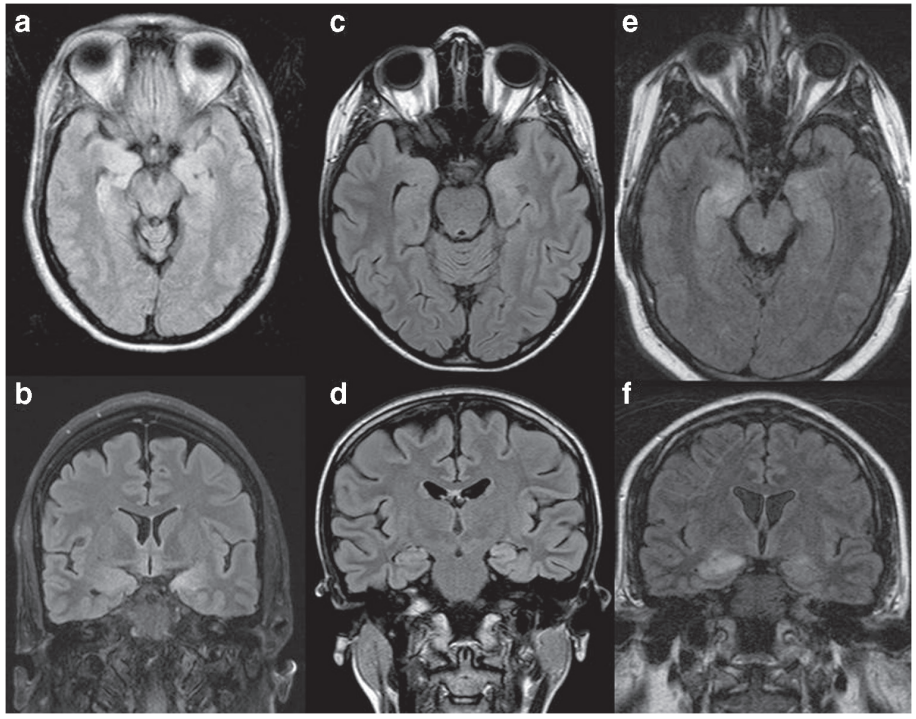
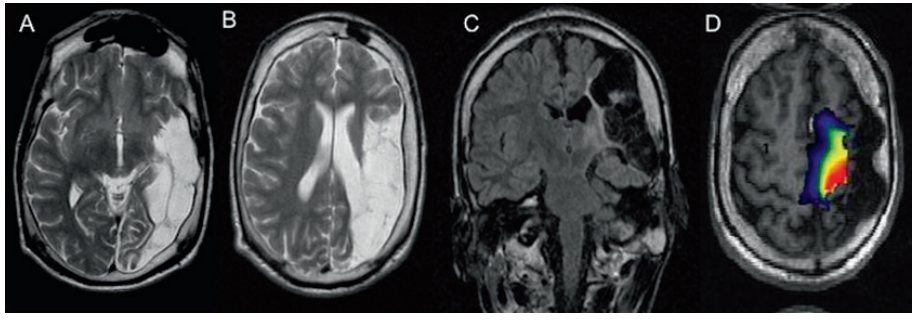
Imaging in a patient with autoimmune epilepsy



(**a–e**) Patient 1 with LGI1 IgG limbic encephalitis. Brain MRI (FLAIR sequence) demonstrating bilateral medial temporal hyperintensities on axial (**a**) and sagittal (**b**) sections. Patient 2 with ANNA-1 IgG limbic encephalitis. Brain MRI (FLAIR sequence) demonstrating bilateral medial temporal hyperintensities on axial (**c**) and sagittal (**d**) sections. Patient 3 with Ma-2 IgG limbic encephalitis. Brain MRI (FLAIR sequence) demonstrating bilateral medial temporal (*right* greater than *left*) hyperintensities on axial (**e**) and sagittal (**f**) sections. *ANNA-1* = antineuronal nuclear antibody-1; *FLAIR* = fluid-attenuated inversion recovery; *LGI1* = leucine-rich glioma-inactivated protein 1

Authors: Khalil S. Husari, Divyanshu Dubey
Title: Autoimmune epilepsy
Journal: *Neurotherapeutics*
DOI: 10.1007/s13311-019-00750-3

Case of a 16-year-old boy with post stroke epilepsy

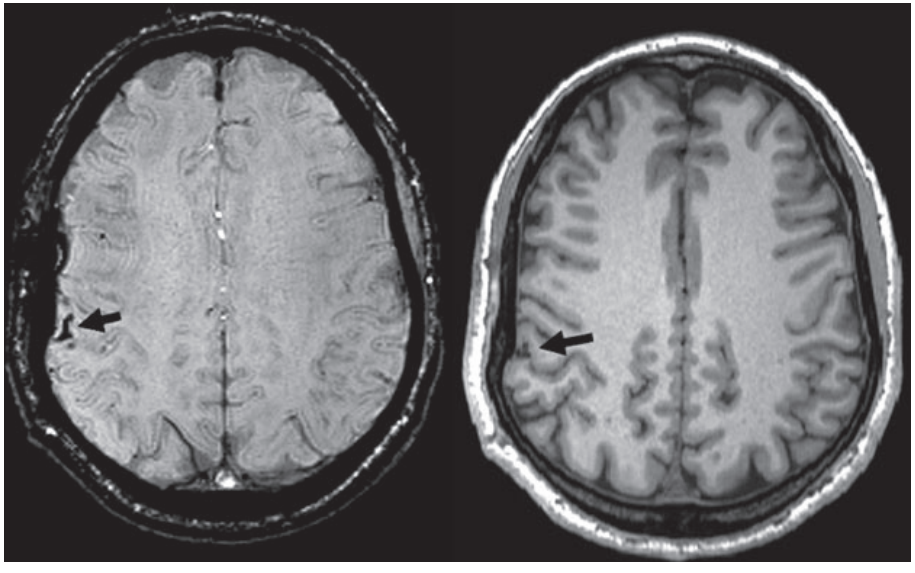


Post-stroke epilepsy (PSE) is defined as the appearance of epilepsy after a cerebrovascular event, especially ischemic or hemorrhagic arterial or venous stroke.

A 16-year-old boy with epilepsy and right hemiparesis following perinatal vascular injury. A large multicystic encephalomalacia that involves left middle cerebral artery territory is seen. There is hyperintensity on T2WI in the white matter due to gliosis, Wallerian degeneration of the adjacent cortico-spinal tract, and atrophy of the cerebral peduncle. The left cranial vault is thickened. SISCOM image shows the ictal hyperperfusion area indicating the seizure-onset location adjacent to the cavity (**A, B,** axial T2WI; **C**, coronal FLAIR; **D**, SISCOM).

Authors: Colombo N., Bargalló N., Redaelli D
Title: Neuroimaging evaluation in neocortical epilepsies
Book: Clinical Neuroradiology
DOI: 10.1007/978-3-319-61423-6_51-1

Magnetic resonance imaging of a patient with post-traumatic epilepsy

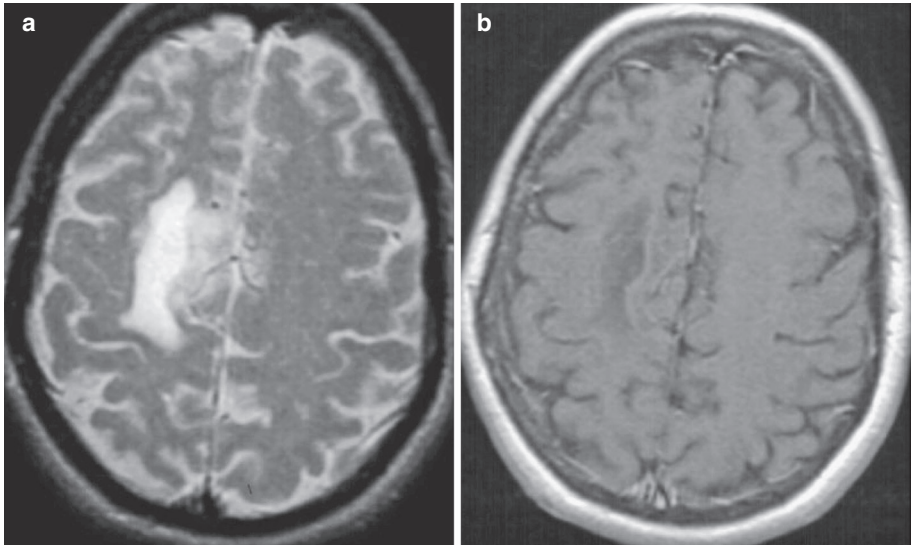


Post-traumatic epilepsy (PTE) refers to recurrent and unprovoked post-traumatic seizures (PTS).

Patient with history of brain trauma that developed PTE. The SWI (*on the left*) shows subpial and cortical hemosiderin deposition in the right lateral central region (*black arrow*). The T1WI (on the *right*) shows a focal cortical atrophy and a small old depressed fracture of the right parietal bone (*black arrow*).

Authors: Colombo N., Bargalló N., Redaelli D
Title: Neuroimaging evaluation in neocortical epilepsies
Book: Clinical Neuroradiology
DOI: 10.1007/978-3-319-61423-6_51-1

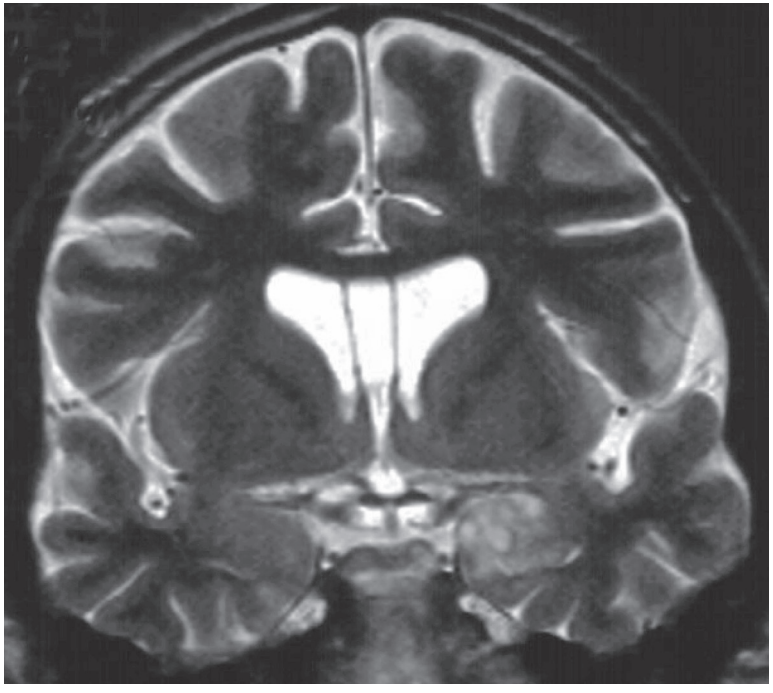
Magnetic resonance imaging of a woman with a 9-year history of infrequent seizures



Magnetic resonance imaging (MRI) scans showing an oligodendroglioma. (**a**) MRI scan showing a large, low-grade astrocytoma in the right premotor area in a 51-year-old woman with nearly normal neurologic examination findings (except for left arm hyperreflexia) and a 9-year history of infrequent seizures. Frontal lobe tumors can get quite large without causing symptoms other than seizures. (**b**) T1-weighted MRI scan of the right premotor area appears hypointense and there is some mass effect, but not as much as would be seen with more malignant neoplasms. The sulcus at the bottom of the lesion most likely represents the central sulcus. Preoperatively, the patient's seizures consisted of secondarily generalized tonic-clonic seizures. MRI 2.5 years after resection of the tumor showed no recurrence, and the patient remained seizure free for 1.5 years. She then experienced several simple partial motor seizures of the left foot after attempted medication reduction.

Author: Van Ness P.C.
Title: The epilepsies
Book: Atlas of Clinical Neurology
DOI: 10.1007/978-3-030-03283-8_10

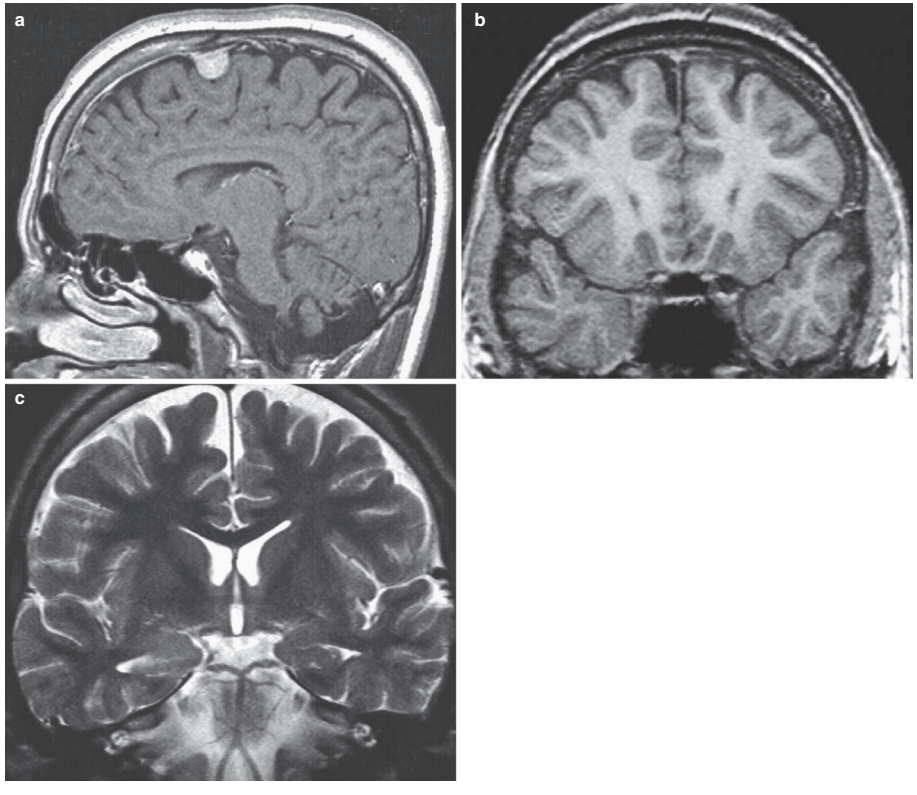
Patient with a history of seizures followed by speech arrest and rarely loss of consciousness: findings on MRI



Magnetic resonance imaging scan from a 35-year-old right-handed patient with a ganglioglioma of the left amygdala. He has had seizures since he was 14 years old. The seizures consist of an aura of déjà vu or a smell of butterscotch followed by speech arrest and, rarely, loss of consciousness. An EEG showed left temporal spikes in a left temporal ictal pattern. An MRI scan done 6 years earlier showed a similar lesion, although it was not recognized at the time. The lesion in the left amygdala does not enhance with gadolinium and represents a ganglioglioma. A dysembryoplastic neuroepithelial tumor would be another diagnostic consideration. These lesions tend to grow very slowly, if at all. The patient also has a cavum septum pellucidum.

Author: Van Ness P.C.
Title: The epilepsies
Book: Atlas of Clinical Neurology
DOI: 10.1007/978-3-030-03283-8_10

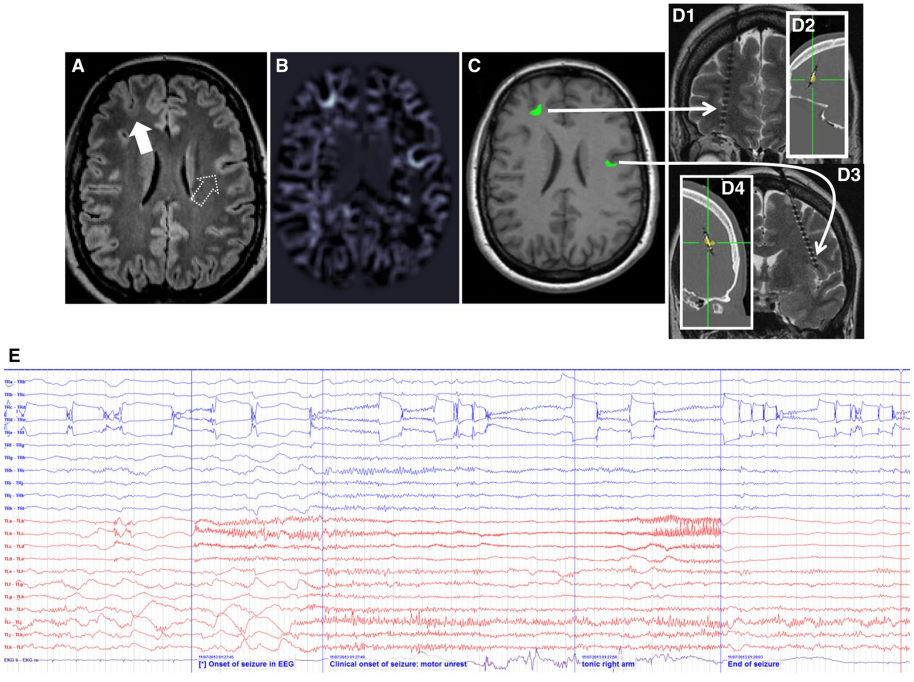
Magnetic resonance imaging scan of a patient with medically refractory seizures



Magnetic resonance imaging (MRI) scans of a 20-year-old man with medically refractory seizures. (**a**) A midline parasagittal meningioma is visible slightly to the right side, but after video EEG monitoring it was clear that the patient had right temporal epilepsy, based on the EEG seizure patterns and the clinical semiology of the seizure. Other MRI techniques in these series of images demonstrate right mesial temporal sclerosis. (**b**) A more anterior coronal T1-weighted MRI view shows distortion of the gray-white boundaries in the right anterior temporal lobe when compared with the left side. (**c**) A more posterior coronal T2-weighted MRI view demonstrates marked hippocampal atrophy on the right side compared with the left. The undulations of the dentate gyrus can be appreciated in these 2-mm thick sections.

Author: Van Ness P.C.
Title: The epilepsies
Book: Atlas of Clinical Neurology
DOI: 10.1007/978-3-030-03283-8_10

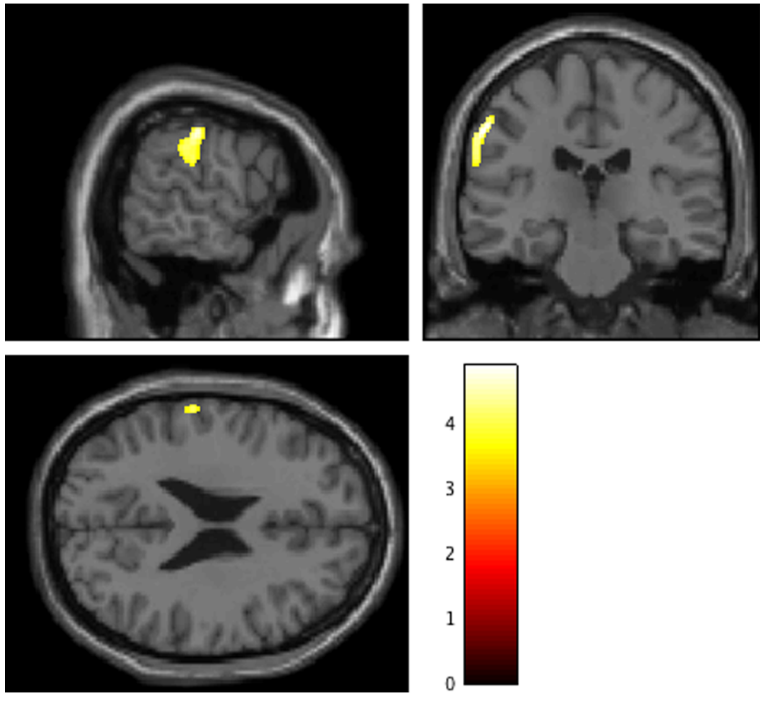
Multimodal approach for optimizing presurgical epilepsy work-up



Clinical work-up of the patient. (**A**) Diagnostic MRI at 3 T (including 3D-FLAIR with 1 mm voxel edge length) showed the right frontal focal cortical dysplasia (FCD) IIB (*full arrow*) but was negative for the second FCD (*dotted arrow*). Morphometric MRI-analysis (**B**) led to a suspicion of the existence of two FCDs in the junction analysis. After transforming the junction analysis abnormalities into regions of interest (ROIs) (**C**) a minimal invasive, confirmative implantation strategy was chosen to document interictal activity and seizure onset in either suspected FCD. Panel D shows the ROI-based implantation of each one depth electrode into the right and left frontal FCD (**D1** MRI documentation of the right frontal depth electrode; **D2** according to overlay with CT the depth electrodes penetrate the ROI perfectly; **D3** and **D4:** same for the left frontal FCD). Note radiological convention on MR images: patient's right is viewer's left. Interictal EEG showed the typical discharge pattern often seen in FCD IIB in both lesions. Seizure onset, however, was documented only in the left FCD IIB. **Panel E:** *blue traces* represent the right frontal FCD, *red traces* the left frontal FCD, *traces 1–3* represent the intralesional contacts; note that the short seizure is running in the left frontal FCD while the interictal discharge pattern in the right frontal FCD continues unaffected.

Authors: Aydin, Ü., Rampp, S., Wollbrink, A. *et al.*
Title: Zoomed MRI guided by combined EEG/MEG source analysis: a multimodal approach for optimizing presurgical epilepsy work-up and its application in a multi-focal epilepsy patient case study
Journal: *Brain Topogr*
DOI: 10.1007/s10548-017-0568-9

Chronic psychosis in epilepsy: MRI findings



Decreased gray matter regions in interictal chronic epilepsy psychosis (EPS) patients compared with epilepsy only (EP) patients. EPS patients exhibited significantly reduced gray matter volumes in the left postcentral gyrus (peak: [−58, −22, 40], $t = 4.89$) and the left supra marginal gyrus (peak: [−62, −27, 32], $t = 4.41$), compared with EP patients. Color bars represent the t-value of the contrast (adjusted $p < 0.05$). The [x, y, z] locations indicate Montreal Neurological Institute coordinates.

Authors: Hirakawa, N., Kuga, H., Hirano, Y. *et al*.
Title: Neuroanatomical substrate of chronic psychosis in epilepsy: an MRI study
Journal: *Brain Imaging Behav*
DOI: 10.1007/s11682-019-00044-4

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