MRI-negative epilepsy treatment

Several methods for processing MRI postacquisition data have identified either previously undetectable or overlooked MRI abnormalities. The resection of these abnormalities is associated with excellent postsurgical seizure control. There have been major advances in functional imaging as well, one of which is the application of statistical parametric mapping analysis for comparing patient data against normative data. This approach has specifically improved the usefulness of both PET and single-photon emission computed tomography in MRI-negative epilepsy surgery evaluation. One other development of importance is that of PET-MRI coregistration, which has recently been shown to be superior to conventional PET. More recent publications on magnetoencephalography have added to the literature of its use in MRI-negative epilepsy surgery evaluation, which up to now remains somewhat limited. However, recent data now indicate that a single magnetoencephalography cluster is associated with better chance of concordance with intracranial EEG localization, and with excellent postsurgical seizure control if completely resected.

Summary: Advanced MRI and functional imaging and subsequent intracranial EEG confirmation of the seizure-onset zone are essential to make MRI-negative epilepsy surgery possible and worthwhile for the patient [1].

The optimal management of MRI-negative epilepsy may involve invasive monitoring followed by resection or responsive neurostimulation in most cases, as these treatments were associated with the best seizure outcomes in a cohort of the Yale New Haven Hospital. Unless multifocal epileptogenesis is clear from the non-invasive evaluation, epilepsy invasive monitoring is preferred before pursuing deep brain stimulation or vagus nerve stimulation directly [2].

Magnetoencephalography (MEG) is valuable for guiding in resective epilepsy surgery. MEG is a useful supplement for patients with MRI-negative epilepsy. MEG can be applied in minimally invasive treatment. MEG clusters can help identify better candidates and provide a valuable target for stereoelectroencephalography guided radiofrequency thermocoagulation, which leads to better outcomes. [3].

1)
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