MR spectroscopy of temporal lobe epilepsy: good news and bad news.

R N Bryan

AJNR Am J Neuroradiol 1998, 19 (1) 189
http://www.ajnr.org/content/19/1/189.citation

show that volumetry not only can be done accurately, but also can provide validation of the presence of disease not obvious by qualitative interpretation. In the future, other advanced applications such as perfusion and diffusion imaging might benefit from the accurate determination of the pathologic volume. This study is certainly a step in the right direction.

WILLIAM S. BALL, JR
Senior Editor

MR Spectroscopy of Temporal Lobe Epilepsy: Good News and Bad News

While temporal lobe epilepsy remains a clinical challenge, recent advances in diagnosis and treatment have significantly improved patient outcome. Scalp electroencephalography (EEG) has been improved by higher-density montages and computer-assisted analysis, resulting in a greater percentage of patients with clearly defined electrical foci. MR can now show most gross lesions, including tumors and encephalomalic processes. In addition, high-resolution MR of the temporal lobes shows most cases of mesial temporal sclerosis, the most common cause of temporal lobe epilepsy (TLE) (1, 2). The combination of these two techniques yields concordant (ie, colateralizing) results in approximately 90% of patients. Approximately 80% of patients with appropriate clinical history and concordant EEG and MR findings will respond favorably to careful medial temporal lobe surgical resections, though there remains a need for longer-term follow-up to document treatment outcome better (3).

Numerous additional imaging studies, including fludeoxyglucose F 18 (FDG) positron emission tomography (PET) and, more recently, single-photon emission computed tomography (SPECT) and MR spectroscopy, have been proposed to locate epileptogenic foci. However, there is little convincing evidence that they add significantly to treatment in patients with TLE and concordant EEG and MR findings.

Despite these diagnostic and therapeutic improvements, there do remain many problematic patients, particularly those with nonconcordant EEG and MR findings and those with non–temporal lobe epilepsy. Although TLE remains a clinical challenge, imaging research should now begin to focus on these patients (4).

The article by Achten et al in this issue of the *AJNR* nicely correlates single-voxel proton MR spectroscopic and FDG PET findings in patients with TLE. They confirm previous reports that MR spectroscopic measures of *N*-acetylaspartate and choline and decreased interictal FDG PET uptake have a strong correspondence to scalp EEG and MR findings. However, in EEG and MR concordant patients, neither study seems to affect patient treatment significantly, and they present no evidence that they improve the prediction of these patient's clinical outcome. While MR spectroscopy and FDG PET do not seem to be important in the evaluation of concordant TLE patients, they may prove valuable in the evaluation of the problematic discordant TLE and non-TLE patients. In this group of patients, current diagnostic techniques clearly are inadequate as reflected by generally poor control of seizures by current treatment regimens (5). However, the single-voxel technique of Achten et al will become an

See article on page 1.

increasing problem when addressing non-TLE patients. Even in TLE subjects, the single-voxel technique suffers from limited site sampling and partial volume averaging. In non-TLE patients, there may be no or few clues as to where to place the MR spectroscopic voxels. Multivoxel MR spectroscopic imaging, while much more technologically demanding, will probably be required for the more difficult epilepsy evaluations (6).

However, the needed clinical investigations are very demanding, especially in light of the relative small number of patients, the lack of a well-defined pathologic cause, and the necessity of long-term patient follow-up to ascertain outcome. To design a traditional randomized study properly under these conditions is very difficult; actually to complete such a study might be so impractical as to be impossible—that is the bad news. However, this challenge must now be addressed by any new epilepsy diagnostic technique as clinical history, EEG, and MR now appear to direct treatment of most TLE patients adequately, which is, of course, the good news.

R. NICK BRYAN
Senior Editor

References

1. Cendes F, Andermann F, Gloor P, et al. **MRI volumetric measurement of amygdala and hippocampus in temporal lobe epilepsy.** *Neurology* 1993;43:719–725
2. Jack CJ. **MRI-based hippocampal volume measurements in epilepsy.** *Epilepsia* 1994;35:S21–S29
3. Berkovic SF, McIntosh AM, Kalnins RM, et al. **Preoperative MRI predicts outcome of temporal lobectomy: an actuarial analysis** [see comments]. *Neurology* 1995;45:1358–1363
4. Spencer SS. **MRI and epilepsy surgery** [editorial; comment]. *Neurology* 1995;45:1248–1250
5. Cascino GD. **Magnetic resonance imaging in frontal lobe epilepsy.** *Adv Neurol* 1995;66:199–207
6. Duyn JH, Gillen J, Sobering G, van Zihl PCM, Moonen CTW. **Multislice proton MR spectroscopic imaging of the brain.** *Radiology* 1993;188:277–282