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The evaluation of interictal focal EEG findings in adult patients with absence seizures

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ABSTRACT

Purpose: To investigate the focal interictal EEG abnormalities in adult patients with absence seizures (ASs) and to identify their clinical, EEG and semiological correlates.
Methods: Fifty patients older than 18 years, diagnosed as having IGE with AS documented with ictal recordings. Interictal focal sharp or spike–waves and strictly focal paroxysmal slow activity were considered as focal EEG features. The patients having focal EEG features were classified as "Group I", whereas the remaining of them was classified as "Group II".
Results: We observed focal findings in 34% of the patients, mainly in frontotemporal (41%), and frontal (29%) regions. There were no significant differences with respect to the clinical parameters such as sex, epilepsy duration, positive family history and the age of the onset between the groups. Psychiatric co-morbidities were significantly higher in Group I when compared to Group II ($P = 0.00$). Accompanying automatisms were higher in Group I, whereas eye deviation during absences was higher in Group II. In Group I, the asymmetry of the ictal discharges was more frequently observed. Focal EEG features were more frequently seen in juvenile absence epilepsy syndrome, without reaching a significance level.
Conclusion: The focal findings in adult absence epilepsy patients could have some unknown etiopathogenetic and prognostic implications. We emphasize the cautious interpretation of isolated interictal focal EEG abnormalities to prevent a wrong diagnosis of focal epilepsy in patients who may indeed suffer from generalized epilepsy.

1. Introduction

Idiopathic generalized epilepsy (IGE) with absence seizures (ASs) usually has its onset in childhood and puberty and is expected to remit in adulthood. Nevertheless it may persist, appear or recur in adult life in 7–81% of the cases.[1–5] There are reports of adult IGE patients with AS who remain unrecognized are diagnosed with a substantial delay.[6,7] The classical interictal EEGs of AS present a normal background activity with bilateral symmetric and synchronous 3-Hz spike and wave discharges usually with a superior frontal maximum. However, a few authors have reported additional interictal focal EEG features in about 1/3 of the cases.[6,8–10]

In a cohort with various IGE syndromes including those with AS, 56% had focal features which presented in up to 65% of the EEGs in each of the patients.[11] It was reported that absence epilepsy (AE) syndromes in adults may show particular clinical and EEG patterns distinct from those in childhood or adolescence.[10] Thus, absence epilepsy in adult life requires special attention.

Furthermore, recent studies in epileptic rats confirmed that there is a consistent focus within the somatosensory cortex from which seizure activity generalizes over the cortex, even though a functionally intact thalamocortical network is required for the generation of the spike and wave discharges.[12]

The purpose of the current study is to investigate interictal focal EEG features in adult patients with AS and to identify their clinical correlates.

2. Methods

All patients who were older than 18 years, diagnosed as having IGE with AS according to the ILAE criteria[13] and followed-up for at least 1 year at Istanbul Faculty of Medicine, Department of Neurology, Epilepsy Outpatient Clinic between the years of 1997 and 2002 were investigated in this retrospective study. Ninety-eight patients had a history of short spells the prominent feature of which was an alteration of consciousness with loss or decrease of motor activity accompanied by generalized, bilaterally symmetrical spike and wave discharges on the EEG and normal

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background activity. None of them had previous neurological problems except for febrile seizures and all subjects had normal neurological examinations, although some of them had mild intellectual deficits. The results of all laboratory tests were in the normal range including those of neuroimaging when performed.

From the main group, we included 50 patients with ictal recordings to the current study, those with either good quality videos (25) or detailed records of the seizure semiology (25) during AS. The remaining 48 patients who described AS clinically and had short-lasting (less than 2 s) generalized spike and wave paroxysms as interictal discharges without clinical symptoms were excluded (Fig. 1). Two of the investigators (ZM, AG) re-examined a total of 476 EEGs or video-EEGs and the clinical charts of the cases for the current study, in order to select the patients with clear-cut ictal discharges compatible with a diagnosis of absence seizures. Only 1 patient had 1 EEG (a 4-h recording) and 5 patients had 2 EEGs. The remainder of the group had 3–15 EEGs. In one of our previous studies,[14] all consecutive patients admitted with a presumptive diagnosis of "absence" seizures had undergone a detailed epileptological examination and video-EEG monitoring after the patients' informed consent. These patients were also included in the current study.

EEG recordings were performed with scalp electrodes placed according to the international 10–20 system with both bipolar and referential montages. Standard activating procedures were performed in all patients. We studied the following scalp EEG phenomena: background activity, effects of intermittent photic stimulation and hyperventilation, asynchronous onset and termination of ictal discharges, asymmetrical appearance of generalized ictal activity, fragmentation of the discharges, regularity, fast rhythmic activity during the ictus, anterior predominance at the onset of ictal discharges and multiple spike and wave morphology. Interictal focal sharp or spike/spike and wave complexes, and strictly focal paroxysmal 2–7 Hz slow wave activity (seen in more than 1 EEG) were considered as focal EEG features. The patients with these focal features were classified as "Group I", whereas the remaining patients who were classified as "Group II" had no focal discharges. Other definitions for EEG were as follows. Spike: a transient activity with duration of 20–70 ms and variable amplitude, clearly distinguishable from the background. Sharp wave: a transient activity with a duration of 70–200 ms, clearly distinguishable from the background. Slow wave: a wave with duration longer than alpha waves. Amplitude asymmetry: >50% difference in the amplitude of activity recorded from the two sides of the head. Asynchrony: waveforms that occur in different channels without constant time relation to each other. Fast activity: 8–20 Hz low amplitude rhythmic bursts.

Clinical parameters evaluated included sex, age at onset of epilepsy, age at onset of absence seizures, age at the last follow-up, duration of follow-up, history of febrile seizures, family history for seizures, presence of psychiatric problems and semiological analysis of absence seizures with regard to tonic, clonic, myoclonic components, automatisms, hypotonia, eye blinking, eye deviation, and autonomic signs or simple absences. These ictal semiological features (myoclonic, clonic components, etc.) and automatisms were defined as described in the ILAE Commission Report.[15] Seizure frequency was inquired separately for each seizure type at each visit and seizure diaries were examined routinely. Absence seizures were grouped according to their frequency at the beginning and at the end of the study period as seen in Table 4. All patients were independently evaluated by at least two of the experienced epileptologists during follow-up. If the physicians noted the existence of psychiatric problems or the patient reported psychiatric complaints, they were sent to the psychiatry team to clarify the psychiatric diagnosis according to the DSM-IV. All the listed clinical features were compared between the two subgroups to find out if these subgroups had specific patient profiles.

An epilepsy syndrome diagnosis was made for each patient in joint sessions, based on the clinical and EEG features according to

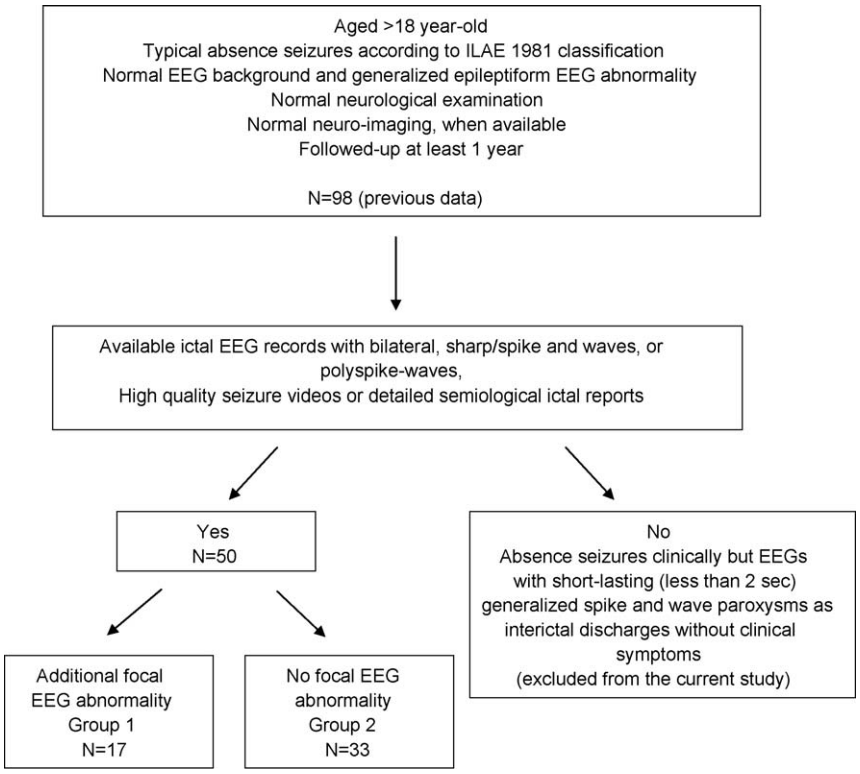

Fig. 1. The flow chart of the study.