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Partial (Focal) Epilepsy: Epidemiological, Clinical, Paraclinical, Etiological, Therapeutic and Evolutionary Aspects in the Neurology Department of the Amirou Boubacar Diallo National Hospital

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ABSTRACT

Introduction: The prevalence of epilepsy in sub-Saharan Africa is high and therefore constitutes a major public health problem. In Niger, the hospitalization rate is 29.5%. The aim of the study is to improve the management of patients living with epilepsy. The objective of the study is to contribute to improving the management of patients living with epilepsy.

Methods: This was a retrospective and prospective cross-sectional study in the neurology department of the Amirou Boubacar Diallo National Hospital from May 2017 to December 2022.

Results: Our study involved 75 epileptic patients out of 5546 patients who consulted for epileptic seizures, or 0.5%. The sex ratio (M/F) was 1.27. Average age of 17.2 years. Time to treatment less than 2 days in 62.67%. Clinical manifestations with motor signs represented 65.33% and 34.66% of the psychological manifestations. No seizure triggers were found in 50.67% of cases. Familial epilepsy was found in 16% of cases. Head trauma was the personal antecedent in 4% of cases. Consanguinity was found in 48% of cases. Physical examination was abnormal in 6.67% of cases. Secondary generalized focal abnormalities predominated on EEG in 64% of cases and insular localizations in 26.32% of cases. Idiopathic epilepsy was the predominant etiology in 72% of cases. Brain CT was performed in 35% of cases and brain MRI in 12%. Monotherapy was prescribed in 90.67% of our patients. The evolution was favourable in 93.33% of cases.

Conclusion: Epilepsy is a common neurological disorder affecting patients of all ages, especially young subjects.

KEYWORDS: Partial epilepsy; epileptic seizure; Amirou Boubacar Diallo National Hospital; Niamey; Niger.

INTRODUCTION

Epilepsy is a neurological disease characterized by "the transient presence of signs and/or symptoms due to excessive or synchronous abnormal neuronal activity in the brain"[1]. Its consequences can be neurological, psychological, cognitive or social. Partial epilepsies are epilepsies with a focal point of onset and an identified or unidentified a etiology[2]. Like other diseases, epilepsy is not only a burden for those affected and those around them. Indeed, this complex disease also has an economic impact on society in terms of health needs, premature deaths and lack of productivity. In 2016, it accounted for 0.5% of the global disease burden[3]. The World Health Organization recognizes epilepsy as a major public health problem. It affects about 50 million people worldwide, of whom about 80% live in low- and middle-income countries where the incidence is 2.8 times higher than in high-income countries and the prevalence in developing countries is estimated to be around 10-20 per 1000[4-8]. Although seizure control can be achieved in about 70% of people on adequate treatment, the treatment gap can be as high as 50% in most middle-income countries, up to 75% or more in low-income countries. In sub-Saharan Africa, the overall prevalence of epilepsy is 9-39 per 1000[7].

In Africa, the stigmatization of epilepsy is the main cause of the delay in diagnosis and management [9, 10]. In Niger, several studies have been carried out on epilepsy in general, but none on partial epilepsy, hence our study.
The objective of this work is to contribute to the description of the characteristics and management of partial epilepsy.

METHODS

This was a retrospective and prospective cross-sectional study in the neurology department of the Hospital National Amirou Boubacar Diallo from May 2017 to December 2022.
Patients with epileptic seizures, patients with EEG compatible with clinically correlated partial epilepsy and patients who agreed to participate in the study were included in our study. Not included were patients with clinically correlated EEGs not consistent with partial epilepsy, patients with non-epileptic partial seizures or myoclonus, patients with incomplete data and patients lost to follow-up.
Variables studied were: socio-demographic variables: age, sex, occupation, ethnicity, education level, marital status, residence, socio-economic level. Variables related to clinical and anamnestic characteristics: date of first seizure, duration of epilepsy, time to neurological diagnosis, time to treatment, clinical manifestations, seizure triggers, personal and family history, terrain and comorbidities, physical examination, treatment and follow-up. Variables related to paraclinical data: EEG, CT and MRI brain scans.
Data analysis and processing: Data were collected by the Kobocollect application and the Kobotoolbox platform. Data entry and word processing were done with Word and Excel 365 software, and then analyzed by R software in its version 4.2.2 after making a data entry mask.
Ethics and deontology: To carry out this study we obtained the approval of the Dean of the Faculty of Health Sciences and the management of the Amirou Boubacar Diallo National Hospital. We also obtained consent from each patient and guardians for minor patients before the questionnaires were started. Patient confidentiality was guaranteed and respected during the presentation of the results.
Difficulties encountered: Lack of precision in the answers of certain patients; Limited financial means of the patients which made it difficult to carry out certain explorations; Lack of precision of the data collected on the consultation registers; Non-availability of certain anti-epileptic drugs.

RESULTS

Epidemiological data: Our study involved 75 epileptic patients out of 5546 patients who consulted for epileptic seizures, i.e. a prevalence of 51‰.The male sex was predominant with 56% for a sex ratio of 1.27. The mean age was 17.2 years with the age range of 6-10 years being the most represented. The median age was 13 years. 85.33% of the patients lived in urban areas and 56% had a low socio-economic level. The age of onset of the first attack was between 0 and 5 years in 29.33%. In 50.67% of the patients, the course of the epilepsy lasted from 0 to 2 years. The time to neurological diagnosis was 6 to 7 days in 37.33% of cases, with a time to treatment of less than 2 days in 62.67%. In 50.67% of cases, the schedule of attacks was diurnal and nocturnal. Clinical manifestations with motor signs represented 65.33% and 34.66% of the psychological manifestations. No seizure triggers were found in 50.67% of the cases. Familial epilepsy was found in 16% of cases. Head trauma was the most common personal antecedent in 4% of cases. Consanguinity was found in 48% of cases. The physical examination was abnormal in 6.67% of cases.
Paraclinical: EEG was performed in all our patients. Focal abnormalities, secondarily generalized, were predominant in 64% of the cases. Insular localizations were the most represented in 26.32% of cases. Other abnormalities encountered were slowing of the background rhythm and focal slow waves in 8% and 2.67% of cases respectively. Idiopathic epilepsy was the most common etiology in 72% of cases. Cerebral CT was performed in 20% of the cases with abnormalities found in 40%. Cerebral MRI was performed in 10.67% of cases with 37.5% of anomalies found.
Therapeutically: Monotherapy was the most prescribed type of treatment for our patients in 90.67% of cases, with carbamazepine being the most used molecule in 82.35% of cases. Dual therapy was prescribed in 9.33% of cases and the combination of carbamazepine and phenobarbital was the most used in 42.86%. The evolution was favourable in 93.33% of cases.

DISCUSSION

Epilepsy constitutes a major public health problem in Niger. In our study, 283 patients had been collected among 5546 patients presenting with epileptic seizures who came for consultation, i.e. a prevalence of 51‰ of which 75 patients were retained. This prevalence is lower than that found by R.Gati Ouonkoye and S.Ocquet [11] in Niger in 2003 who found a prevalence of 213,9‰. On the other hand our results are largely superior to those reported by Ndoye Nd in Dakar(Senegal) [12] and Laho Diallo L et al.[13] in Conakry who found 8 to 14 ‰ and 14 ‰ respectively. Multicentric studies carried out in Sub-Saharan Africa by Preux PM and Druet-Cabanac M [7] and Ngugi et al [14] would place the global prevalence of epilepsy between 9 to 39‰. This high prevalence observed at this medical facility could be explained by the fact that it represents a reference center in the management of neurological

diseases in Niger receiving populations from all parts of the country, and we also believe that the high prevalence observed in our sample is related to the very selective nature of the latter.

Sex: The male sex represented 56% against 44% with a sex ratio (M/F) of 1.27. This male predominance was noted by Assadeck et al [15] in Niger in 2019, Hassane Djibo et al [1] in Niger in 2020 and in Guinea [16] in 2017, Nyassidine J et al [17] in Senegal, Basse A et al [18] in Senegal, Dadah [19] in Senegal, and Hassane Djibo et al [19] in Guinea. [18] in Senegal, Dadah et al [19] in Senegal and ADJIEN K. et al [20] in Benin in 2017, which found a male predominance with a sex ratio of 1.6, 1.74, 1.72, 1.83, 1.7 and 1.9 respectively. However, a female predominance was reported in the literature by Osuntokun et al [21] in Nigeria, Rwiza et al [22] in Tanzania, and Simms et al [23] in Rwanda who found a sex ratio (F/H) of 1.1, 1.08 and 1.2 respectively. We conclude that gender is not a predisposing factor for epilepsy despite the difference in the neurobiological development of men and women.

Age: The mean age of our patients was 17.2±16.3 years with extremes ranging from 1 to 58 years with a median of 13 years. The age range from 6 to 10 years was the most represented with 22.67%. Our results are lower than those reported by Hassane Djibo et al [1] in Niger who found a mean age of 36 years with the age range of 0 to 20 years being the most represented in 68.9%. Assadeck et al [15] in Niger found an average age of 65.82 years and the most represented age group of 60 to 64 years in 43.5%. Napon Christian et al [24] in Burkina Faso found an average age of 31.7 years with a proportion of children under 11 years in 11% of cases. However, our results are close to those reported by Dadah et al [19] in Senegal and Basse A et al [18] in Senegal, who found an average age of 7.93 years and 5.17 years respectively, and the 5 to 10 year old age range. The age range of 0 to 5 years represented 50% was reported by Mariame D [25] in Mali. This could be explained by the fact that in our study the majority of our patients are of pediatric age.

The delay of neurological diagnosis was 6 to 7 days in 37.33%. Our results are different from those reported by Doumbia-Ouattara et al [26] in Côte d'Ivoire who found an average delay of 2.2 years. Mukuku O et al [27] in the Democratic Republic of Congo found a mean duration between the onset of seizures and consultation of 6.95 years. This difference could be explained by the increasing number of neurologists in our context.

Time to treatment : In our study, 62.67% of patients started treatment within 2 days. Our results are different from those reported by Doumbia-Ouattara et al [26] in Côte d'Ivoire who found an average delay of 3.6 years. This difference could be explained by the fact that in our context, the prescription time for anti-epileptic drugs is short because patients are slow to perform the EEG due to their limited means, and this would allow us to reduce the risk of aggravation of the disease and improve the quality of life of patients.

Seizure timing: in 50.67% of cases the timing was day and night, followed by day and night in 44% and 5.33% of cases respectively. Our results are in line with those found by Doumbia-Ouattara et al [26] in Côte d'Ivoire who reported day and night seizures in 45.6% of cases and night seizures in 24.8% of cases. However, our results are different from those reported by Traoré M [28] in Mali who found nocturnal seizures in 61.43% of cases, daytime and nocturnal seizures in 37.14% of cases and daytime seizures in 1.43% of cases. This difference could be explained by the fact that frontal seizures tend to occur at night [2].

Clinical manifestations: Clinical manifestations with motor signs represented 65.33% and psychic manifestations 34.66%. In our study, partial motor seizures with secondary generalization predominated with 34.69%, followed by partial motor seizures in 28.56% of cases and tonic-clonic generalized seizures in 20.41%. Our results are different from those found by Hassane Djibo et al [1] in Niger who reported tonic-clonic generalized seizures in 37.4% of cases followed by simple partial seizures in 14.8%. Assadeck et al [15] in Niger reported generalized tonic-clonic seizures in 41.9% of cases, partial seizures in 25.8% of cases. Adjien et al [29] in Benin reported partial seizures secondarily generalized in 14.28%, followed by partial seizures in 74.28% of cases and generalized tonic-clonic seizures in 5.71%. Doumbia-Ouattara et al [26] in Côte d'Ivoire reported generalized tonic-clonic seizures in 85.1% of cases, partial seizures in 6.9% of cases and secondary generalized partial motor seizures in 4% of cases. Our results were in line with those reported by Hassane Djibo et al [16] in Guinea who found that secondary generalized partial seizures were the most frequent in 46.67% of cases, followed by tonic-clonic generalized seizures in 36.67% of cases and simple partial seizures in 6.67% of cases. Daou Mariam [30] in Mali reported generalized tonic-clonic seizures in 30% of cases, partial seizures in 43.6% of cases and secondary generalized partial motor seizures in 25.6% of cases. Lassana CISSE [31] in Mali reported partial seizures in 72.41% of cases and tonic-clonic generalised seizures in 20.14%. This could be explained by the delay between the appearance of the first seizure and the consultation. In our study, psychic manifestations represented 34.66% of cases. Our results are in line with those reported by Matonda et al [32] in the Democratic Republic of Congo, Lassana CISSE [31] in Mali, Sarr et al [33] in 2008 in Senegal and Hassane Djibo et al [1] in Niger, who reported respectively 44.9%, 13.34%, 37.7% and 9.5% of cases. Our result could be explained by the fact that our study concerned only partial epilepsy and that psychic manifestations predominate in partial epileptic seizures.

Seizure triggers: In our study no seizure triggers were found in 50.67% of cases, therapeutic interruption triggered seizures in 30.67% of cases, fever in 9.33% of cases and sleep in 2.67%. Our results are similar to those reported by Lassana CISSE [31] in Mali who found no triggering factor in 37.93% of cases, therapeutic interruption in 3.45% of cases, and fever in 27.59% of cases. Daou Mariam [30] in Mali who found no triggering factor in 12.8% of cases, therapeutic interruption in 12.8% of cases, sleep in

51.2%. Sow-Sembene et al [34] in Senegal reported different results from ours. They found strong emotions in 46.5%, fatigue in 45.5%, lack of sleep in 33.1% of cases, stress in 19%, and excessive drinking in varying proportions depending on the nature of the drink (alcoholic: 2.7%; stimulating: 35.5%). There were also atypical factors, such as high frequency music (15.1%). Light stimulation was reported as a trigger in 28.7% of our patients. More than 40 seizure triggers have been reported in the literature [35]. It is difficult, if not impossible, to know precisely which factor facilitates an acute seizure in a patient, as sometimes several factors contribute to the occurrence of a seizure [34].

Personal history: In our study, head trauma was found in 4% of cases. Our result is in line with that of Daou Mariam [30] in Mali and Bony et al [36] in Ivory Coast who found a proportion of 5.1% and 8.5% of cases respectively. Head trauma is a common cause of epilepsy. In Africa, road accidents are one of the main causes of head injuries, due to the lack of road traffic control and the failure to respect traffic regulations, particularly the failure to wear seat belts or helmets for motorcyclists [37].

Family history and consanguinity:

Family epilepsy was found in 16% of cases as a family antecedent. This result is in line with those of Bony et al [36] in Ivory Coast and Daou Mariam [30] in Mali who reported a proportion of 16% and 12.8% of cases respectively. However, our results differ from those of Dadah et al [19] in Senegal and Hassane Djibo et al [1] in Niger, who found a proportion of 5.5% and 2.3% of cases respectively.

Parental consanguinity was found in 48% of cases. Our result is similar to those found in the literature. For example, Dadah et al [19] in Senegal and Hassane Djibo et al [1] in Niger found a proportion of 17.62% and 14.9% of cases respectively. The important role attributed to consanguinity in the development of genetically determined diseases is well documented; however, its association with epilepsy has been suggested by some studies and refuted by others [38]. Consanguinity is a risk factor significantly associated with epilepsy. A strategy of prevention and public awareness of the impact of consanguineous marriages as well as genetic counselling for couples with a family history of epilepsy is needed.

Physical examination: was abnormal in 6.67% of cases. Our result is different from that found by Daou Mariam [30] in Mali who reported a pathological examination in 71.8%. Yacouba T [39] in Burkina Faso reported a pathological examination in 35% of cases. This difference could be explained by the symptomatic nature of epilepsy, which encourages patients to seek medical attention as soon as possible.

EEG: Intercritical EEG was performed in all our patients. Our results are consistent with those of Assadeck et al [40] in Niger and Hassane Djibo et al [1] in Niger. This could be explained by the fact that EEG is performed in all patients known to be epileptic or not for the diagnosis and follow-up of our patients. In our study, secondary generalized focal abnormalities were the most common EEG findings in 64% of cases. Our results are different from those found by Daou Mariam [30] in Mali and Mariame D [25] in Mali who reported respectively a predominance of focal anomalies in 47.6% and 59% of cases. This could be explained by the delay between the consultation and the appearance of the first attack. In our study, insular, temporal and frontal locations were predominant in 26.32%, 21.05% and 15.79% of cases respectively. Our results are different from those reported by Mariame D [25] in Mali who found temporal, frontal and occipital locations predominant in 43%, 13% and 4% of cases respectively. The notion of insular epilepsy has long remained speculative, and the role of the insula lobe in partial epilepsies has remained little known to this day [41].

Cerebral imaging: cerebral CT: was performed in 20% of cases with abnormalities found in 40%. Our results are inferior to those of Adjien et al [20] in Benin who reported a proportion of cerebral CT in 77.14% of cases. Yacouba T [39] in Burkina Faso reported a proportion of 39.6%. Our results are close to those of Basse et al [18] in Senegal who reported a proportion of cerebral CT in 12.9% of cases. This result could be explained by the high cost of imaging examinations and the low socio-economic level of the general population.

Etiologies: in 72% of cases the etiology was not found. Structural and genetic causes were found in 14.67% and 12% of cases respectively. Assadeck et al. in Niger reported a predominance of idiopathic epilepsy in 46.1% and structural epilepsy in 11.8% of cases. Maïga et al [42] in Mali reported 76.9% structural causes and 18% idiopathic causes. Mukuku O et al [27] in the Democratic Republic of Congo reported 38.4% structural causes. This could be explained by the limited means of the health structures and of our patients in the etiological research of these partial epilepsies.

Treatment : Monotherapy was the most common type of treatment used in our patients in 90.67% of cases. Dual therapy was prescribed in 9.33% of cases. Carbamazepine was the most prescribed drug in 82.35% of cases and the combination of carbamazepine and phenobarbital was the most used in 42.86%. Our results are similar to those found by Assadeck et al [15] in Niger who reported a prescription of carbamazepine in 72.6% of cases and the combination carbamazepine-phenobarbital in 3.2%. Hassane Djibo et al [16] in Guinea in 2017 who reported the combination of carbamazepine and phenobarbital in 70% of cases. Our results are different from those of Hassane Djibo et al [1] in Niamey who reported a predominance of phenobarbital in 44% of cases. Daou Mariam [30] in Mali in 2013, Traoré M [28] in Mali, Mariame D [25] in Mali and Sarr et al [33] in Senegal who reported respectively a predominance in the prescription of sodium valproate in 51.3% 85.7%, 83% and 63.85% of cases. Traoré M [28] in Mali prescribed sodium valproate and clonazepam in 4.3%. Our result could be explained by the fact that carbamazepine is active

on partial seizures, its availability throughout the country, its affordable cost compared to new anti-epileptics. Indeed, most current anti-epileptic drugs have psychotropic effects. Phenobarbital is known to impair cognitive abilities. In contrast, carbamazepine and valproate have little deleterious effect on cognitive function. Some anti-epileptic drugs such as sodium valproate, carbamazepine and lamotrigine are used in psychiatry as mood stabilizers in bipolar disorders and as potentiators of antidepressant treatments in resistant depression, and benzodiazepines are widely used as anxiolytics or sleep indicators. However, there is a risk of dependence and addiction [43-45].

CONCLUSION

Epilepsy is a public health problem in developing countries, particularly in Niger, and constitutes a real factor of social exclusion. The prevalence of epilepsy in our study was higher than in developing countries. The pediatric population was predominant in our study. The EEG was performed in all our patients. It remains a crucial examination for diagnosis and follow-up. The etiology was not found in the majority of our patients due to the high cost of imaging examinations and the limited diagnostic resources in our hospitals. Monotherapy was the most common type of treatment, with carbamazepine being prescribed predominantly. The evolution was favourable in the majority of our patients.

Multidisciplinary management is essential for better control of seizures and management of associated disabilities.

Conflict of interest: No author has any conflict of interest to disclose.

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