Pediatric Epilepsy: What the radiologist provides

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One of the main roles of the neuroradiologist is to identify a lesion on MRI. In 20-50% of patients with focal intractable epilepsy, a lesion is not identified on MRI. Patients with non-lesional MRI have poorer surgical outcome compared to those with a lesion seen on MRI. Therefore it is essential to increase lesion detection in children with focal intractable epilepsy, which can be done by (i) optimizing the MRI sequences through improving contrast and resolution of the scan and (ii) enhancing the neuroradiologist's familiarity with imaging appearances of different types of lesions, in particular focal cortical dysplasia, and (iii) reviewing the MRI with knowledge of the location of the epileptogenic zone.

Additionally, the neuroradiologist can help localize (i) the eloquent cortex using functional MRI (fMRI) or magnetoencephalography (MEG), (ii) the eloquent white matter tracts using diffusion tensor imaging (DTI) tractography, and (iii) the epileptogenic zone with functional imaging such as MEG, positron emission tomography (PET), and single photon emission computed tomography (SPECT). The information from the above multimodal imaging can be integrated and incorporated onto the neurosurgical navigation system to help guide placement of invasive intracranial electrodes and also guide surgical resection.