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RESEARCH

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Clinical profile of epilepsy in western Algeria

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Abstract

Background Epilepsy is one of the most common neurological diseases that affects people of different ages, ethnicities, and geographical locations. The objective of the present study was to determine the demographic and clinical characteristics of epilepsy in west Algerian population.

Patients and methods We enrolled 226 patients with epilepsy and collected data from medical records. We analyzed socio-demographic data, personal and family history, age at onset, seizure types, neurological and psychological findings, etiologies, syndromic classification and comorbidities.

Results In our cohort, the mean age was 27.26 ± 17.57 years and there was no gender predominance. The mean age of seizure onset was 17.11 ± 16.27 years. Genetic epilepsy was the most observed (45.13%). Focal seizures (69.02%) were more frequent than generalized seizures which were mostly represented by absence and tonic–clonic seizures. We reported 51.45% of patients with comorbidities and 16.65% with a history of traumatic brain injury.

Conclusion This is the first report describing the clinical profile and the socio-demographic features in a cohort of patients with epilepsy in the western Algeria. Our results could help to offer personalized care to our patients based on the clinical particularities of their epileptic disorders.

Keywords Epilepsy, Seizure, Etiology, Brain, Algeria

Introduction

Epilepsy is one of the most common neurological diseases, affecting over 70 million people worldwide [1]. Many studies have illustrated that more than half of epilepsies begin early in childhood and during adolescence [2, 3]. The incidence and prevalence of epilepsy around the world vary widely. A meta-analysis including 222 studies showed a prevalence of 6.38 per 1000 people with active epilepsy and a lifetime prevalence of 7.60 per 1000 while the incidence was 61.44 per 100,000 persons-years [4]. Moreover, there is a great heterogeneity between different studies regarding clinical features such as etiology and seizure types.

In Algeria, only one study estimated the prevalence of epilepsy at 8.32 per 1000 [5]. Algeria being a vast country with an area exceeding 2 million km^2, it seemed necessary for us to carry out a study aiming to describe the characteristics and clinical profile of patients with epilepsy in western Algeria.

Materials and methods

Data collection

This descriptive study was carried out at the neurology department of Oran University Hospital between January and December 2023. This region was chosen as the optimal site of investigation because it covers a large area going from Chlef [East] to Tlemcen [West] and from Oran [North] to Bechar [South]. In addition, all patients with epilepsy (PWE) from this region converge on Oran

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University Hospital which represents the reference center in epileptology in western Algeria.

All neurologists working in this center were asked to take part in the study by referring all patients meeting the diagnosis of epilepsy according to the 2017 International League Against Epilepsy (ILAE) criteria [6].

Data were collected using a standardized questionnaire and medical records. We analyzed socio-demographic data, personal and family history, age at onset, disease course, seizure types and frequency, neurological and psychological findings, etiology, syndromic classification and comorbidities. The patient's anonymity was respected and the study was carried out according to the Declaration of Helsinki.

Statistical analysis

The collected data were coded and entered into the SPSS 21.0 for Mac OS X. We conducted a descriptive analysis involving the calculation of means and standard deviations for quantitative variables and percentages for categorical variables.

Results

Sex ratio, age and BMI

Two hundred twenty-six (226) patients with epilepsy participated in this study. The statistical analysis of the data collected, demonstrated a slight male predominance 128 (56.7%) men and 98 (43.3%) women with sex ratio male/female 1.3.

The mean age of our population was 27.26 years (SD ± 17.57) and only 55 patients (24.3%) were over 40 years old (mean 52.72 ± 10.69). The average BMI was 24.7 kg/m^2 (SD ± 7.39).

Epilepsy etiology

Epilepsy was considered genetic (idiopathic) in most patients 102 (45.13%) (Fig. 1). Among them, 27 patients had juvenile myoclonic epilepsy and 17 had childhood absence epilepsy. However, Dravet syndrome was observed in only one patient. Epilepsy was structural in 32.30% (Fig. 2), with head trauma and stroke being the most frequent (21 and 18, respectively).

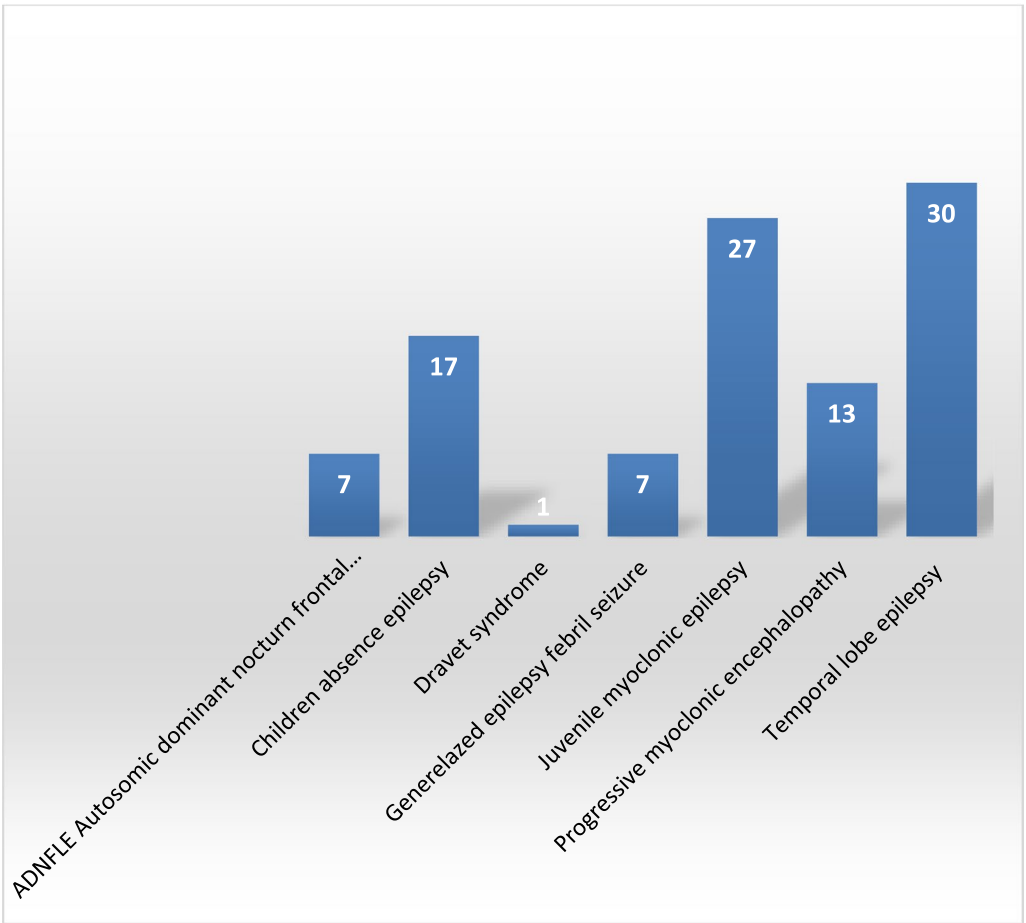

Fig. 1 Graphic representation of the idiopathic epilepsy

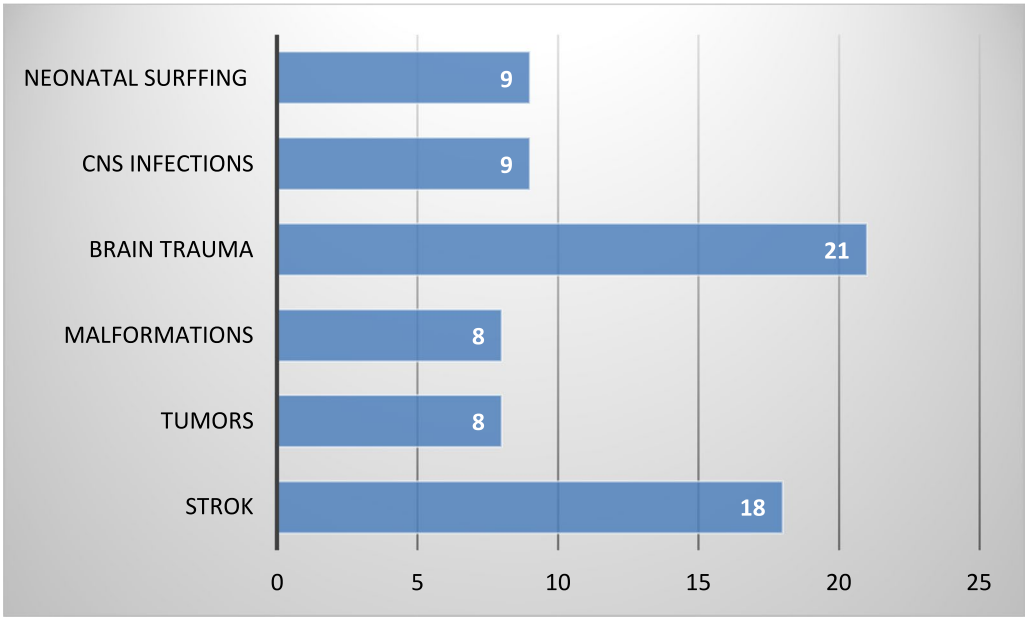

Fig. 2 Graphic representation of the symptomatic epilepsy

Epileptic seizures

The mean age of seizure onset was 17.11 years (SD ± 16.27). Moreover, we observed that 26 patients manifested seizures from the first year of life.

Focal seizures (69.02%) were more frequent than generalized seizures which were mostly represented by absence seizures (42.47%) and tonic–clonic seizures (21.68%) (Fig. 3).

Medical background

The analysis of our cohort revealed that 116 patients have a medical history (51.54%) (Fig. 4) with 12.52% experiencing chronic diseases (arterial hypertension, diabetes, dysthyroidia and cardiac disorders), 3.41% having a surgical history (heart, brain and breast surgery) and 19.65% mild-to-severe brain injury.

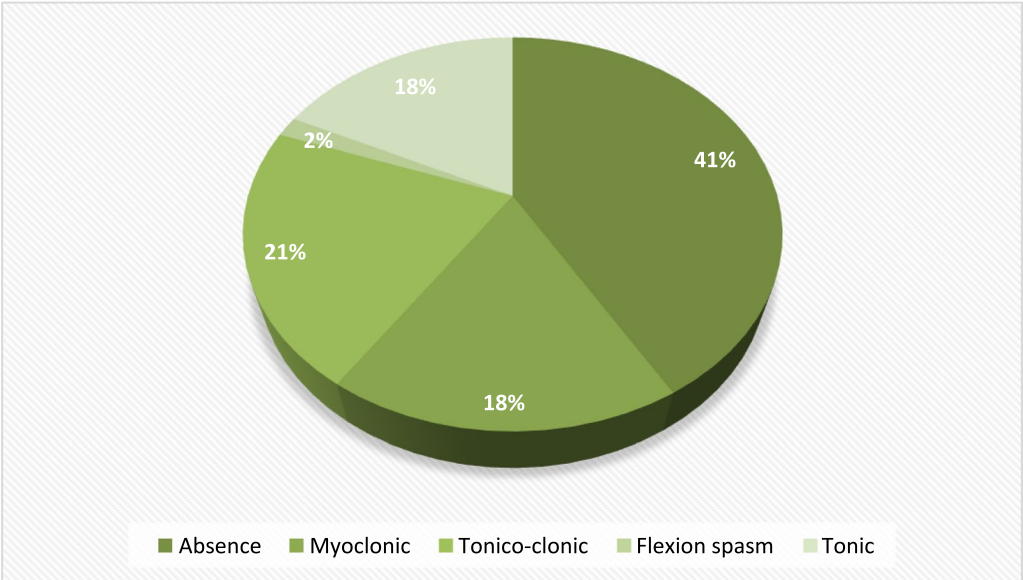

Fig. 3 Graphic representation of the generalized epileptic seizure

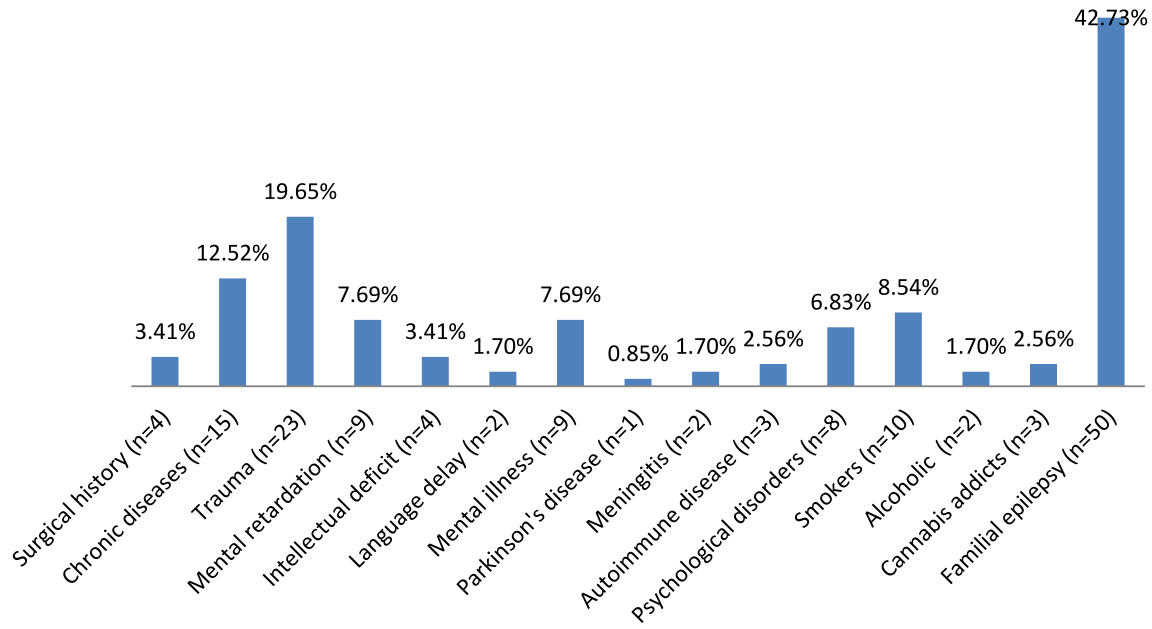

Fig. 4 Graphic representation of the epileptic with a medical history

Neurological disorders were also present in our cohort with 13 (11.1%) cases of intellectual disability, 08 patients with brain tumors, 7.9% with stroke, 2 patients with language delay (1.70%), 9 patients with psychiatric comorbidities (7.69%) and 1 patient with Parkinson's disease (0.85%).

Three patients (2.56%) were also suffering from autoimmune diseases namely multiple sclerosis, celiac disease and lupus erythematosus. In addition, 10 patients were smokers (8.54%), 2 patients were alcohol addicts (1.70%) and 3 patients were cannabis users (2.56%). Regarding family history of epilepsy, 50 patients had at least one first-degree relative with epilepsy (42.73%).

Discussion

This study is the first report describing the clinical profile of epilepsy in western Algeria according to 2017 International League Against Epilepsy (ILAE) criteria [6].

Sex ratio, age and BMI

In our study, there was no gender predominance. Previous studies (Italian, Faroese, Sweden and Croatian) reported a slight male predominance [7–13] while conflicting results have been found in other populations (Thailand, Aeolian Islands and Chile) [14–16].

The mean age of our population was 27.26 years (SD ± 17.57). In addition, it was observed that 55 patients were above 40 years old (mean 52.72 ± 10.69). These results are in line with other studies including Iceland population [12, 17]. However, it was demonstrated that the prevalence of epilepsy increases after the age of 50 in populations of Chile, Ecuador and Zambia [16, 18, 19].

The mean BMI in our cohort was 24.7 kg/m^2 ± 7.39. It has been shown in previous studies that patients with epilepsy are less likely to engage in physical activity, putting them at risk of being overweight [20–22].

Epilepsy etiology

According to the 2017 ILAE classification of epileptic syndromes, six etiologic categories have been recognized: structural, genetic, infectious, metabolic, immune and unknown [6]. In our cohort, genetic epilepsies were the most frequent (45.13%). The same result was found by Annegers et al. in Texan epileptic patients [23] and by Granieri et al. in an Italian cohort [7]. Moreover, this predominance was reported in Colombian patients with epilepsy [24].

In our study, 8 patients were suffering from brain tumors. It has been estimated that 4% of patients with brain tumors will develop structural epilepsy [25]. A recent systemic review has demonstrated that many factors contribute to tumor-related epilepsy, such as type, speed growth, location, and tumor burden [26].

Among our patients, 7.9% had a past history of stroke. It is commonly accepted that stroke is the leading cause of seizures and epilepsy in older adults [27]. Patients who have larger and more severe strokes involving the cortex, are younger, and have acute symptomatic seizures and intracerebral hemorrhage are at highest risk of developing post-stroke epilepsy [28].

Epileptic seizures

In 2017, the International League Against Epilepsy (ILAE) revised the classification of seizure types based on the 1981 Classification, extended in 2010 [6]. The purpose of such a revision was to recognize that some seizure types can have either a focal or generalized onset, to allow classification when the onset is unobserved, to include some missing seizure types, and to adopt more transparent names. Changes included the following: (1) "partial" became "focal"; (2) awareness was used as a classifier of focal seizures; (3) the terms dyscognitive, simple partial, complex partial, psychic, and secondarily generalized were eliminated; (4) new focal seizure types included automatisms, behavior arrest, hyperkinetic, autonomic, cognitive, and emotional; (5) atonic, clonic, epileptic spasms, myoclonic, and tonic seizures can be of either focal or generalized onset; (6) focal to bilateral tonic–clonic seizure replaced secondarily generalized seizure; (7) new generalized seizure types were absence with eyelid myoclonia, myoclonic absence, myoclonic–atonic, myoclonic–tonic–clonic; and (8) seizures of unknown onset may have features that can still be classified.

In our study, the mean age of seizure onset was 17.11 ± 16.27 years and focal seizures were the most frequent types. Regarding generalized seizures, absence and tonic–clonic seizures were the most represented. Our results are in line with those of several studies conducted in Minnesota, Chile, Bolivia, Sweden, Spain, Aeolian Islands, India, Turkey, Nigeria and Tanzania [11, 15, 16, 29–35]. Moreover, Medina et al. [36] reported focal seizure being the most observed with a very high frequency (92%) in Hunduras region. In contrast, different results were founded in Mississippi, Ecuador, Italy, China, Ethiopia, Tanzania and Tunisia [7, 24, 37–41]. This divergence could be explained by methodological heterogeneity. Indeed, some studies used older versions of seizures classification (1981 and 2010).

Medical background

In our study, 19.65% of patients had a past history of traumatic brain injury. In the last 30 years, it has been demonstrated that the incidence of epilepsy was 2.1% for mild injuries and 16.7 for severe head trauma [42]. Many previous studies support this finding [43, 44]. In an Iranian cohort, Khalili et al. reported that brain injury represents 10% of all epilepsy etiologies [45]. Moreover, in USA and European population, traumatic brain injury represents 20% of symptomatic epilepsy [46]. In Algeria, Chentouf et al. identified severe head trauma as a significant risk factor of epilepsy in a case–control study including 101 patients with epilepsy and 202 controls [47].

In this study, 10 patients were smokers (8.54%), 2 patients were alcohol addicts (1.70%) and 3 patients were cannabis users (2.56%). A recent meta-analysis showed a strong association between alcohol consumption and the risk of developing epilepsy [48]. Different hypotheses have been advanced to explain the higher prevalence of smokers in the epileptic population such as; a common genetic susceptibility to epilepsy and nicotine consumption, the indirect association of comorbidity with psychiatric illness with the social burden generated by epilepsy, this comorbidity increased the risk of smoking and nicotine could have a beneficial effect on convulsions, inducing patients to smoke [49].

In our study, 12.52% of patients had chronic diseases. People with epilepsy experience a high burden of comorbidity. This means they are significantly more likely (up to eight times more) to develop other health conditions compared to the general population [50]. These conditions include depression, anxiety, dementia, migraines, heart disease, peptic ulcers, and arthritis. Several factors explain the link between epilepsy and these comorbidities, including shared risk factors and bidirectional relationships.

Three of our patients were suffering from autoimmune diseases such as multiple sclerosis, celiac disease and lupus erythematosus. It is well known that the most common neurological manifestations of lupus include seizures and psychological disorders [51]. In the same way, multiple sclerosis can manifest itself by epileptic seizures when the demyelination lesions are located in the cortex. Celiac disease goes beyond intestinal disorders. It is a complex condition affecting multiple organs, with a high number of complications outside the digestive system. These extra-intestinal complications can involve the nervous system and mental health, causing issues like cerebellar ataxia, peripheral neuropathy, epilepsy, headaches, cognitive impairment, and depression. While the exact reasons for these neurological problems are still being debated, recent evidence suggests they might be linked to how gluten triggers the immune system. This includes antibody cross-reaction, immune-complex deposition, direct neurotoxicity and nutrient deficiencies [52].

Conclusion

Our study, the first one conducted on West Algeria population, was conducted to determine the characteristic demographic, etiology's types and seizures category of epilepsy. We also determined the morbidity. It will be interesting to expand the population study to all of Algeria territory for characterizing this population.

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Author contributions
Amina CHEMTOUF: conceptualization, data curation, formal analysis, investigation, methodology, software, supervision, validation, visualization, writing—original draft, writing—review and editing. Wefa BOUGHRARA: software, supervision, formal analysis, investigation, methodology, validation, writing—review and editing. Meriem Samia ABERKANE: formal analysis, visualization, writing—original draft, writing—review and editing.

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Availability of data and materials
The data are available with corresponding author.

Declarations

Ethics approval and consent to participate
Therefore, we rely on obtaining written consent from patients or their legal guardians in the case of minors to participate in the study. We ensure that the involved subject fully understands the study's objectives. The ethical approval was obtained from the Medical Ethics Committee of Oran University Hospital on November 30, 2023.

Consent for publication
This article has been approved for publication by all authors.

Competing interests
All authors declare there is no conflict.

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