EEG Findings of Late Epilepsy in the Algerian population

Abdellaoui Walid[1], Ait Oukaci Wassila[2], Abdellaoui Youssef [3], Badache Kenza[4], Sadibelouiz Mustapha[5], Ait-Kaci-Ahmed Mahmoud[5], Amer-El-Khedoud Wahiba[1]

[1]Neurology Department, Ben-Aknoun Hospital, University of Algiers, Algiers, Algeria
[2]Neurophysiology Department, Ait Idir Hospital, University of Algiers, Algiers, Algeria
[3]Ivybridge Community College, United Kingdom
[4]Neurosurgery Department, Mustapha Pacha Hospital, University of Algiers, Algiers, Algeria
[5]Neurology Department, Ait Idir Hospital, University of Algiers, Algiers, Algeria

Abstract:
Background: *EEG is a non-invasive, non-painful examination, it makes it possible to assess spontaneous cerebral functioning. The contribution of the EEG to the diagnosis of the epileptic nature of a paroxysmal event is valuable. The contribution of the EEG to the diagnosis of a paroxysmal event must be integrated into the bundle of clinical arguments, and alone cannot constitute the key element of the diagnosis. The objective of our study was to determine EEG findings of late epilepsy in the Algerian population.*
Materials and Methods: *The study population includes all Algerian patients whose age of onset of the first seizure is 25 years or more, recruited during the period from January 2008 to December 2016 at ALI AIT IDIR Hospital in Algiers.*
Results: *Among 336 patients with late epilepsy seen between 2008 and 2016: all, patients had a pathological EEG. Focal epileptic abnormalities were found in the majority of patients (254 cases) and were predominant for all age groups. The distribution by age group shows a predominance of focal epileptic abnormalities for all age groups (rate of 75.5%). Temporal epileptic abnormalities were the most represented (104 cases), followed by frontal abnormalities (92 cases). Predominance of temporal topography 41%, followed by frontal topography 36%. Temporal epileptic abnormalities are in the majority for the age groups (30-34 years, 45-49 years, 50-54 years, 55-59 years, 65-69 years, 70-74 years, 75-79 years). Frontal abnormalities are predominant for age groups (35-39 years, 40-44 years, 60-64 years, 80 years and over).*
Conclusion: *EEG abnormalities were focal in 75.6% of patients, generalized in 24.4% of patients. Focal epileptic abnormalities were predominant for all age groups. We find a predominance of temporal topography 41%, followed by frontal topography 36%. Focal temporal epileptic abnormalities are in the majority for the age groups (30-34 years, 45-49 years, 50-54 years, 55-59 years, 65-69 years, 70-74 years, 75-79 years), on the other hand frontal epileptic abnormalities are predominant for age groups (35-39 years, 40-44 years, 60-64 years, 80 years and over).*
Key Words*: EEG findings, Focal abnormalities, Generalized abnormalities, Temporal topography, Frontal topography, Temporal epileptic abnormalities, Frontal epileptic abnormalities*

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I. Introduction

Electroencephalography (EEG) is a neurophysiological exploration technique, allowing the collection of electrical activity of cerebral origin by means of electrodes placed on the scalp. This is a so-called (functional) exploration.

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The contribution of the EEG to the diagnosis of the epileptic nature of a paroxysmal event is valuable.

The contribution of the EEG to the diagnosis of a paroxysmal event must be integrated into the bundle of clinical arguments, and alone cannot constitute the key element of the diagnosis. It has been demonstrated that the realization of an EEG "at the fishing" for the diagnosis of a paroxysmal episode for which no diagnostic orientation by highlighting a slow diffuse or focal postictal activity, or intercritical abnormalities.

It is estimated that 4 per 1000 of adult subjects have paroxysmal abnormalities during an EEG tracing and who have never had an epileptic seizure.

On the other hand, 50% of subjects having presented a generalized tonic-clonic seizure have an abnormal EEG when this is carried out within 24 hours after the paroxysmal event and approximately 16% of subjects if the tracing is recorded at the during the first 48 hours. Conversely, about 15% of patients with epilepsy have no abnormalities on repeated EEGs.

False negatives (normal EEG in subjects with epilepsy) are about 50%, reduced to 30% after performing several EEGs, and to 20% with a prolonged EEG after sleep deprivation.

II. Material And Methods

The study population includes all Algerian patients whose age of onset of the first seizure is 25 years or more, recruited at ALI AIT IDIR Hospital in Algiers.

Inclusion criteria:
1. The age of the patients must be greater than or equal to 25 years at the time of inclus.
2. Patient presenting with his first epileptic seizure at the age of 25 years or older.
3. Clinically and electrically confirmed diagnosis of epilepsy.

Exclusion criteria:
1. Age less than 25 years

III. Results

Our study population includes 336 patients, recruited during the period from January 2008 to December 2016. This figure corresponds to the number of patients selected according to the inclusion criteria.

Electroencephalography findings:
   1. **Distribution of patients according to EEG results:**

Table 1. Distribution of patients according to EEG results

	Cases	%
Normal EEG	0	0
Pathological EEG	336	100
Total	**336**	**100**

In our study, all our patients had a pathological EEG.

2. Breakdown of epileptic abnormalities by age group:

Table 2. Distribution of epileptic abnormalities by age group

	Focal Epileptic Abnormalities	Generalized Epileptic Abnormalities
25-29 years	32	14
30-34 years	32	14
35-39 years	36	13
40-44 years	19	9
45-49 years	24	3
50-54 years	18	8
55-59 years	17	8
60-64 years	22	1
65-69 years	17	3
70-74 years	19	2
75-79 years	12	4
80 years and over	6	3
Total	**254**	**82**

Focal epileptic abnormalities were found in the majority of patients (254 cases) and were predominant for all age groups.
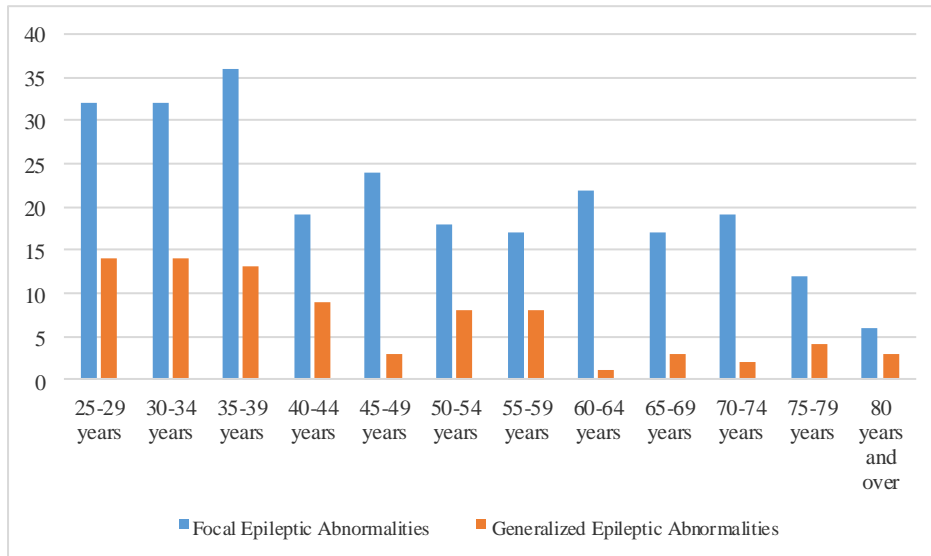
Figure 1. Distribution of epileptic abnormalities by age group

The distribution by age group shows a predominance of focal epileptic abnormalities for all age groups (rate of 75.5%).

3. Topography of focal epileptic anomalies:

Table 3. Topography of focal epileptic abnormalities

	Cases	%
Focal Abnormalities	254	75,5
Frontal	92	27,4
Temporal	104	30,9
Rolandic	7	2
Parietal	36	10,7
Occipital	15	4,5
Total	**336**	**100**

Focal temporal epileptic abnormalities were the most represented (104 cases), followed by frontal abnormalities (92 cases).
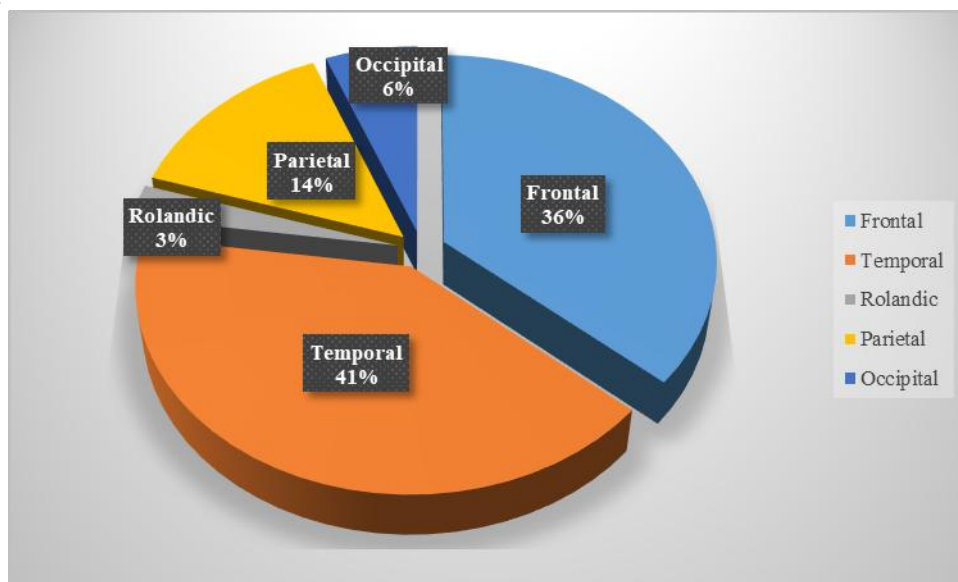

Figure 2. Topography of focal epileptic abnormalities

If we take into account only focal epileptic abnormalities, we find a predominance of temporal topography 41%, followed by frontal topography 36%.

4. Focal epileptic abnormalities by age group:

Table 4. Focal epileptic abnormalities by age group

	Frontal	Temporal	Rolandic	Parietal	Occipital
25-29 years	14	14	1	3	0
30-34 years	13	15	0	1	3
35-39 years	15	12	1	5	3
40-44 years	9	3	0	5	2
45-49 years	9	13	1	1	0
50-54 years	3	8	0	4	3
55-59 years	7	8	0	2	0
60-64 years	10	7	0	2	3
65-69 years	5	6	2	4	0
70-74 years	0	12	1	6	0
75-79 years	3	5	1	2	1
80 years and over	4	1	0	1	0
Total	**92**	**104**	**7**	**36**	**15**

Focal temporal epileptic abnormalities are in the majority for the age groups (30-34 years, 45-49 years, 50-54 years, 55-59 years, 65-69 years, 70-74 years, 75-79 years), on the other hand frontal abnormalities are predominant for age groups (35-39 years, 40-44 years, 60-64 years, 80 years and over).
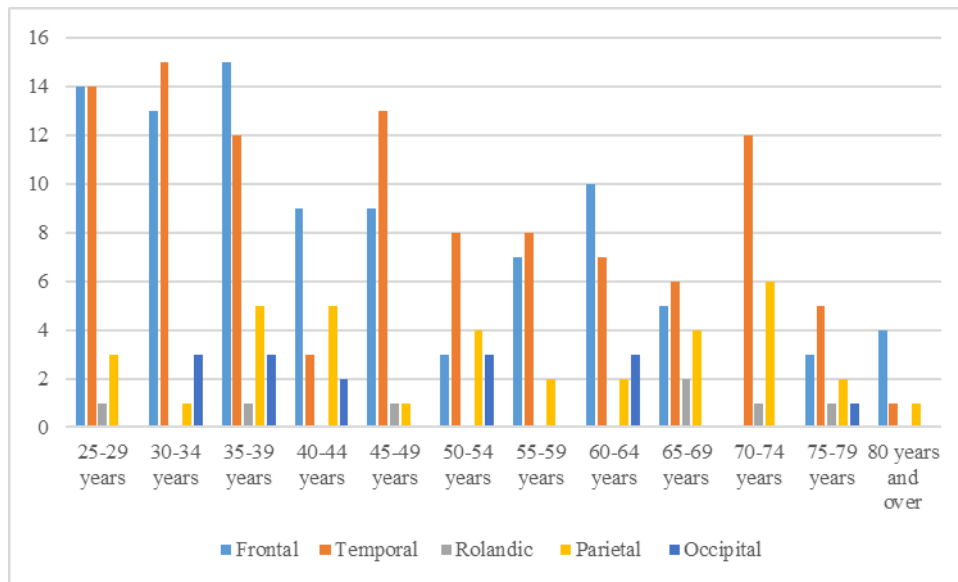

Figure 3. Focal epileptic abnormalities by age group

Analysis of focal epileptic abnormalities by age group confirms the predominance of temporal topography abnormalities.

IV. Discussion

In our study, the EEG was performed in all patients. The EEG was pathological for the 336 patients. It showed focal epileptic abnormalities in 75.5% of cases, and generalized epileptic abnormalities in 24.5% of cases. Our results are consistent with literature data. Agnet Mouritzen Dam, 1985 [1] showed the predominance of focal epileptic abnormalities, with a rate of 51.1%, the same observation made by M. Belaidi et al, 1986 [2], with focal abnormalities more frequent than generalized abnormalities.

Daniel Arbaiza, 1995 [5], found at the end of his study a figure of 50% for focal abnormalities, against 38% for generalized abnormalities. In the work of Roberto Suastegui et al, 2009 [4], these are almost

exclusively focal abnormalities on the EEG with a rate of 40%, on the other hand generalized abnormalities represent only 26%.

Our results are in disagreement with certain data from the literature where Ibrahim Bora, 1995 [3], noted in his study 26% of generalized abnormalities against 8% of focal abnormalities. This result corresponds to the realization of the EEG in patients only with generalized tonic-clonic seizures. Christian Napon et al, 2009 [6] found 60.7% generalized abnormalities, against 19.6% focal abnormalities. This could be explained by the most common type of seizure (generalized tonic-clonic seizures) and by the fact that the EEG could not be performed in all patients (cost of this examination).

Table 5. Literature review of EEG abnormalities

Study	Country	Focal Epileptic Abnormalities	Generalized Epileptic Abnormalities
Agnet Mouritzen Dam, 1985	Denmark	51.13%	ND
Daniel Arbaiza, 1995	Peru	50%	38%
Ibrahim Bora, 1995	Turkey	8%	26%
Robero Suastegui et al, 2009	Mexico	40%	26%
Christian Napon et al, 2009	Burkina Faso	19.6%	60.7%
Our study	**Algeria**	**75.6%**	**24.4%**

ND: Not Documented

V. Conclusion

Our study population includes 336 patients, recruited during the period from January 2008 to December 2016. These patients were selected according to the inclusion criteria.

During the study period, 336 cases of late epilepsy were diagnosed, representing a proportion of late epilepsy of 34% compared to all epilepsies.

On the EEG level, electroencephalographic abnormalities were focal in 75.6% of patients, generalized in 24.4% of patients. Focal epileptic abnormalities were predominant for all age groups. We find a predominance of temporal topography 41%, followed by frontal topography 36%. Focal temporal epileptic abnormalities are in the majority for the age groups (30-34 years, 45-49 years, 50-54 years, 55-59 years, 65-69 years, 70-74 years, 75-79 years), on the other hand frontal abnormalities are predominant for age groups (35-39 years, 40-44 years, 60-64 years, 80 years and over).

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