

Semiology of temporal lobe epilepsies

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ABSTRACT

Temporal lobe epilepsies (TLE) represent the majority of the partial symptomatic/cryptogenic epilepsies. Excellent results of epilepsy surgery in well-selected patients have encouraged a search for localizing and lateralizing signs that could assist in the identification of the best surgical candidates. Seizure types in TLE include simple partial, complex partial and secondarily generalized seizures. Temporal lobe seizures most often arise in the amygdalo-hippocampal region. More than 90% of patients with mesial TLE report an aura, most commonly an epigastric sensation that often has a rising character. Other autonomic symptoms, psychic symptoms, and certain sensory phenomena (such as olfactory) also occur. The complex partial seizures of mesial TLE often involve motor arrest, orolimentary automatisms or non-specific extremity automatisms at onset. Ictal manifestations that have lateralizing value include dystonic posturing (contralateral), early head turning (usually ipsilateral), and adverse head turning in transition to generalization (contralateral). Well-formed ictal language favors right temporal localization. Ictal vomiting, spitting, and drinking tend to be right sided. The duration of TLE complex partial seizures is generally greater than one minute and postictal confusion usually occurs. When postictal aphasia is noted a left-sided lateralization is favored. A lateral temporal onset is less common in TLE, and is most often suggested by an auditory aura. Somatosensory and visual auras are highly unlikely with TLE, and suggest neocortical extratemporal localization. A cephalic aura is non-specific, but is more common in frontal lobe epilepsy.

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Temporal lobe epilepsy (TLE) is the most common symptomatic/cryptogenic partial epilepsy. The characteristic manifestations of temporal lobe seizures have long been recognized. However, it was the advent of electroencephalogram (EEG)-video monitoring and its use in presurgical evaluation that have had the greatest impact on the understanding of temporal lobe seizure semiology. Temporal lobe epilepsy is often refractory to medical therapy, and may respond to surgical treatment. The surgical outcome is dependent on accurate localization of the epileptogenic focus. The analysis of clinical semiology in patients who were seizure-free after temporal lobectomy versus those still experiencing seizures has helped identify manifestations characteristic of temporal lobe origin, and those that suggest extratemporal localization.¹⁻³ In addition, specific seizure manifestations were analyzed for their lateralizing value and their localizing value within the temporal lobe.

Seizure aura. Most patients with TLE report a seizure aura. This is particularly true in mesial TLE, by far the largest TLE group. In a selected patient group with proven mesial temporal lobe origin, more than 90% of patients reported an aura.³ The most common was an epigastric aura.³ Although no aura is totally specific for temporal lobe, some are very strongly associated with a temporal lobe origin, particularly viscerosensory (such as epigastric sensation) and experiential or psychic auras (such as "deja-vu").⁴ Both of these types of aura are more likely with right temporal foci, but this is only a trend.⁴ Whereas viscerosensory auras are generally more common in mesial TLE, experiential auras and deja-vu in particular are more common in the benign familial TLE syndrome. Chills and goosebumps are more common with left temporal foci.⁵ If the manifestations are unilateral, they are usually ipsilateral.⁶ Cephalic auras and vertigo were more likely extratemporal.⁴ The

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same is true of somatosensory and visual auras.^{7,8} An auditory aura is very suggestive of lateral temporal origin.⁹ This can be a positive or negative symptom.¹⁰ The auditory aura is a hallmark of an autosomal dominant form of TLE.^{11,12} Absence of an aura is more likely with bitemporal epilepsy.¹³

Motor manifestations. The complex partial phase of mesial temporal lobe seizures usually starts with motor arrest or motionless staring, oroalimentary automatisms, or non-specific extremity automatisms.¹⁴ Oroalimentary automatisms, mainly lip smacking, chewing and swallowing movements are suggestive of temporal lobe involvement.¹⁴ Nevertheless, they may reflect spread of seizure activity to the temporal lobe from other locations, and can also be seen in a more subtle form in absence seizures, or postictally in a variety of seizure types. Spitting and drinking automatisms suggest right temporal localization.¹⁵⁻¹⁷ The presence of automatisms with preserved responsiveness favors right temporal localization.¹⁸ Extremity automatisms are less specific and can be seen in temporal as well as extratemporal epilepsy. However, the progression of these automatisms is more gradual in TLE. In extratemporal epilepsy, they tend to have an abrupt bilateral onset and a frenzied character.¹⁹ Automatisms in themselves have no lateralizing value. However, the extremity contralateral to the side of the focus is often involved in dystonic posturing or immobility and may therefore not demonstrate automatisms.²⁰⁻²² In this instance, automatisms will predominate in the extremity ipsilateral to the seizure focus. This may lead to confusion for the inexperienced observer who may interpret repetitive automatisms as clonic activity. Defined in the strictest manner, dystonic posturing is an unnatural position that includes a rotatory component.²⁰ Dystonic posturing has been associated with ictal activation in the contralateral putamen.²³ There is evidence that there is a spectrum of posturing, with the classical dystonic posturing at one extreme and simple immobility at the other,²⁴ including subtle posturing without a clear demonstrated rotatory component. Dystonic posturing has a strong lateralizing value in TLE.²⁴ However, as with any other manifestations, late occurrence could represent activation of the contralateral side and may therefore have a lesser value.

Head turning in TLE has been the subject of great controversy.²⁴⁻²⁷ Current evidence suggests that early head turning, particularly that associated with dystonic posturing, tends to be ipsilateral to the focus.^{24,27} Its mechanism is not well defined. Some have suggested it could represent neglect of the contralateral hemisphere. However, in many instances the early head turning is of a tonic nature, which raises the possibility of a motor drive, possibly from the basal ganglia.²⁴ In one study, the occurrence of head turning within 30 seconds of seizure onset, in association with dystonic posturing, and not leading to secondary generalization has been strictly ipsilateral to the temporal seizure focus.²⁴ Late head turning, on the other hand, is more likely to be

contralateral. Head turning that leads to secondary generalization can have a tonic or clonic character and has been termed "versive" or "adversive". Versive head turning is almost always contralateral to the seizure focus.^{24,26,27} An ipsilateral versive head turn has been noted towards the end of secondarily generalized tonic-clonic seizures in some patients.²⁸

Language manifestations have received considerable interest. Speech arrest does not seem to have lateralizing value. It may be due to disruption of language mechanisms, to loss of awareness/responsiveness, or to a positive or negative motor effect.²⁹ There is a suggestion, however, that in temporal simple partial seizures a speech arrest could represent aphasia and may thus be lateralizing to the dominant temporal lobe.³⁰ Well-formed ictal language strongly suggests a non-dominant right temporal lobe focus.²⁹ This is not true, however, of single words or non-verbal vocalizations. The well-formed ictal language in some patients with right temporal lobe seizures has a tinge of fear. For example, it is not uncommon for patients to utter "I'm sick, I'm sick" or "I'm going to die, don't let me die". In most instances, however, the patient does not remember these utterances, and fear may not be a known component of the semiology. Ictal jargon is rare but has been associated with dominant temporal lobe foci.³¹ It may reflect a partial disruption of language mechanisms as seen in chronic Wernicke's aphasia. There have been reports of global aphasia in association with localized simple partial seizures restricted in the temporal lobe, including the basal temporal language area.^{30,32} Chronic temporal lobe lesions do not produce global aphasia. However, acute electrical stimulation in Wernicke's area as well as basal temporal language area does produce global aphasia.³³⁻³⁶ It is speculated that compensatory mechanisms may explain the difference. Global aphasia in simple partial seizures therefore could be consistent with a dominant temporal localization.³⁰ Postictal aphasia is strongly associated with a left dominant temporal localization.^{15,29,37} In one study, all patients with right temporal seizures were able to correctly read a test sentence within one minute of seizure termination while patients with dominant left temporal foci had disruption of reading for more than one minute.³⁷ In patients with atypical language representation, the lateralizing significance of language dysfunction has to be reinterpreted.

A variety of other manifestations may have lateralizing value. Ictal vomiting has been associated with right-sided foci.³⁸ However, this is not uniform, and vomiting may also be a manifestation of extratemporal foci.^{39,40} Unilateral eye blinking tends to be ipsilateral to seizure origin.⁴¹ Ictal vocalization has limited specificity with respect to localization or lateralization. Focal facial motor activity early in the seizure favors a lateral neocortical origin.⁴²

The manifestations upon transition to secondary generalization can be very valuable in lateralization. Versive head turning, tonic posturing, and clonic activity

are most often contralateral to seizure origin.^{27,43} Occasionally, however, they can be falsely lateralizing if there is contralateral seizure spread prior to generalization. Postictal cough has been found predominantly following right temporal seizures; postictal nose wiping tends to be performed with the hand ipsilateral to the seizure focus.⁴⁴⁻⁴⁷

None of the above signs is sufficient in isolation. However, the combination of several signs and symptoms can be a powerful tool in localizing and lateralizing TLE. The addition of semiological information unquestionably enhances the localizing ability of the presurgical evaluation.⁴⁸

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Abstract

Presurgical epileptic evaluation and epileptic surgery was started in 1997 at the Departments of Neurology and Neurosurgery, Al Assad Hospital, University of Damascus. The results of such incentive experiences shall be demonstrated. Between October 1997 and June 1999 a total of 28 patients (18 male and 10 female, age range 4 to 37 years) underwent resective surgery for medically intractable epilepsy. The diagnostic criteria were: 1. incomplete control of true seizures using at least 2 first-line anticonvulsive agents for at least one year. 2. focal specific epileptic or suspicious graphic elements in the interictal scalp electroencephalogram (EEG). 3. Magnetic resonance imaging findings prove a localized morphologic pathology adequate for epileptogenicity. 4. clinical anatomical congruence of seizure semiology, EEG focus and magnetic resonance image (MRI) pathology. The operative procedures, carried out so far: Anterior temporal lobectomy with (n=22) and without (n=2) hippocampectomy, frontal lobectomy (n=2), occipital topectomy (n=1), functional hemispherectomy (n=1). Morphology: hippocampal sclerosis (n=15), ganglioglioma (n=5) astrocytoma grade 1, dysembryoplastic neuroepithelial tumor, cavernoma or unspecific pathological tissue in the other 8 cases. At a mean follow-up interval of 12.9 months, 23 patients (82%) have been seizure free since the operation (Engel's classification 1), 2 patients (7%) had no more than 2 seizures per year (Engel II), and 3 patients (10%) showed a reduction in seizure frequency of at least 75% (Engel III). There was no operative and postoperative mortality. Even on the basis of an absolute noninvasive diagnostic level, the start of epileptic surgery proved to be of considerable epileptological benefit, especially to patients with temporal lobe epilepsy, 95% of them remained seizure free so far.