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# Temporal Lobe Epilepsy Surgery: Definition of Candidacy

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**ABSTRACT:** Medical intractability is one of the absolute indications for considering temporal lobe epilepsy surgery. This is a relative concept that has to be highly individualized. It is quite easy to determine when a patient's seizures are fully controlled. On the other hand, "continuing seizures are not necessarily a measure of intractability or disability". A positive decision to operate would be based on some of the following factors: assurance of a firm diagnosis, seizures that are frequent and disabling, and seizures occurring in patients who are drug refractory to optimal anti-epileptic medications and dosages.

**RÉSUMÉ:** Définition de critères pour le choix des candidats à la chirurgie de l'épilepsie temporale. L'échec du traitement médical est l'une des indications absolues d'envisager la chirurgie. C'est un concept relatif qui doit être individualisé. Il est facile de déterminer quand les crises d'un patient sont parfaitement contrôlées. Cependant, la persistance des crises n'est pas nécessairement une mesure de l'absence de réponse au traitement ou de l'invalidité. La décision de recourir à la chirurgie devra être basée sur les facteurs suivants: la certitude du diagnostic, des crises qui sont fréquentes et invalidantes et des crises chez des patients qui sont réfractaires à une médication antiépileptique optimale quand au choix et à la posologie.

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Medical intractability is one of the absolute indications for considering temporal lobe epilepsy surgery. It is quite easy to determine when a patient's seizures are fully controlled. On the other hand, not all who continue to have seizures "are medically intractable" or more specifically disabled. There are no widely accepted or uniformly applied definitions of "refractory epilepsy" and the criteria used to determine medical intractability are either quite heterogenous or rather vague. A patient who continues to have seizures in spite of multiple appropriate anti-epileptic drugs, or continues to have unacceptable side effects, would be considered intractable from the conceptual point of view. Although in principle this is straightforward, how do we really know that every reasonable drug and combination of drugs have had an adequate trial and have failed? As such, intractability will have to remain a relative concept and be very highly individualized.

## SOME CLINICAL ASPECTS FOR CONSIDERATION OF EPILEPSY SURGERY

### 1. *The patient must have temporal lobe epilepsy.*

The seizures may be simple partial, complex partial, or partial that may become secondarily generalized. The chapters on temporal lobe seminology and EEG localization, plus the chapter on neuroimaging are critical in this assessment. The

older term of psychomotor seizures was too all inclusive when used interchangeably with temporal lobe epilepsy. The contemporary term "complex partial seizures" is a non-committal term referring to seizure semiology but does not imply from which lobe of the brain they arise.<sup>1</sup> Whereas most patients with auras leading to complex partial seizures have temporal lobe epilepsy,<sup>2</sup> a small percentage will have seizures arising from elsewhere, most notably the frontal lobe.

### 2. *The seizures need to be disabling.*

This is a relative concept and not one easily defined. A classic patient with greater than three seizures per month for greater than three years, who has tried greater than three first line anti-seizure drugs, would be considered intractable by most. In contradistinction, a newly diagnosed patient with infrequent seizures and questionable compliance probably does not meet this arbitrary definition, although the likelihood of controlling seizures is statistically poor.<sup>3</sup> Rather than trying to quantify the number of seizures, a better approach would be to consider a functional definition. Seizures that

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significantly interfere with quality of life<sup>4,5</sup> could be considered intractable. Again, this definition needs to be individualized. For example, in spite of optimal care, infrequent seizures may prevent driving and may be anxiety-provoking in terms of one's willingness to access the community independently. For a woman contemplating pregnancy there is anxiety about possible teratogenesis and the effect that seizures might have on the fetus.<sup>6</sup>

In theory, ictal events solely occurring in sleep may not interfere with daytime activities. Here the definition, or the distinction of intractability, may be more difficult. On the other hand, the fear of having a possible diurnal seizure or the prospect of a lifetime of anti-epileptic drugs may tip the balance towards consideration of seizure surgery.<sup>7</sup> Patients with nocturnal seizures that are secondarily generalized in sleep may be more inclined to consider surgery because of the secondary effects that they suffer in terms of falls out of bed and from having fatigue and tiredness the following day.

In addition to continuing seizures, the concept of intractability should include the considerable burden of chronic medication use, including possible side effects and expense.<sup>8</sup> Even if the seizures were controlled, but only at the expense of intolerable side effects, one may consider the patient "intractable" and therefore "surgical".<sup>6,7</sup>

Often the primary care physician will accept "a few seizures" as a necessary evil or, alternatively, may have the patient on such high doses of anti-epileptic drugs that the patient is dulled. Children don't usually complain of chronic over-medication and both physicians and parents often assume the slowness is related to the condition. Successful surgery is a solution to these scenarios.<sup>9</sup>

### 3. *Patients must be drug refractory.*

This implies that the patient has been on the optimal anti-epileptic agent for the condition and have been faithful in taking it and have been on adequate doses with therapeutic serum levels. The key words in this last sentence gleaned from the literature on this subject were "optimal, faithful, adequate and therapeutic". All are used very loosely and are poorly defined. Again, drug refractoriness is a conceptual consideration and one that needs to be individualized.

For seizures arising from the temporal lobe, most would agree that, as a minimum, at least the drugs carbamazepine and phenytoin should be tried, plus either valproate and/or one of the newer adjunctive agents such as clobazam, gabapentin, lamotrigine, topiramate or vigabatrin. Mattson's work from the Veteran's Affairs studies<sup>10,11</sup> suggests that after optimal monotherapy, approximately 30% of patients will have unsatisfactory control. With the addition of a second drug the number diminishes, but approximately 20% remain poorly controlled. With the addition of a third drug, approximately 15% will have unsatisfactory control. It's for this group where one would consider surgery or experimental drug therapy. Five percent or less of patients become seizure-free for the first time following use of the newer drugs.<sup>12,13</sup>

Occasionally patients have been said to have failed on a drug when, in fact, it had not been pushed to the maximum tolerated dose before abandoning it. Likewise, a drug can

hardly be considered a failure if the patient, for whatever complicated reason, was not compliant.

### 4. *Non-epileptic attacks.*

When evaluating patients for medical intractability one must consider the reasons for intractability, or failure. Failure of optimal drug therapy with "adequate doses" and "therapeutic levels" should be a flag for considering an alternative diagnosis such as non-epileptic seizures.<sup>14,15,16</sup> Most centres have found that approximately 10 to 20% of patients referred for so-called intractable seizures, don't have epilepsy at all. Instead they have pseudo-epileptic seizures.<sup>14</sup> Often only intensive monitoring with EEG-video will confirm this diagnosis.<sup>17</sup>

### 5. *Intelligence.*

Whereas a normal intelligence is not requisite for surgical consideration, a cognitive deficit raises the possibility of multi-focal epileptogenicity and a possible poor outcome to surgical intervention. Exceptions include a patient with tuberous sclerosis and an epileptogenic temporal lobe lesion that could be resected,<sup>18</sup> although most of the reported cases to date have been restricted to surgery within the frontal lobe. Candidates for surgery need to be able to fully comprehend the procedure and to cooperate with a prolonged hospitalization for monitoring; for many there will be further tests that require cooperation, such as an angiogram and MRI scanning, that can be quite claustrophobic.

### 6. *Psychiatric disorders.*

Chronic psychosis is not an absolute contraindication for surgery if the patient is in remission. However, active mental illness, such as active psychosis, or a depression or a significant personality disorder would preclude surgery because of the inability of the patient to cooperate in the evaluation and the difficulty in post-operative rehabilitation. See chapter by Manchanda and Savard, in this volume.

## INVESTIGATIONS

Requisite aspects of the several investigations for surgical candidature will appear in chapters by Sadler and Desbiens, Dubeau and McLachlan, Lee and Jones-Gotman et al in this supplement.

## CONCLUSION

Although, in principle, this approach is straightforward, it nevertheless is somewhat arbitrary and the definition of intractability will have to remain a relative concept that is highly individualized from patient to patient.

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