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[Letters to the Editor]

## The Requirement for Ictal EEG Recordings Prior to Temporal Lobe Epilepsy Surgery

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In the April 2000 issue of the ARCHIVES, Cendes et al [1](#) present a provocative study that suggests that in a certain highly selected subgroup of patients undergoing evaluation for temporal lobe epilepsy (TLE) surgery, one could dispense with ictal recordings before proceeding to resection. Because surgical outcome data are not provided, their claim is difficult to evaluate. Most epileptologists believe that the ictal electroencephalograph (EEG) is necessary for definitive lateralization because bilateral interictal epileptiform discharges are commonly observed in patients with strictly unilateral seizures. [2](#) However, this study is the latest in a series of reports that indicate that it is possible to define a group of patients in which the interictal information is at least as informative as the ictal recordings in terms of lateralization and, furthermore, that discordance is extremely unlikely when the information is backed up by reliable quantitative structural magnetic resonance imaging (MRI) data. [1, 3-4](#) The benefits of dispensing with ictal recordings are obvious—a reduction in the potential risks associated with the need to withdraw anticonvulsant medication, a reduction in the time of inpatient stay, and a reduction in the overall cost of the hospital visit. While these are clearly admirable goals, we feel that the results of the study of Cendes et al do not address all of the issues that require resolution before it would be prudent to do away with long-term EEG monitoring.

Spencer, [5](#) Raymond et al, [6](#) and Fish and Spencer [7](#) have pointed out that in studies of large groups of subjects, there appears to be a definite subgroup of patients who have clear unilateral mesial temporal disease on MRI, but whose seizure onset occurs elsewhere. [5-7](#) This phenomenon has become known as dual pathology and may include the coexistence of extrahippocampal neocortical disease on the ipsilateral and contralateral sides as well as bilateral hippocampal disease. [7](#) Thus, while the EEG may not be discordant in terms of lateralization, it may not be in agreement in terms of localization.

While the recent interest in the concept of dual pathology has been driven by improvements in radiological analysis, the proposition that TLE is rarely, if ever, confined to the hippocampus is a relatively old one. Impressive evidence for the widespread nature of the pathological features of TLE has come from histological analysis of both surgical and autopsy specimens.<sup>8-12</sup> Furthermore, early indirect radiological studies concentrated on atrophy of the whole lobe rather than just the mesial structures.<sup>13-14</sup> More recently, the application of functional imaging techniques, both dynamic and static, to the TLE population again supports the idea of more widespread abnormalities.<sup>15-17</sup>

Cendes et al have clearly addressed the issue of bilateral hippocampal sclerosis through the use of quantitative hippocampal volumetry corrected for intracranial volume (the finding of 19% with bilateral hippocampal sclerosis is similar to percentages reported in previous studies<sup>18-19</sup>). However, they do not seem to have addressed the coexistence of damage in the neocortex or of minor developmental abnormalities, such as focal cortical dysplasia.

The practical issue related to dual pathology and discordant localization is the extent of resection. The growth in popularity of the selective procedures<sup>20</sup> has necessitated an improvement in determining the difference between seizures of hippocampal or neocortical origin, since it has been suggested that a selective procedure in a patient with predominantly neocortical onset is likely to result in a poorer surgical outcome.<sup>21</sup> However, the findings of uncontrolled nonrandomized studies are in conflict over whether patients who have selective procedures with so-called neocortical-onset seizures do worse than those with mesiobasal-onset seizures.<sup>22-23</sup> In contrast, outcome studies in patients with MRI evidence of dual pathology are more conclusive, showing poorer outcomes in patients with bilateral hippocampal sclerosis<sup>24-25</sup> and in patients with coexisting dysgenetic lesions.<sup>26-28</sup>

Thus, the question remains as to whether there are reliable radiological or neurophysiological tests that Cendes and his colleagues could have applied to their patients in order to rule out coexisting extrahippocampal abnormalities. Unfortunately, in the current literature, volumetric data about the mesial structures have proliferated almost to the exclusion of the rest of the temporal lobe.<sup>10</sup> Although a few quantitative and semiquantitative studies of the extrahippocampal tissue have been published, these methods have not become routine because of a lack of consensus on anatomical borders, and possibly because of the fact that, on visual analysis alone, temporal atrophy may be seen as a "soft" sign.<sup>10, 26, 28-30</sup> Furthermore, while proton spectroscopy has provided subtle metabolic information about the lateral temporal structures, this modality has been shown to be more valuable in predicting surgical failure than success.<sup>31-32</sup>

This brings us to the place of ictal recordings. Alving<sup>33</sup> has summarized the

conventional thinking about the purpose of ictal recordings, emphasizing two important issues not addressed by Cendes et al. The first concerns the need to make sure that the seizures the patient is having are, in fact, epileptic in origin in order to avoid what he called "the disaster of operating on someone with pseudoseizures." Secondly, Alving addressed the issue of focal vs regional onset. Over the last few years, several studies have shown that ictal recordings may reveal patterns that help localize seizure onset to either the mesiobasal area or the temporal neocortex.<sup>2, 34-35</sup> Thus, regardless of the convergence of lateralization between ictal and interictal recording, it seems that the scalp EEG, subject to postprocessing, may have localizing value that single interictal discharges do not have.

In conclusion, we believe that, given the importance of establishing the diagnosis of true epileptic seizures and in the absence of reliable quantitative or qualitative radiological data to assess the extrahippocampal tissue, in order to rule out dual pathology, ictal recording should remain an important adjunct to presurgical evaluation, even in the highly selected patients chosen by Cendes et al.

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