Arq Neuropsiquiatr 2003;61(3-A):580-587

SYNDROMIC CLASSIFICATION OF PATIENTS WITH TYPICAL ABSENCE SEIZURES

Laura M.F.F. Guilhoto[1], Maria Luíza G. Manreza[1], Elza M.T. Yacubian[1]

ABSTRACT - The aim of this study is to compare ILAE classification (1989) and Panayiotopoulos' criteria (1997) for absence epilepsies. We studied 455 typical absences (ILAE, 1981) by video-EEG in 43 patients with normal neurological and neuroradiological examinations and interictal EEG with spike-wave complexes higher than 2.5Hz. Syndromic diagnosis was possible in 60.5% and 67.4% of the patients using ILAE classification and Panayiotopoulos' proposal, respectively. According to ILAE criteria 19 patients had childhood absence epilepsy (CAE), five juvenile absence epilepsy (JAE), one juvenile myoclonic epilepsy (JME) and one epilepsy with specific modes of seizure precipitation. According to Panayiotopoulos' proposal, 10 had CAE, 14 JAE, one JME, three myoclonic absence epilepsy and one eyelid myoclonia with absences. We conclude that Panayiotopoulos' criteria and ILAE classification for absence epilepsies, which did not allow for the classification of 32.6% and 39.5% of cases, respectively, were still insufficient to classify all patients under specific diagnosis.

KEY WORDS: absence epilepsy, generalized epilepsy, idiopathic epilepsy, epilepsy syndromes, classification.

Classificação sindrômica de pacientes com crises de ausência típica

RESUMO - O objetivo deste estudo é comparar a classificação da ILAE (1989) e a proposta de Panayiotopoulos (1997) para epilepsia ausência. Foram estudadas 455 crises de ausência típica (ILAE, 1981) através de vídeo-EEG em 43 pacientes com exames neurológico e neurorradiológico normais e EEG interictal mostrando complexos de espícula-onda ritmados acima de 2,5Hz. Diagnóstico sindrômico foi possível em 60,5% e 67,4% dos pacientes usando a classificação da ILAE e de Panayiotopoulos, respectivamente. De acordo com os critérios da ILAE,19 pacientes apresentavam epilepsia ausência da infância (EAI), cinco epilepsia ausência da juventude (EAJ), um epilepsia mioclônica juvenil (EMJ) e um epilepsia com modos específicos de precipitação das crises. De acordo com a proposição de Panayiotopoulos, 10 tinham EAI, 14 EAJ, um EMJ, 3 epilepsia ausência mioclônica e um mioclonias palpebrais com ausências. Concluímos que a proposição de Panayiotopoulos e a classificação da ILAE para epilepsia ausência, que não permitiram a classificação de 32,6% e 39,5% dos casos respectivamente, ainda se mostraram insuficientes para classificar todos os pacientes sob diagnósticos específicos.

PALAVRAS-CHAVE: epilepsia ausência, epilepsia generalizada, epilepsia idiopática, síndromes epilépticas, classificação.

There are several controversies regarding typical absences classification. The International League Against Epilepsy (ILAE) classification (1989)[1] recognizes the following syndromes with typical absences: childhood absence epilepsy (CAE), juvenile absence epilepsy (JAE), juvenile myoclonic epilepsy, epilepsy with specific modes of seizure precipitation and myoclonic absence epilepsy. Panayiotopoulos (1994, 1997)[2,3] discussed the electroclinical differences of typical absences in these as well as in other syndromes recently described such as eyelid myoclonia with absences, perioral myoclonia with absences, phantom absences with generalized tonic-clonic seizures (GTCS) and absence epilepsy with single myoclonic jerks.

All these syndromes have different prognosis and outcomes. Children with CAE have good outcome and antiepileptic drugs (AED) can be discontinued after some years of treatment. On the other hand, most patients with a defined diagnosis of juvenile myoclonic epilepsy and JAE must take AED throughout their lives. The new described syndromes, such as eyelid myoclonia with absences and perioral myoclonia with absences, also carry a worse prognosis. For this reason it would be very important to rigoro-

Divisão de Clínica Neurológica do Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo (FMUSP) São Paulo SP, Brazil: [1]MD, PhD. Supported by CNPq (Brazil).

Received 14 October 2002, received in final form 21 February 2003. Accepted 15 March 2003.

Dra. Laura M.F.F. Guilhoto - Avenida Dr. Enéas de Carvalho Aguiar - Divisão de Clínica - Neurológica - Hospital das Clínicas FMUSP - 05403-900 São Paulo SP - Brasil - FAX: 551130827548. E-mail: lauragui@usp.br

usly define the syndromic classification for every particular patient as an individual.

The aim of this paper is to compare the ILAE classification (1989)[1] and Panayiotopoulos' criteria (1997)[3] for absence epilepsies in 43 patients with typical absences in order to analyze both systems of classification.

METHOD

We studied 455 seizures recorded in 43 patients with typical absences (mean 10.5 per patient) by video-EEG. All patients signed an informed consent to participate in the study. Typical absences were defined based on ILAE classification (1981)[4]: "sudden onset, with interruption of ongoing activities, a blank stare, possibly a brief upward rotation of the eyes lasting from a few seconds to half a minute". All patients had normal neurological and neuroimaging examinations and EEG interictal bursts of spike-wave complexes (SWC) higher than 2.5 Hz. For the video-EEG recording, we utilized a Telefactor 32 channel system in 41 patients and a Nihon-Kohden 18 channel-EEG machine in two.

The video-EEG monitoring consisted of a minimum of three hours of recording, in the morning after sleep deprivation and without any change in the current medication. Forty patients had muscular electrodes in the deltoid muscles. Intermittent photostimulation was performed in all patients and hyperventilation in 42. These patients were then submitted to several periods of hyperventilation with the eyes open, when they were asked to count aloud the number of respiratory incursions, as suggested by Panayiotopoulos et al.[5]

The analysis of semiological characteristics included alteration of consciousness graded as severe, when the patient stopped hyperventilation and/or the counting and there was an alteration of the reactivity and the memory; and as subtle, when either one of these tasks was not abolished or when the seizure lasted less than 1.5 seconds. The reactivity was measured by asking the patient to obey simple commands (such as to stick out the tongue) and the verbal memory by asking to remember some words during and after the seizures.

The EEG study consisted of the analysis of the background activity, interictal discharges and ictal abnormalities such as the frequency of the SWC. The following frequencies were analyzed: initial (first second), intermediate (two-four seconds), final (last three seconds) and total, which consisted of the average of all the former. Two neurophysiologists analyzed these data, one of them blind to clinical information.

The patients were followed in the out-patient unit for a period ranging from two years to four years and three months (mean 40 months).

The criteria of the ILAE classification (1989) and the Panayiotopoulos proposed classification (1997) were strictly utilized to classify these patients and are listed in Tables 1 and 2, respectively. In the ILAE classification two points were not considered sufficiently clear: school age and seizure frequency. Since school age was not precisely defined, in this study we considered it as four to 10 years of age. Regarding the frequency of the seizures, they were considered as very often if the patient presented more than 10 seizures per day.

RESULTS

Age of typical absences onset ranged from five to 16 years. The patients' age at the time of examination ranged from one year and five months to 53 years. A syndromic diagnosis was possible according to ILAE criteria and Panayiotopoulos proposed classification in 60.5% and 67.4% of the patients, respectively. Graphic 1 shows the number of patients classified by these two criteria.

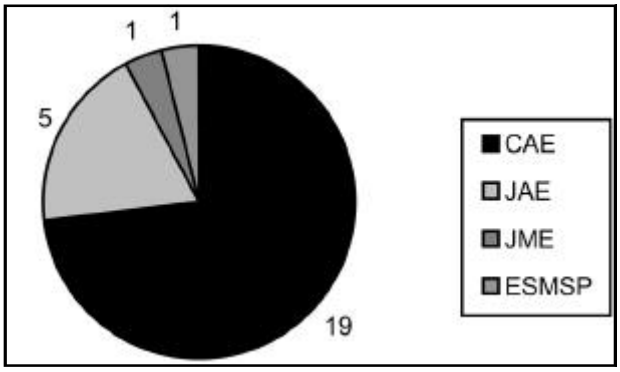
Eleven patients (25.6%) did not present electroclinical characteristics that could permit the inclusion either in ILAE system of Classification or in Panayiotopoulos proposal. Three subgroups were identified: early onset of the seizures (n=4); fast activity (10-20Hz) associated to SWC (n=4); inadequacy of clinical and electrographical findings that would fit a specifically described syndrome (n=3).

ILAE criteria

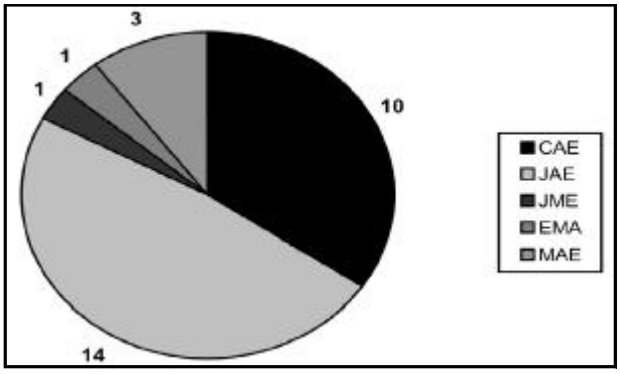
According to ILAE criteria 19 patients were classified as CAE, five as JAE, one as juvenile myoclonic epilepsy and one, as having absences precipitated by photostimulation, as epilepsy with specific modes of seizure precipitation. In 17 patients (39.5%) the syndromic classification was not possible. The following clinical findings did not permit the inclusion in syndromes described in the ILAE classification: very early onset of absence and GTC seizures (n=5); ictal fast electrographical activity (10-20 Hz) associated to SWC (n=4); incongruence between EEG and clinical criteria, such as age of onset, seizure frequency and electrographical pattern (n=8). Graphic 2 shows the syndromic classification regarding ILAE's criteria.

Panayiotopoulos' criteria

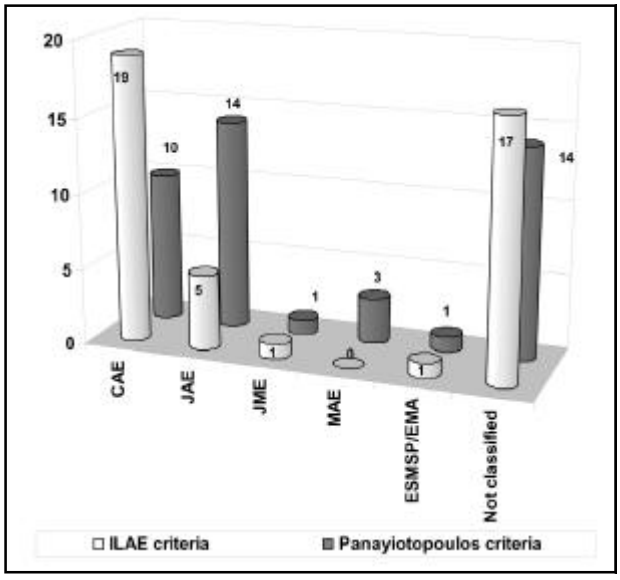
According to Panayiotopoulos' proposal we were able to classify the patients in the following groups: CAE (n=10), JAE (n=14), juvenile myoclonic epilepsy (n=1), myoclonic absence epilepsy (n=3) and eyelid myoclonia with absences (n=1). In 14 patients specific syndromes could not be identified due to the following features: very early onset of absences and GTCS (n=4); short duration of absence seizures (less than four seconds) (n=4); ictal fast electrographical activity (10-20 Hz) associated to SWC (n=4); and fi-



Graphic 1. Classification according to ILAE's criteria (1989). CAE, childhood absence epilepsy; JAE, juvenile absence epilepsy; JME: juvenile myoclonic epilepsy; ESMSP, epilepsy with specific modes of seizure precipitation.



Graphic 2. Classification according to Panayiotopoulos' proposal (1997). CAE, childhood absence epilepsy; JAE, juvenile absence epilepsy; EMA, eyelid myoclonia with absences; JME, juvenile myoclonic epilepsy; MAE, myoclonic absence epilepsy.



Graphic 3. Specific syndromic classification. CAE: childhood absence epilepsy; JAE: juvenile absence epilepsy; JME: juvenile myoclonic epilepsy; MAE: myoclonic absence epilepsy; ESMSP: epilepsy with specific mode of seizure precipitation; EMA: eyelid myoclonia with absences.

nally, two patients with clinical characteristics of perioral myoclonia with absences had EEG patterns which differed from those described by Panayiotopoulos, such as long duration of seizures (20 seconds) and regular SWC.

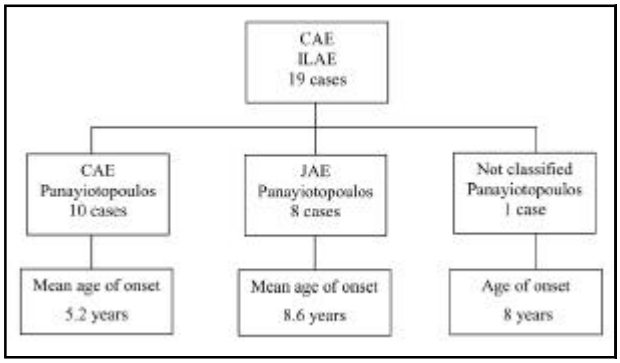
Graphic 3 shows the syndromic classification regarding Panayiotopoulos' criteria.

Comparison between ILAE/Panayiotopoulos' criteria

There was congruence in the syndromic diagnosis according to ILAE and Panayiotopoulos' criteria in 14 patients (32.6%). The results of the comparison between the two criteria can be verified in Graphic 4.

In cases with different diagnosis the greater discrepancy was found in the groups of CAE and JAE. In the ILAE classification a greater (n=19) number of cases could be placed under the diagnosis of CAE than in Panayiotopoulos' proposal (n=10). On the contrary, in this group, a greater number of patients received the diagnosis of JAE (n=19) when compared to the ILAE classification (n=5).

The following diagram shows the classification according to Panayiotopoulos' proposal of 19 patients classified as CAE when ILAE's classification was used.



In the patients who were classified as CAE in ILAE classification and as JAE in Panayiotopoulos' proposal[3] we observed a mean age of onset of seizures older (mean 8.6 years) than in the patients classified as CAE according to this author (5.2 years).

One patient was diagnosed as having epilepsy with specific modes of seizure precipitation according to ILAE and eyelid myoclonia with absences in Panayiotopoulos' proposal.

Six patients classified according to Panayiotopoulos' criteria could not be classified by that of ILAE. Three of these patients were classified as myoclonic absence epilepsy according to this author's criteria and were not classified according to ILAE, because of the presence of polyspikes that were not described

Table 1. Syndromes with typical absences described in the Proposal for Revised Classification of Epilepsies and Epileptic Syndromes of the Commission on Classification and Terminology of the International League Against Epilepsy (1989).

Childhood Absence Epilepsy (Pyknolepsy)
Children of school age (peak manifestation six to seven years)
Very frequent (several to many per day) absences
EEG with bilateral, synchronous and symmetrical spike-waves, usually at 3 Hz
Development of GTCS often occurs during adolescence
Juvenile Absence Epilepsy
Absences are the same as in pyknolepsy though retropulsive movements are less common
Clinical manifestation occurs around puberty
Seizure frequency lower than in pyknolepsy, less frequently than every day
Frequent association with GTCS which precede the absence seizures more often than in pyknolepsy
Not infrequently, presence of myoclonic seizures
Spike waves are often >3 Hz
Excellent response to therapy
Juvenile Myoclonic Epilepsy (Impulsive Petit Mal)
Appears around puberty
Seizures with bilateral, single or repetitive, arrhythmic, irregular myoclonic jerks, predominantly in the arms with no noticeable disturbance of consciousness
Often, there are GTCS and less often, infrequent absences
Rapid, generalized, often irregular spike-waves and polyspike-waves in interictal and ictal EEG
Frequently the patients are photosensitive
Good response to appropriate drugs
Epilepsy with Specific Modes of Seizure Precipitation
Environmental or internal factors consistently precede the attacks
Consistent relationship can be recognized between the occurrence of one or more definable nonictal events and subsequent occurrence of a specific stereotyped seizure
Epilepsy with Myoclonic Absences
Absences accompanied by severe bilateral rhythmical clonic jerks, often associated with a tonic contraction
Bilateral, synchronous and symmetrical discharges of rhythmical spike-waves at 3 Hz in EEG, similar to childhood absence
Seizures occur many times a day
Rare association with other seizure types
Age of onset is seven years
Prognosis is less favorable than in pyknolepsy owing to resistance to therapy of the seizures, mental deterioration and possible evolution to other types of epilepsy

in this category. Another patient classified as CAE according to Panayiotopoulos' proposal was not classified by ILAE because of the very early absence onset (2.5 years).

Two patients classified as JAE by Panayiotopoulos' criteria were not classified by ILAE, one because of ictal frequency lower than 3 Hz, and another because of irregular SWC and polyspikes.

Two patients classified as CAE and one as JAE according to ILAE could not be classified by Panayiotopoulos' criteria because of the short duration of seizures (less than four seconds) and did not meet all the criteria for the diagnosis of phantom absences with GTCS.

DISCUSSION

In this series, the syndromic classification was performed in 67.4% and 60.5% of the cases according to Panayiotopoulos' criteria (1997) for absence epilepsie and ILAE's classification (1989), respectively. Eleven patients (25.6%) presented electroclinical characteristics that could not permit the inclusion in syndromes described in those two systems of classification, such as early onset of the seizures, fast activity (10-20Hz) associated to SWC and finally discrepancy in clinical and electrographical findings that would fit a specifically described syndrome.

Table 2. Syndromes with typical absences described in Panayiotopoulos proposal for absence epilepsies (1997)[3].

Childhood Absence Epilepsy (CAE)

Frequent (many per day), brief (around ten seconds, more than four seconds) typical absences with abrupt and severe impairment of consciousness
Age of onset between two and eight years, with a peak at five years
Remission occurs before the age of 12 years
Generalized, spike or double-spike and slow wave regular complexes at 3 Hz (2.7-4 Hz) in EEG

Clinical Exclusion Criteria

Absences with marked eyelid or perioral myoclonus, single or rhythmic limb and trunk myoclonic jerks
Absence with mild or not clinically detectable impairment of consciousness
Other types of epileptic seizures in the early stages of the disease (infrequent GTCS in adult life may occur in no more than 3% of the patients)
Stimulus-sensitive absences (photosensitive, pattern-sensitive, fixation-off sensitive, etc.)

EEG Exclusion Criteria

Discharge fragmentation (within one second) and multiple spikes
Irregular, arrhythmic spike and multiple spike and slow wave discharges with marked variations of the intradischarge frequency or of the spike and multiple spike and slow wave relations
Predominantly brief discharges of less than four seconds
Posterior rhythmic slow activity is accepted and probably favors diagnosis

Juvenile Absence Epilepsy

Typical absences manifested by abrupt and severe impairment of consciousness (less than CAE) which occur less frequently (one to ten per day) than in CAE
Age of onset of absences is at seven to 16 years, with a peak at 10-12 years
Random and infrequent myoclonic jerks as well as infrequent GTCS in the majority of patients
Lifelong disorder, although the absences tend to become less severe and less frequent
Regular complexes of generalized spike or multiple spike and slow waves at 3 Hz and discharge fragmentation in EEG may be present

Clinical Exclusion Criteria

Absences with marked eyelid or perioral myoclonus, single or rhythmic limb and trunk myoclonic jerks
Absence with exclusively mild or clinically undetectable impairment of consciousness

EEG Exclusion Criteria

Irregular, arrhythmic spike and multiple spike and slow wave discharges with marked variations of the intradischarge frequency or of the spike and multiple spike and slow wave relations in EEG
Predominantly brief discharges (less than four seconds)

Myoclonic Absence Epilepsy (based on Tassinari et al., 1995)[6]

Absence seizures with impairment of consciousness that vary from mild to severe and rhythmic myoclonic jerks mainly of the shoulders, arms, and legs with a concomitant tonic contraction lasting 10 to 60 seconds
Frequent absences (pyknoleptic character)
Age of onset varies from 11 months to 12 years (mean seven years)
Other seizure types (mainly GTCS) occur in 2/3 of the patients
Mental retardation is present in 45% before onset and is developed in 25% during the course of the disease
Generalized rhythmic 3 Hz spike or multiple spike and slow wave discharges in EEG

Eyelid Myoclonia with Absences (based on Jeavons, 1977)[7]

Frequent seizures of eyelid myoclonia associated with brief absences with upward deviation of the eyes
Mean age of onset six years
Resistance to treatment with sodium valproate, persisting in adult life, during which infrequent GTCS are almost inevitable
Photosensitivity
Characteristic brief generalized discharges of polyspikes and slow waves at 3 to 6 Hz occurring on closing of the eyes inhibited by total darkness in EEG

Table 2 *(continues)*

Perioral Myoclonia with Absences
Brief absences (mean 3.7 seconds) with rhythmic contractions of perioral muscles with variable frequency and severity of impairment of consciousness
Age of onset from two to 13 years
Infrequent GTCS in all patients
Frequent absence status
Persistence into adult life
Generalized discharges of multiple spikes and slow waves at 3 to 4 Hz, with frequent irregularities and fragmentation of the discharges in ictal EEG
Syndrome of Phantom Absences and Generalized Tonic-Clonic Seizures
Brief absences (three to four seconds) of which the patients are unaware with mild impairment of cognition (detected by video-EEG)
Age of onset difficult to determine, usually starting after the teen years
Infrequent GTCS
Absence status in half of the patients
Brief 3-4 Hz spike or multiple spike in ictal EEG

The age of onset of all seizure types did not permit the classification in 4 patients. ILAE criteria considers school age that varies according to time and place of study and we have arbitrarily chosen the ages of 4 to 10 years and Panayiotopoulos' proposal has also set the limit at 2 years. Hirsch et al. (1994)[8] have considered that age of onset is not an important factor in classification and prognosis of TA. However the coexistence of GTCS and precipitating factors as photosensitivity would imply in a worse prognosis for the latter mentioned.

We observed 4 patients that had absence seizures with SWC associated to ictal fast electrographical activity (10-20Hz). They were all adult male patients that had had absences and GTCS since adolescence. According to Gastaut & Broughton (1974)[9] atypical absence seizures could present besides the pattern of SWC with frequencies lower than 2.5Hz, fast activity or recruiting epileptic rhythm, and this pattern was associated with slow background activity also cognitive disturbance, which was not observed in our patients.

Gastaut & Broughton (1974)[9] described the composition of the rhythm in absence seizures as a mixture of slow waves at 3 Hz superimposed to one or two sharp waves lasting around 100 msec which correspond to the frequency of 10Hz, considered the recruiting epileptic rhythm. For them there would be overlap of several frequencies, predominating 3 to 10Hz and their harmonics.

Michelucci et al. (1996)[10] described 2 patients with modification of SWC to polyspikes and fast activity (10-20Hz) several years later. Gastaut et al. (1986)[11] described deterioration of EEG pattern with appearance of recruiting epileptic rhythm in 4 of 22 patients with typical absence seizures followed up more than 20 years.

Three patients could not be classified in both criteria because of inadequacy of clinical and electrographical findings that would fit a specific described syndrome. Two of them had different syndromic diagnosis according to clinical and EEG criteria using both systems of classification.

Another patient with clinical characteristics of PMA had EEG patterns different from those described by Panayiotopoulos such as long duration of seizures (20 sec) and regular SWC. Clemens (1977)[12] described the case of a girl with a probable clinical picture of EMA and EEG showing regular SWC at 3Hz of prolonged duration. We believe that a greater number of patients is necessary as well as a longer follow up period to perform a more appropriate syndromic classification in these patients.

Panayiotopoulos' criteria (1997) for absence epilepsies may include more patients under specific diagnosis than the ILAE's classification (1989). The greater discrepancy between these two classifications was observed in the cases of CAE and JAE, since Panayiotopoulos has suggested more homogeneous and restrictive criteria for the diagnosis of CAE. The presence of infrequent GTCS as well as the lack of remission before 12 years were exclusion criteria for this syndrome in his proposal leading to the diagnosis of the juvenile form, independent of either the

pykno- or spanioleptic character of the seizures. Probably these factors would constitute prognostic implications such as lower seizure remission, which may determine a lifelong disorder.

In patients in whom Panayiotopoulos' classification changed the diagnosis from the childhood to the juvenile form because of the occurrence of GTCS or the lack of remission after 12 years, the age of onset was higher than in patients without these factors (8.6 and 5.2 years, respectively). It probably reflects greater similarity to the juvenile form. Obeid (1994)[13] studied 15 patients with JAE and observed frequent pyknolepsy and mean age of absences at 11.4 years. In his report these absences always preceded GTCS.

The age of onset of all seizure types did not permit the classification in five patients according to ILAE criteria and in two according to Panayiotopoulos' proposal. His proposal has excluded seven cases with associated GTCS to be diagnosed as CAE. According to some authors, the frequency of the absence seizures is fundamental for the correct diagnosis[14,15]. Pyknolepsy would be characteristic of CAE and spaniolepsy of JAE. For Panayiotopoulos, pyknolepsy would not be patognomonic of CAE and could occur in JAE, although less frequently[16,17] . In the present study when we utilized his criteria we observed pyknolepsy in all patients with CAE and in 64.2% of those with JAE.

Three patients were classified as myoclonic absence epilepsy according to Panayiotopoulos' criteria. Polygraphic studies with muscular activity recording is fundamental in these cases since they can have an EEG pattern similar to CAE but with a worse prognosis according to Tassinari et al. (1995)[6]. The clinical findings were suggestive of CAE according to ILAE classification, but not the EEG, which revealed polyspike-waves not described there.

One patient classified as having epilepsy with specific modes of seizure precipitation in ILAE criteria was diagnosed as presenting eyelid myoclonia with absences according to Panayiotopoulos' proposal. After the initial description by Jeavons in 1977[7], several other publications also have described other cases. The prognosis of this syndrome is restricted[18] and most of the patients analyzed in the literature are refractory to treatment. Our patient is seizure free after valproate administration. We consider the denomination of eyelid myoclonia with absences more appropriate in selecting patients to establish a better delimited clinical and prognostic evaluation and to select patients for genetic studies.

Two patients with clinical characteristics of perioral myoclonia with absences had EEG patterns which differed from those described by Panayiotopoulos. The short duration of the seizure (less than four seconds) was a factor that did not permit the classification according to his criteria in four patients. The syndrome of phantom absences with GTCS was described with defined criteria by Panayiotopoulos in 1995[19] in 12 adult patients with brief absences documented by video-EEG associated with the lack of perception of the episodes, GTCS in adult life and absence *status epilepticus* in 50% of them. Neither our patients nor their relatives had noticed the episodes until the age of 10 and they all had had GTCS during adolescence. This syndrome may present a larger clinical spectrum including younger patients that could have perception of some of these brief absences.

In this study, Panayiotopoulos' proposal permitted to group under the diagnosis of the juvenile form, a greater number of patients than the ILAE classification, which implies that these patients would probably have a lifelong disorder. Therefore, a syndromic classification is necessary in patients with typical absences in order to obtain therapeutic and prognostic implications in groups of higher uniformity, as well as to select patients for genetic evaluation. Long term studies are necessary to define the real prognostic factors in this type of epilepsy in spite of the already known factors considered as inclusion criteria for the characterization of the several typical absences syndromes. Nevertheless, Panayiotopoulos' criteria (1997) and ILAE classification (1989) for absence epilepsies, which could not allow the inclusion of 32.6% and 39.5% of cases, respectively, were still considered insufficient to classify all patients under specific diagnosis.

The new proposal of classification of ILAE[20] for epileptic syndromes describes, besides childhood absence epilepsy and epilepsy with myoclonic absences, a group of idiopathic generalized epilepsies with variable phenotypes which includes JAE, juvenile myoclonic epilepsy and epilepsy with GTCS. This proposal is still under discussion and it will be continuously revised. Nevertheless, this approach understands that a syndromic diagnosis may not always be possible and more detailed classification systems might be necessary for specific epidemiological and genetic studies.

We consider that some of these cases in which the described classification could not be performed may constitute the concept of *continuum* suggested by Pazzaglia et al.[21] in 1969. For these authors, there

would be electroclinical variations of spike-wave patterns since the benign diffuse epilepsy, such as pyknolepsy, to malignant diffuse epilepsy as the Lennox-Gastaut syndrome. Gloor et al. (1982)[22] have considered that epilepsy would be a multifactorial condition, in which acquired factors could exacerbate the genetically determined neuronal excitability. Wolf & Inoue (1984)[23], confirming the concept of *continuum*, considered that the therapeutic response in patients with absence seizures is not uniform and is related to the electroclinical presentation. Berkovic et al. (1987)[24] reinforced the concept of biological *continuum* between primary and secondary generalized epilepsy, with different proportions of genetic and acquired factors in intermediate cases.

We believe that the different syndromes are probable genetically distinct subgroups. According to individual seizure susceptibility and exposition to acquired factors, they could manifest as a *continuum* although they still remain grouped in relatively specific entities of higher occurrence. These would permit categorization into syndromes and isolated cases, which would not fit into nosological classifications.

REFERENCES

1. Commission on Classification and Terminology of the International League against Epilepsy. Proposal for revised classification of epilepsies and epileptic syndromes. Epilepsia 1989;30:389-399.
2. Panayiotopoulos CP. The clinical spectrum of typical absence seizures and absence epilepsies. In Malafosse A, Genton P, Hirsch E, Marescaux C, Broglin D, Bernasconi R (eds). Idiopathic generalized epilepsies: clinical, experimental and genetic aspects. London: John Libbey & Co, 1994:75-85.
3. Panayiotopoulos CP. Absence Epilepsies. In Engel Jr J, Pedley TA (eds). Epilepsy: a comprehensive textbook. Philadelphia: Lippincott-Raven, 1997:2327-2346.
4. Commission on Classification and Terminology of the International League against Epilepsy. Proposal for revised clinical and electroencephalographic classification of epileptic seizures. Epilepsia 1981;22:489-501.
5. Panayiotopoulos CP, Baker A, Grünewald R, Rowlinson S, Walsh P. Breath counting during 3 Hz generalized spike and wave discharges. J Electrophysiol Technol 1993;19:15-23.
6. Tassinari CA, Michelucci R, Rubboli G, et al. Myoclonic absence epilepsy. In Duncan JS, Panayiotopoulos CP, (eds). Typical absences and related epileptic syndromes. London: Churchill Livingstone, 1995:187-195.
7. Jeavons PM. Nosological problems of myoclonic epilepsies in childhood and adolescence. Dev Med Child Neurol 1977;19:3-8.
8. Hirsch E, Blan-Platier A, Marescaux C. What are the relevant criteria for a better classification of epileptic syndromes with typical absences? In Malafosse A, Genton P, Hirsch E, Marescaux C, Broglin D, Bernasconi R (eds). Idiopathic generalized epilepsies: clinical, experimental and genetic aspects. London: John Libbey & Co, 1994:87-93.
9. Gastaut H, Broughton R. Crisis epilépticas: fisiopatología y clínica. In Gastaut H, Broughton R (eds). Ataques epilépticos: clínica, electroencefalografía, diagnóstico y tratamiento. Veciana JMG(trad). Barcelona: Toray, 1974:57-75.
10. Michelucci R, Rubboli G, Passarelli D, et al. Electro clinical feactures of idiopathic generalized epilepsy with persisting absences in adult life. J Neurol Neurosurg Psychiatr 1996;61:471-477.
11. Gastaut H, Zifkin BG, Mariani E, Puig JS. The long-term course of primary generalized epilepsy with persisting absences. Neurology 1986;36:1021-1028.
12. Clemens B. Perioral myoclonia with absences? A case report with EEG and voltage mapping analysis. Brain Dev 1997;19:353-358.
13. Obeid T. Clinical and genetic aspects of juvenile absence epilepsy. J Neurol 1994 241:487-491.
14. Doose H, Völzke E, Scheffner D. Verlaufsformen kindlicher Epilepsien mit Spike wave-Absencen. Arch Psychiat Nervenkr 1965;207:394-415.
15. Janz D, Beck-Mannagetta G, Spröder B, Spröder J, Waltz S. Childhood absence epilepsy (pyknolepsy) and juvenile absence epilepsy: one or two syndromes? In Wolf P (ed). Epileptic seizures and syndromes. London: John Libbey, 1994:115-126.
16. Panayiotopoulos CP, Obeid T, Waheed G. Differentiation of typical absence seizures in epileptic syndromes. Brain 1989;112:1039-1056.
17. Panayiotopoulos CP, Chroni E, Dascalopoulos C, Baker A, Rowlinson S, Walsh P. Typical absence seizures in adults: clinical, EEG, video-EEG findings and diagnostic/syndromic considerations. J Neurol Neurosurg Psychiatr 1992;55:1002-1008.
18. Appleton RE. Eyelid myoclonia with absences. In Duncan JS, Panayiotopoulos CP, (eds). Typical absences and related epileptic syndromes. London: Churchill Livingstone International, 1995:213-220.
19. Panayiotopoulos CP. Debate on classification of epileptic syndromes with typical absences. Section 3: Typical absences are syndrome-related. In Duncan JS, Panayiotopoulos CP, (eds). Typical absences and related epileptic syndromes. London: Churchill Livingstone International, 1995:300-319.
20. Engel Jr J. A proposed diagnostic scheme for people with epileptic seizures and with epilepsy: report of the ILEA task force on classification and terminology. Epilepsia 2001;42:796-803.
21. Pazzaglia P, Frank L, Orioli G, Lugaresi E. L'evoluzione elettro-clinica del piccolo male tipico. Riv Neurol 1969;39:557-566.
22. Gloor P, Metrakos J, Metrakos K, Andermann E, Van Gelder N. Neurophysiological, genetic and biochemical nature of the epileptic diathesis. Electroencephalogr Clin Neurophysiol 1982; Suppl 35:45-56.
23. Wolf P, Inoue Y. Therapeutic response of absence seizures in patients of an epilepsy clinic for adolescents and adults. J Neurol 1984;231:225-229.
24. Berkovic SF, Andermann F, Andermann E, Gloor P. Concepts of absence epilepsies: discrete syndromes or biological continuum? Neurology 1987;37:993-1000.