Does semiology tell us the origin of seizures consisting mainly of an alteration in consciousness?

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SUMMARY

Purpose: Studies on seizures only with an alteration of consciousness were limited mainly to generalized epilepsy. This seizure type has been described rarely in focal epilepsy. We aimed to analyze the semiologic features of this seizure type in focal and generalized epilepsies in a blinded design.

Methods: A total of 338 seizure videos in 100 patients were included exclusively by semiologic criteria. Two investigators evaluated the seizure semiology (aura, seizure duration, blinking, mild motor phenomena including automatisms, and so on) from the videos. Primarily the ictal electroencephalography (EEGs) studies and all laboratory findings were evaluated for the localization of the epileptogenic zone and delineating the syndromes, in the second step.

Key Findings: Of the focal epilepsy patients (n = 57), the epileptogenic zone could be localized to the temporal (n = 20), frontal (n = 9), and parietooccipital (n = 3) regions. The most common etiology of the generalized epilepsy patients (n = 43) was presumably genetic (n = 33). The presence of aura (none in generalized epilepsy vs. 35% in focal epilepsy; p = 0.0008), lack of blinking (19.3% in focal vs 65.1% in generalized epilepsy; p = 0.01), and longer seizure duration (generalized 14.3 ± 17.7 s vs focal 54.9 ± 40.1 s; p < 0.0001) are significantly associated with focal epilepsy, whereas high seizure frequency (p = 0.002), family history of epilepsy (p = 0.016), and responsiveness to therapy (p = 0.004) point to generalized epilepsy with logistic regression analysis.

Significance: Seizures consisting mainly of an alteration in consciousness may originate from any brain lobe in focal epilepsies and also occur in generalized epilepsies. Several semiologic and clinical features that help to differentiate between focal and generalized epilepsy should be considered in the syndrome diagnosis.

KEY WORDS: Absence, Semiology, Consciousness, Focal epilepsy, Generalized epilepsy.

Previous studies on seizures consisting mainly of an alteration of consciousness with minimal motor activity used highly selected patients with generalized epilepsies (absence seizures) based on strict electroencephalography (EEG) criteria (Penry et al., 1975; Stefan et al., 1982; Holmes et al., 1987; Panayiotopoulos et al., 1989). Alteration of consciousness is difficult to define, both theoretically and practically (Gloor, 1986). Operational definition was, therefore, recommended, such as alteration of responsiveness, awareness, and postictal recollection (Commission on Classification and Terminology of the International League against Epilepsy, 1981). Patients with focal epilepsies may also present with seizures clinically identical or very similar to absence seizures (Bancaud & Talairach, 1992; Noachtar et al., 2000). Usually these seizures are associated with an impairment of consciousness and have been labeled as arrest reaction, immobility, and even “absence” or pseudoabsence (Delgado-Escueta & Walsh, 1985; Bancaud & Talairach, 1992). Only limited data are available on seizures consisting of a lapse of consciousness in patients with focal epilepsy (Noachtar et al., 2000). Many of these patients have been reported to have frontal lobe epilepsy (Bancaud & Talairach, 1992). However, reports have also shown that these seizures may also originate from the temporal lobe (Wieser et al., 1992; Manford et al., 1996).

The new term “dialeptic” seizure is based exclusively on seizure semiology to avoid confusion with the term absence, which is reserved for generalized epilepsies. Dialeptic seizures (alteration of consciousness, staring, and loss of or minimal motor activity) (Lüders et al., 1998) have been identified with the help of video-EEG monitoring in patients...
with different focal epilepsies (Noachtar et al., 2000). During a dialeptic seizure, motor activity is normally reduced, although some minor movements may be present the longer the seizure lasts. Afterward, the International League Against Epilepsy (ILAE) Classification Core Group proposed another new term “dyscognitive seizures with or without automatisms,” which are not exactly synonymous with “complex partial seizures.” I defined on the basis of impaired consciousness only. Dyscognitive seizures implied that mesial temporal limbic areas and their connections are involved in the clinical manifestations, although seizures may have been initiated elsewhere (Engel, 2006). Due to these overlapping concepts and related confusion, the clinical characteristics of these seizures are awaiting further evaluation in a systematic comparative study design in patients with focal and generalized epilepsies.

The aim of the current study was to evaluate the semiotic characteristics of video-recorded seizures consisting mainly of an alteration in consciousness (absence/dialeptic seizures) in a large series of patients with focal and generalized epilepsies.

### Patients and Methods

We searched in our video-EEG archives of epilepsy monitoring units (EMUs) for patients, in whom at least one video-EEG–documented seizure was recorded, which mainly consisted of an alteration of consciousness and no or minimal motor activity. The seizures with “minimal motor activity” were included only after the agreement of all investigators and were defined as minor movements such as subtle and short tonic or versive upward eye movements, blinking, mild automatisms, or mild clonic jerks of the face or extremities lasting less than one-fourth of the seizure duration. In addition, the video-EEG investigations from a previous study (Baykan et al., 2005) were included after the patients’ informed consent. Technically poor videos, videos with inadequate ictal testing of consciousness, and videos in which the patients’ faces were not visible were excluded.

Responsiveness and recall of events happening during the ictal phase were tested by the EMU staff, and the patients were asked to remember test words or objects presented to them during the seizure. Loss of consciousness (LOC) is defined operationally when no or inadequate reaction to external stimuli can be obtained and the patient is amnestic for this episode. Once the patients had regained consciousness, they were asked using a structured interview to determine whether they (1) have had postictal aphasia, (2) recalled having an aura (3), or had any recall of what happened during the seizure.

All children aged <8 years were excluded because of the reported effect of age on the seizure semiology (Fogarasi et al., 2002). Seizures in severely mentally retarded patients were also not included because it is impossible to assess ictal consciousness in these individuals (Källen et al., 2002). Other seizure types (nondialeptic) occurring in these patients were not evaluated for the semologic part of the study. We also excluded 12 patients diagnosed with nonconvulsive status epilepticus.

The patients’ seizure videos were anonymized and identified by registration and seizure numbers. Two investigators, blinded to the clinical, EEG, and other laboratory findings, reviewed videotaped seizures according to the following semiotic features: seizure duration, onset and offset characteristics, eye blinking, eye/head deviation (sustained or mild), brief motor signs (myoclonic, tonic, clonic, dystonic, and so on), automatisms, aura, vocalization, and postictal findings (such as aphasia, amnesia, and Todd paresis).

If present, subtle and short (lasting less than one-fourth of the seizure duration as indicated above) motor manifestations (myoclonic, tonic, clonic, dystonic, and so on) were noted and automatisms were defined as described in the ILAE Commission Report (Blume et al., 2001). Head and eye movements are considered as “sustained” only if they appeared forced and consisted of at least a 45-degree rotation or tilt (Wyllie et al., 1986).

The clinical onset of the seizure was determined by the first visible change in the behavior, or when the patient announced his/her aura or pressed the seizure alarm button. The clinical seizure was judged to have ended when the patient started to interact normally with their surroundings. The presence of any aura and advance to other types of seizures during seizure evolution were also recorded, but these seizures were excluded from seizure duration analysis and postictal evaluations. An ictal feature was considered present if obvious to the reviewers during at least one of the patient’s seizures. It was not required to be present in all seizures of a given patient.

For each patient, a maximum of 15 seizures (usually the first 15) were analyzed. The most comprehensive symptomatology recorded from all seizures was assessed for the final analysis. For the final analysis of seizure duration, the median duration was taken. If the clinical duration of the seizure could not be judged by any of the investigators, it remained blank in this step and EEG duration of the seizure was used for final analysis of the seizure duration in the following step of the study, to avoid a selection bias.

Two reviewers examined the seizures individually; ambiguous findings were noted. In case of disagreement, a third reviewer reexamined the video and disagreements were solved with a consensus after the interobserver reliability analysis was completed.

After this step, ictal EEG studies of the investigated video-recorded seizures were examined. The records of clinical, neuroimaging findings, and other EEG investigations and all other laboratory data were evaluated and used for classification of the epilepsy syndrome. This retrospective review of files was accomplished after the end of the blinded part of the video analyses. Aura and postictal
amnesia for the seizure were obtained from descriptions on videotape or from medical records or both.

We did not include invasive recordings for binding purposes; invasive EEG evaluations were performed only in selected patients with focal epilepsy to determine the exact location of the epileptogenic region. Informed consent for noninvasive recordings, invasive recordings, and subsequent surgery was obtained in all patients.

Magnetic resonance imaging (MRI) according to standard protocols of each center, ictal and/or interictal single-photon emission computed tomography (SPECT) or positron emission tomography (PET), formal neuropsychological testing, and Wada test or functional MRI (fMRI) to lateralize speech and memory dominance were performed according to clinical indications.

Definition of the location of the epileptogenic zone was based on ictal EEG and concordant findings in the other investigations. In case of multifocal origin or uncertain ictal EEG or if major discrepancies exist with the other laboratory data (such as MRI or PET indicating lesions of a different location) the patient’s epilepsy syndrome was labeled as focal epilepsy not further localized.

Seizure frequency was sometimes difficult to assess and varied with treatment and time course. Therefore, seizure frequency was grouped in broad categories such as daily, weekly, or monthly according to the reported frequency in the previous months at the time of the video-EEG recording.

Pharmacoresistance to medical therapy was determined by history based on seizure frequency (more than one seizure monthly) under appropriate treatments with at least two antiepileptic drugs.

Descriptive statistics were performed on parameters such as age, age at onset, and so on. Pearson’s chi-square or Fisher’s exact test was applied to evaluate the significance of the relevant parameters, where appropriate. Mann-Whitney U test was applied to age at onset and clinical seizure duration. Kappa analysis was performed for inter- and intraobserver agreement analysis. We performed binary logistic regression analysis to explore differentiating clinical anamnesis variables between generalized and focal seizures, separately for significant parameters. Furthermore, penalized maximum likelihood logistic regression analysis was performed with significant semilogic variables between generalized and focal seizures to include aura, which was not present in the generalized epilepsy group (Heinze & Schemper, 2002).

**RESULTS**

Three hundred thirty-eight seizures (144 focal and 194 generalized seizures) of 100 consecutive patients were evaluated. The mean age was 26.1 ± 12.7 years and the mean age at onset of epilepsy was 12.4 ± 9.2 years. Table 1 summarizes the clinical and semilogic data in relation to the two subgroups of focal and generalized epilepsy. An average of 3.4 ± 3.9 dialeptic seizures per patient was investigated.

The onset of the seizure was abrupt in 72 patients and indefinite or gradual in 28 patients (7 of the generalized group vs. 21 from the focal group). The clinical offsets of the seizures were not obvious to examiners in five patients with generalized epilepsy and 18 patients of the focal group.

All patients showed impaired responsiveness during the studied seizures. The recall of ictal events could not be judged in 58 patients due to lack of conclusive examination in the video. The remaining 16 patients could recall some events during the seizure (10 patients with generalized and 6 patients with focal epilepsy), whereas 26 patients had postictal amnesia (12 cases in the focal epilepsy group and 14 cases in the generalized epilepsy group). Postictal aphasia was determined in eight patients with focal epilepsy and in none of the patients with generalized epilepsy.

Minimum ictal duration was 2 s and maximum duration was 210 s in the whole group with a median of 37.5 ± 38.1 s. Dialeptic seizures of <15 s are always in the context of generalized epilepsy, and seizures lasting >77 s are always a reflection of focal epilepsy. The overlap group of the seizure durations, seen in Figure 1, consisted of 11 patients with generalized epilepsy and 48 patients with focal epilepsy and did not show any specific clinical or syndromic characteristics in the final analysis. Figure 2 shows distribution of focal versus generalized epilepsy cases according to age at onset and median duration.

Eye blinking is significantly more frequent in generalized epilepsy (Table 1), whereas the types of automatisms were not different among the subgroups. The special situation of eye opening at seizure onset was present in 27 patients in our series, being more frequent in the generalized group. Aura was present in only 35.1% of the patients with focal epilepsy and in none of the patients with generalized epilepsy. The patients with generalized epilepsy had more frequent seizures when compared with the focal group.

The overall interobserver agreement analysis assessed in 100 randomly selected seizures was excellent, with a kappa index of 0.9. The intraobserver agreement assessed by the first author in two separate evaluations done 2 months apart was also excellent (kappa 0.87).

Abnormal MRI findings were significantly higher in patients with focal epilepsy (40 patients; 70.2%) and in only 3 (7.7%) of the patients with generalized epilepsy. MRI investigations (and results of neuropathologic investigations when available) revealed congenital malformation (polymicrogyria, double cortex, and so on) in 2 patients, mesial temporal sclerosis in 7 patients, tumor in 8 patients, and vascular malformation in 3 patients of the focal epilepsy group. In 16 patients, MRI showed lesions supporting a remote insult like birth trauma, head trauma, or encephalitis. In the remaining patients the nature of the MRI lesion could not be determined.
The presence of the normal EEG background activity is not helpful for differentiating the subgroups (Table S1). Invasive EEG evaluations were performed only in selected patients with focal epilepsy (n = 15; 26.3%) to determine the exact location of the epileptogenic region. Ninety-four of the 100 patients also had other seizures types in addition to the video-analyzed seizures (automotor, myoclonic, generalized tonic–clonic, and so on). The patients were further classified according to their ictal EEGs as explained in the Methods section.

Ictal EEG analysis and its concordance with neuroimaging and other laboratory data was the basis for the classification into focal versus generalized groups and, therefore, nine patients without clear cut ictal EEG origins were excluded.

The syndromic classification and characteristics of the focal and generalized patients were shown in Table 2. Because aura is not present in the generalized group, it is not suitable for ordinary logistic regression analysis, so we performed penalized maximum likelihood logistic regression analysis described by Heinze and Schemper with significant semiologic variables extracted from the video analysis. The results of this analysis shown in the Table 3 disclosed that aura, seizure duration, and blinking were statistically significant semiologic variables to differentiate between focal versus generalized epilepsy.
A second logistic regression analysis was performed with clinical variables extracted from anamnesis. The results of this analysis, shown in Table 4, disclosed that seizure frequency, refractoriness, and family history were statistically significant variables to differentiate between focal versus generalized seizures.

**DISCUSSION**

We analyzed the semiology of seizures with an alteration of consciousness (dialeptic) in both generalized and focal epilepsies in a comparative design. Aura, seizure duration, and blinking are the semiologic features that help to differentiate between dialeptic seizures of patients with generalized or focal epilepsies. In addition to these semiologic features, differentiating clinical features are seizure frequency (p: 0.002), family history of epilepsy (p: 0.016), and refractoriness to antiepileptic medication (p: 0.004) with logistic regression analysis.

Our study corroborates previous observations: complex partial seizures have a longer duration than absence seizures (Penry et al., 1975; Dreifuss, 1992) and the well-known presence of aura in focal epilepsies only. Interestingly, semiologic features such as automatisms did not help to distinguish between focal and generalized epilepsies, since they occurred similarly in both syndromes. The pioneering work of Penry et al. (1975) has already shown that automatisms were frequently observed during absence seizures in addition to other mild motor signs movements and decreased postural tone.

Ictal arrest of activity in frontal lobe epilepsy was not reported to be associated with eye blinking (Broglin et al., 1992), as it is commonly observed during absence seizures in patients with idiopathic generalized seizure (IGE) (Penry et al., 1975). Indeed, blinking came out as another significant semiologic variable to differentiate between the generalized versus focal epilepsy in favor of generalized epilepsy in our study. There are reports of patients with unilateral eye blinking ipsilateral to the ictal discharge (Benbadis et al., 1996), and there was one patient with ipsilateral eye blinking in our series. In a study aimed at defining the semiology of seizures in temporal lobe epilepsy (TLE) according to the age at onset (Villanueva & Serratosa, 2005), it was concluded that the later onset group presented a higher incidence of blinking, suggesting some unknown influence of developmental factors on blinking associated with seizures.

Head deviation was more frequent in focal seizures; however, this finding could not reach significance in logistic regression analysis. There is no previous study comparing the head and eye version in generalized epilepsy with partial epilepsy, although reports exist about head version in generalized epilepsy (Leutmezer et al., 2002). Abrupt onset and end of the seizures, which were typical features of absence seizures, also occur in patients with focal epilepsy.

Epileptic ictal activity affecting purely the medial surface of the intermediate frontal region has been described.
to produce “frontal absences” (Bancaud & Talairach, 1992). These findings were described as secondary bilateral synchrony in surface and depth recordings (T/C252kel & Jasper, 1952; Niedermeyer et al., 1969). In addition, seizures from frontopolar region are characterized by an early and major disturbance of contact with the environment, which could be mistaken for generalized epilepsy (Bancaud & Talairach, 1992). In the seizures of temporal lobe origin, initial motionless stare was observed in 24% of the patients (Quesney, 1986). In a study based mostly on witnessed focal seizure descriptions, it was found that absence-like seizures with no focal symptoms were predominantly related to TLE (Manford et al., 1996). Indeed, most of the cases in our series had clear evidence of TLE. However, all but one also had seizures with prominent oral and manual automatisms, making the assumption of TLE easier. Furthermore, diaplectic seizures were reported in a series of patients with intractable parietal lobe epilepsy (Kim et al., 2004). Our study has shown that ictal discharges in temporal lobe (mostly with mesial, but as well as with lateral TLE), in frontal lobe, and also in parietooccipital lobes could be associated with this seizure type, making it highly unlikely that they are specific for a particular cortical region. The predominance of the TLE could, however, be related to the overrepresentation of the patients with TLE.

All kinds of epilepsy etiology, either known or unknown, could be associated with this seizure type, but a remote symptomatic etiology seems pronounced in the group with focal epilepsy in our series.

Although loss of consciousness is usually seen when both hemispheres are affected by the ictal discharge (Jasper, 1964), it could also appear during unilateral seizures, as demonstrated in our study. Lux et al. (2002) analyzed the localizing value of ictal loss of consciousness and found it frequently impaired in patients with left temporal or bitemporal seizure activity (Inoue & Mihara, 1998). It is worth emphasizing that bilateral lesions, diffuse hemispheric involvement, multifocal origin, and large foci were present in at least one third of our patients. On the contrary, strictly localized ictal discharges of the nondominant hemisphere were still observed in some of our patients, causing the same clinical picture.

Neuropsychological and physiologic studies have suggested that the consciousness is neither an emergent property of the brain as a whole nor a function of a single center (Delacour, 1997). Operationally, the International League Against Epilepsy links consciousness to the degree of awareness (memory) and/or responsiveness (intention and perception). Preserved perception with inhibited motor activity has been well-documented (Fromm, 1986), making it again unlikely that consciousness and motor activity are disturbed by the same mechanisms. Bilateral automatisms with preserved consciousness could be elicited during unilateral stimulation of the anterior cingulate (Talairach et al., 1973). Therefore, loss of consciousness does not appear to

### Table 3. Results of the penalized maximum likelihood logistic regression between focal and generalized epilepsy groups based on semilologic findings of video-recorded seizures

<table>
<thead>
<tr>
<th>Semiologic parameter</th>
<th>Parameter estimate</th>
<th>Odds ratio</th>
<th>Lower 95% CI</th>
<th>Upper 95% CI</th>
<th>Chi-square p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median duration</td>
<td>0.05446</td>
<td>1.0560</td>
<td>1.02333</td>
<td>1.10</td>
<td>&lt;0.0001*</td>
</tr>
<tr>
<td>Eye opening</td>
<td>0.00767</td>
<td>1.01077</td>
<td>0.22714</td>
<td>4.76</td>
<td>0.9919</td>
</tr>
<tr>
<td>Blinking</td>
<td>−1.68132</td>
<td>0.1861</td>
<td>0.04269</td>
<td>0.68</td>
<td>0.0106*</td>
</tr>
<tr>
<td>Head turning</td>
<td>0.19714</td>
<td>1.2179</td>
<td>0.32027</td>
<td>4.42</td>
<td>0.7657</td>
</tr>
<tr>
<td>Aura</td>
<td>3.55179</td>
<td>4.8756</td>
<td>3.41310</td>
<td>4865.90</td>
<td>0.0008*</td>
</tr>
<tr>
<td>Vocalization</td>
<td>0.94442</td>
<td>2.5713</td>
<td>0.48158</td>
<td>17.81</td>
<td>0.2763</td>
</tr>
</tbody>
</table>

*Statistically significant p values < 0.05. CI, confidence interval.

### Table 4. Results of the logistic regression analysis between focal and generalized epilepsy groups based on clinical anamnestic variables

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE</th>
<th>Wald</th>
<th>D.f.</th>
<th>Sig.</th>
<th>Exp (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seizure frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency (1)</td>
<td>−3.671</td>
<td>0.890</td>
<td>17.007</td>
<td>1</td>
<td>0.000</td>
<td>0.025</td>
</tr>
<tr>
<td>Frequency (2)</td>
<td>−2.374</td>
<td>0.780</td>
<td>9.273</td>
<td>1</td>
<td>0.002</td>
<td>0.093</td>
</tr>
<tr>
<td>Refractoriness (1)</td>
<td>2.083</td>
<td>0.725</td>
<td>8.264</td>
<td>1</td>
<td>0.004</td>
<td>8.030</td>
</tr>
<tr>
<td>Age at onset</td>
<td>0.026</td>
<td>0.037</td>
<td>0.481</td>
<td>1</td>
<td>0.488</td>
<td>1.026</td>
</tr>
<tr>
<td>Remarkable events in history (1)</td>
<td>1.334</td>
<td>0.761</td>
<td>3.068</td>
<td>1</td>
<td>0.080</td>
<td>3.795</td>
</tr>
<tr>
<td>Family history (1)</td>
<td>−2.044</td>
<td>0.848</td>
<td>5.814</td>
<td>1</td>
<td>0.016</td>
<td>0.130</td>
</tr>
<tr>
<td>Constant</td>
<td>1.009</td>
<td>1.139</td>
<td>0.786</td>
<td>1</td>
<td>0.375</td>
<td>2.743</td>
</tr>
</tbody>
</table>

B, beta (regression coefficient); SE, standard error; D.f., degree for freedom; Sig., significance; Exp (B), OR: exponential B, odds ratio.

*The model summary showed a −2 Log likelihood ratio of 69.8 and using this model 82% of the patients (84 of the focal seizures and 79 of generalized seizures) could be classified correctly with a cut off value of 0.5.
be a precondition for the presence of automatisms. This poor localizing value of “consciousness,” which is also evident in our study, raises the question of whether consciousness is suitable to be used as a parameter in the context of seizure classification. Hence, the ILAE Commission on Classification and Terminology has decided for focal seizures that the distinction between the different types (e.g., complex partial and simple partial) should be eliminated (Berg et al., 2010). They also stated that recognizing that impairment of consciousness/awareness or other dyscognitive features, localization, and progression of ictal events can be of importance in the evaluation of individual patients.

The presence of clear cut auras in epileptic seizures is of certain diagnostic importance, indicating the focal nature of the epileptic disorder as well as giving information for localization (van Dorselaar et al., 1980); however, their differentiating value is questionable when they are absent or nonspecific. Penfield and Jasper were the first to report amnesia of a documented epileptic aura (Penfield & Jasper, 1954).

The dichotomy between focal and generalized epilepsies has been blurred, since neuropathologic studies (Meencke & Janz, 1984) as well as imaging data (Woerman et al., 1998; Bernasconi et al., 2003) hypothesized the existence of focal abnormalities in patients with well-documented IGE. In a retrospective study of IGE, Leutmezer et al. (2002) observed clinical signs pointing toward focal epilepsy including version and postictal hemiparesis, among others. Our series provided support to these clinical as well as EEG overlaps (Tables 1–2). The new ILAE special report also underscored these clinical and EEG overlaps, among others. Our series provided support to these clinical as well as EEG overlaps (Lombroso, 1997) between focal and generalized seizures (Tables 1–2). The new ILAE special report also underscored that “generalized” and “focal” should be redefined for seizures as occurring in and rapidly engaging bilaterally distributed networks (generalized) and within networks limited to one hemisphere and either discretely localized or more widely distributed (focal) (Berg et al., 2010).

Childhood absence epilepsy (CAE) is the archetypal absence epilepsy syndrome (Loiseau et al., 1994). Because of the age limit of CAE, it is possible that CAE is underrepresented in our study. Our IGE group should be criticized in that it is a highly selected group of atypical and resistant generalized epilepsy cases because the patients were admitted to tertiary centers, but the group also includes ordinary consecutive patients of another study (Baykan et al., 2005).

In conclusion, seizures consisting mainly of an alteration in consciousness may originate from any brain lobe in addition to occurring in generalized epilepsies. Short seizure duration and presence of blinking are helpful semilogic features that point to a generalized epilepsy and are less likely to occur in focal epilepsies, which have auras as differentiating variables. The history of patients with generalized epilepsy shows a higher seizure frequency, more commonly positive family history of epilepsy, when compared with the focal epilepsy patients who are more likely to be refractory to medical treatment.

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**Disclosure**

None of the authors has any conflict of interest to disclose and the paper conforms to the ethical guidelines of *Epilepsia* for publication. We confirm that we have read the Journal’s position on issues involved in ethical publication and affirm that this report is consistent with those guidelines.

**References**


**Supporting Information**

Additional Supporting information may be found in the online version of this article.

**Table S1.** Summary of interictal EEG data (recorded during continuous EEG-video monitoring).

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