

MEDICAL INTRACTABILITY AND IMAGING: CAN MRI PREDICT THE FUTURE?

MRI Evidence of Mesial Temporal Sclerosis in Sporadic "Benign" Temporal Lobe Epilepsy

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OBJECTIVE: To determine whether there is MRI-detectable mesial temporal sclerosis (MTS) in patients with sporadic benign temporal lobe epilepsy (BTLE).

METHODS: Brain MRIs were obtained from 101 consecutive, unrelated patients (51 women; mean age 37.3 ± 17.5 years; range 10–83 years) with BTLE, who reported rarely or never having had seizures at the time of long-term (>2 years) follow-up. The mean age at seizure onset was 22.3 ± 17.4 years; the mean duration of epilepsy was 16.4 ± 14.1 years. MRI diagnosis of MTS was based on the occurrence of hippocampal formation atrophy on T1 slices, an increased mesial temporal signal intensity alteration on fluid-attenuated inversion-recovery (FLAIR) or T2 images, or both.

RESULTS: Thirty-nine of 101 patients (38.6%) had MRI evidence of unilateral MTS (19/39 left MTS, 20/39 right

MTS), which correlated with the epileptiform activity. Hyperintense FLAIR and T2 signal with or without atrophy was observed in 24 of 39 individuals. There was no difference between patients with or without MRI-detected MTS in age at onset and duration of epilepsy. Family history of epilepsy or febrile convulsions (FCs) was more frequent in patients with MRI-detected MTS (36%) as compared with patients with normal MRI (22.7%), but the difference was not significant. Antecedent FCs were more frequent ($p = 0.03$) in patients with MRI-detected MTS (9/39; 23%) vs those with normal MRI (5/62; 8%).

CONCLUSIONS: MRI-detected mesial temporal sclerosis is often encountered in patients with sporadic benign temporal lobe epilepsy.

COMMENTARY

MRI of the mesial temporal structures has revolutionized the presurgical evaluation of patients with medically refractory temporal lobe epilepsy. In the early 1990s, it became evident that the hippocampal abnormalities seen pathologically in many patients with temporal lobe epilepsy could be visualized on MRI scans as hippocampal atrophy and abnormal signal characteristics. When studies are performed to optimize visualization of the medial temporal structures, MRI is a very sensitive technique, approaching the status of a pathological surrogate (1). Retrospective studies consistently have shown that patients with MRI evidence of mesial temporal sclerosis (MTS) have a favorable prognosis for seizure control with surgical treatment (2,3). This fact, by itself, often leads clinicians to push patients with temporal lobe epilepsy toward surgical management. The trend has been fueled further by many reports suggesting that patients with evidence of MTS on MRI

have a very poor prognosis for gaining or maintaining seizure control with anticonvulsant treatment (4–7).

Most prior studies suggest that only 11% to 25% of patients with MTS detected on MRI will respond to medical therapy (4–7). In contrast, Stephen and colleagues found that over 40% responded to anticonvulsants (8). The observations of Labate et al. that nearly 40% patients with temporal lobe epilepsy selected for good seizure control have MTS further supports the possibility that a significant subset of patients with MTS might be well controlled with medical management. As noted in their article, Kobayashi and colleagues found MTS in patients with easily controlled familial temporal lobe epilepsy (9), providing another example that MTS is not necessarily synonymous with medical intractability. The observations of Labate et al. do not speak directly to the likelihood that a patient with MTS will be able to gain seizure control; however, the finding that many patients with well-controlled temporal lobe epilepsy have MTS suggests that it may not be as uncommon as previously thought.

The diagnostic criteria used to identify patients in the Labate et al. series included clinical and electroencephalographic measures that would be expected to correctly classify temporal lobe epilepsy most of the time, with relatively few false

identifications (10). The authors imply that in making the epilepsy syndrome diagnosis, MRI was only used to exclude mass lesions; however, they do not explicitly state whether the finding of MTS on MRI was sometimes used for diagnostic purposes. If MTS was used as a diagnostic criterion, this series might overestimate MTS in patients with well-controlled temporal lobe epilepsy.

The criteria that the authors used to classify patients as “benign” also deserve further scrutiny. All but three of 101 patients required medicine, and nine individuals required two medicines. Patients were allowed to have as many as two “disabling” seizures per year over the course of 2 years. Unfortunately, the authors do not provide further information about the distribution of seizure control in their patients. While it is true that most patients undergoing surgery for medically intractable seizures have seizures more frequently than the patients of Labate and colleagues, it is certainly possible that some of the patients in their series (those with frequent auras and rare convulsions) had seizure control approaching that of temporal lobectomy candidates. Future analysis of patients with “benign” temporal lobe epilepsy would benefit from application of stricter limits for and clearer definitions of seizure control and from more thorough descriptions of the distribution of seizure control in the population studied.

In spite of the limitations of their observations, the authors’ finding of MTS in a substantial proportion of patients in a large series of patients with temporal lobe epilepsy, preselected for good seizure control raises the question of how often this finding might be encountered in the primary care setting. The general consensus among neurologists has been that patients with MTS and good seizure control are rare. However, this finding could reflect the fact that patients who have seizures and are being treated in community centers (i.e., not requiring referral to a tertiary center) often are not evaluated in a manner that would optimize the identification of MTS. It is not uncommon for patients with intractable epilepsy to have normal scans at community hospitals, be referred to a tertiary program, and then be identified with MTS. Clarification of this issue will require that standards for imaging (and for analyzing MRI) in patients evaluated in a community setting be improved from the current practice.

The practical implications from Labate et al. study and from prior studies of seizure control in patients with temporal lobe epilepsy are as follows:

- 1 Patients with temporal lobe epilepsy may have MRI findings of MTS, regardless of their seizure control.
- 2 The use of MRI findings as a surrogate for current or future seizure control is premature. Prospective studies utilizing modern MRI techniques in patients with new epilepsy will be necessary to define the relationship between MTS and intractability.

by Paul Garcia, MD

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