Clinical and Social Findings of Childhood Epilepsy

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Abstract

Background: Seizures are defined as a transient occurrence of signs and symptoms due to the abnormal, excessive, or synchronous neuronal activity in the brain characterized by abrupt and involuntary skeletal muscle activity. Seizure is related to specific risk factors like positive family history, fever, infections, neurological comorbidity, premature birth, mother's alcohol abuse, and smoking in pregnancy. Epilepsy is the most frequent chronic neurologic condition in children. Studies have suggested declining incidence rates of childhood epilepsy in high-income countries during the last decades.

Objective: To describe the clinical features and social findings of epilepsy in children, and to evaluate some risk factors associated with control of epilepsy.

Patients and Methods: This cross-sectional study was conducted in the pediatric department of Albatool teaching hospital in Diyala province, Iraq. A total of 100 children were included in the study from February 2020 to May 2020. All children diagnosed with epilepsy in this study.

Results: One hundred children with epilepsy, their mean age was 5.96± 3.33 years (range 1-14 years). Of the 48(48%) children were male and 52(52%). Of the total patients, 79% were free from seizure on AED, 21% of them were refractory to treatment.Patients without developmental delay (88.7%, p=0.012) can be controlled by AED. Patients who had idiopathic seizures (87.5%, p=0.04) can be controlled by AED. Patients who had seizure attacks can be controlled by AED more than patients who had weekly or monthly seizure attacks (97.4%) (p<0.001). Patients who had been treated by monotherapy (94.7%, p=0.012) can be controlled more than patients who were treated by multidrug therapy. Affected social interaction and need more supervision were factors that detected more in patients with

refractory epilepsy, p=0.04, 0.01 respectively. While there was no association between frightened other people and epilepsy control.

Conclusion: Most of the patients are characterized by: treatment approach monotherapy, less affected by social interaction and need less supervision. Patients with refractory epilepsy had opposite factors.

Keywords: Epilepsy, Albatool teaching hospital.

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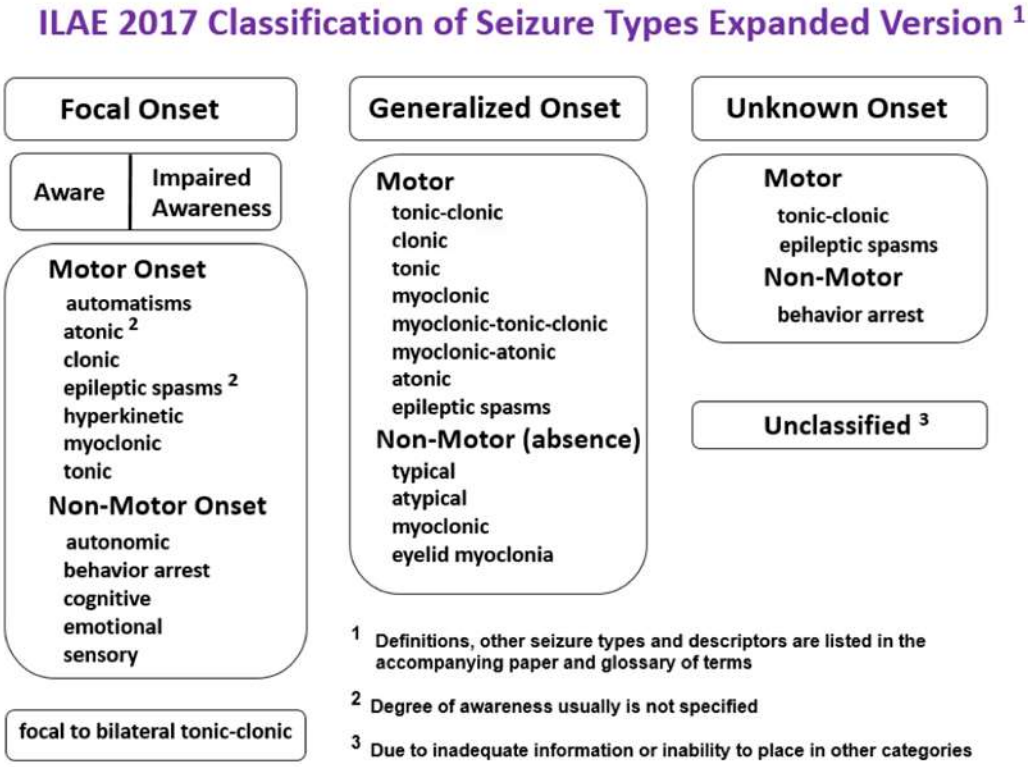
Introduction

Epilepsy is the most chronic neurologic condition in children. Epilepsy is characterized by the following conditions: At least two unprovoked (or reflex) seizures occurring >24 h apart.One unprovoked (or reflex) seizure and a probability of further seizures similar to the general recurrence risk after two unprovoked seizures)[1]. Studies have shown declining incidence rates of epilepsy in high-income countries [2].

Seizures are defined as a transient occurrence of signs and symptoms due to the abnormal, excessive, neuronal activity in the brain that leads to involuntary skeletal muscle activity[3]. Seizure onset, especially in the child population, is related to specific risk factors like positive family history, fever, infections, neurological comorbidity, premature birth, mother's alcohol abuse, and smoking in pregnancy[4]. Epilepsy affects 1-2% of children. In childhood, epilepsy is more common in the first year of life, and its incidence decreases with increasing age. In 75% of these cases, seizures are well controlled with antiepileptic drugs and 25% of epilepsy is refractory to pharmacological treatment and a surgical approach should be considered [5]. Early childhood brain damage such as cerebral palsy and mental retardation represented a major cause of symptomatic epilepsy, whereas CNS infection was the main cause in Sudan[6].

Indeed, the classification includes three levels: seizure types, epilepsy type, and epilepsy syndrome. Where possible, a diagnosis at all three levels should be sought as well as the etiology of the individual's epilepsy [4].

Classification of the epilepsies		
Seizures types	**Epilepsy types**	
•Focal **•Generalized** **•Unknown**	•Focal •Generalized •Combined generalized and focal •Unknown	Epilepsy syndromes
Etiology **Structural, Genetic, Infectious, Metabolic, Immune, Unknown**		



ILAE, international league against epilepsy(7).

The aim of treatment is to achieve control of seizures with minimum side effects and to ensure good quality of life. About 70 % of the patients become seizure-free when appropriate monotherapy was used especially children with new-onset epilepsy those with idiopathic generalized epilepsies [8]. The drugs were initially used in a certain dose and then increased gradually to a maximum dose and firstly monotherapy was used then add the second drug. It is recommended that combination therapy (adjunctive or add-on therapy) should only be considered when attempts at monotherapy with AEDs have not resulted in seizure freedom [9]. Intractable epilepsy can be defined as inadequate seizure control despite appropriate medical therapy with at least two antiepileptic drugs in maximally tolerated doses for more than 18 months, or adequate seizure control with unacceptable drug-related side effects.

Epilepsy surgery is the most effective treatment for drug-resistant focal epilepsy and should be considered as soon as appropriate trials of two AEDs have failed. The success of epilepsy surgery is influenced by different factors, including epilepsy syndrome, presence and type of epileptogenic lesion, and duration of post-operative follow-up [10].

Patients and Methods

Study Design

A cross-sectional retrospective study was done from 1st of Feb to 30th of May 2020.

Study Setting: This study was conducted in the department of pediatrics in pediatric neurology consult unite in Al-Batool teaching hospital for maternity and children in Diyala province, Iraq.

Study Population: The target population was the children attending as outpatient to the pediatric neurology unite of the paediatric department of Albatool hospital. A total of 100 children were included in the study from 1st February to 30th May 2020.

Inclusion criteria: All children diagnosed with epilepsy from 1 to 14 years were enrolled in the study.

Data Collection: Data were collected from medical records and questionnaires. Data collection was done through interviewing parents' or the caregiver of the children directly using a questionnaire that was used before studying epilepsy.

The questions were in an Arabic language and the English copy. To minimize any embarrassment to the children, parents or guardians were accessed directly to obtain the information.

The questionnaire consisted of two parts: The first part included socio-demographic characteristics of the sample (age, sex). The second part was designed to enquire about patients and seizure characteristics, family history, clinical features, drug therapy.

The height was measured for over 2 year-old children using a portable stadiometer unit mountable to the wall with an accuracy of 0.1 cm. The height of children less than 2 years of age was measured in a supine position with a measuring wood board. The weight of children was measured by a standardized uni-scale with an accuracy of 100 g.

ranging from 8-77 years, the median age was 45.5 years, male: female ratio was 1.07:1.

LBW: infant having a birth weight of less than 2.500 g [11].

LGA: infant born at a weight greater than 90th percentile for age (11).

LGA: infant born at a weight greater than 90th percentile for age (11).

OFC: head circumference is determined using a flexible tape measure run from the supraorbital ridge to the occiput in the path that leads to the largest possible measurement.

Statistical analysis

Statistical analysis was carried out using a statistical package for social sciences (SPSS) version 24, the data presented as frequency and percentage tables. A chi-square test and Fisher exact test for significant association were performed to assess relations between categorical variables. Student T-test was used to compare group means. A level of p-value less than 0.05 was considered statistically significant.

Results

One hundred children diagnosed with epilepsy were involved in the study, their mean age was 5.96± 3.33 years (range 1-14 years), 52% of them aged 5 years and below, 37% of them aged 5-10 years, and 11% aged more than 10 years. About half of them 48(48%) children were male and 52(52%) patients were female, M: F ratio was 0.92.

Table (1): Relationship between age and sex of the patients

Age	Sex		Total	P Value
	Male	Female		
<=5	22	30	52	0.4
	42.3%	57.7%	100.0%	
5-10	20	17	37	
	54.1%	45.9%	100.0%	
>10	6	5	11	
	54.5%	45.5%	100.0%	
Total	48	52	100	
	48.0%	52.0%	100.0%	

The weight \age of 12(12%) patients was below the 25th percentile, 87(87%) patients were 25^{th}-75^{th} percentile, and 1(1%) patient was above the 75^{th} percentile. The height \ age of 1(1%) patients was below the 25^{th} percentile, 98(98%) patients were 25th-75th percentile, and 1(1%) patient was above the 75^{th} percentile. The OFC \age of 5(5%) patients was below the 25^{th} percentile, 92(92%) patients were 25^{th}-75^{th} percentile, and 3(3%) patient was above the 75^{th} percentile. Seventy-nine percent of the patients were free from seizure on AED, 21% of them were refractory to treatment. The mean seizure length was 8.54±5.37 minutes (range= 1-30 minutes), 92% of the patients had a generalized seizure, 6% and 2% of the patients had partial and infantile spasms respectively. In 76% of the patients, the seizure frequency was few times, 20% of the patients got seizures monthly, 4% of the patients got seizures weekly. The most common cause of seizure was symptomatic causes found in 52% of the patients, and the most common cause was asphyxia, found in 36.5% of symptomatic patients. Of the total patients, 63% of patients had clinic visits regularly, as shown in Table (2).

Table (2): Distribution of the patients according to their seizure characteristics

Seizure characteristics		**Frequency (%)**
Type of seizure	Generalized	92
	Partial	6
	infantile spasm	2
Frequency of seizure	Few times/life	76
	Monthly	20

	Weekly	4
Causes of seizure	Idiopathic	48
	Symptomatic	52
Symptomatic causes (N=52)	asphyxia	19(36.5%)
	infection	11(21.2%)
	head trauma	9(17.3%)
	brain malformation	7(13.5%)
	metabolic	3(5.8%)
	kernicterus	2(3.8%)
	hemorrhage	1(1.9%)
Visit the clinic regularly	Yes	63
	No	37

The Developmental delay was reported in 47% of the patients. Of the total [47] patients who had developmental delay, the most frequent type was a global delay that found in 46.8% of patients, the least one was gross motor and social speech delay, gross and fine motor and speech delay which found in 2.1% of the patients. Of the total patients, 30% of them affected their social interaction, 6% were frightening for the people, 53% of them need more supervision as in Table (3).

Table (3): Distribution of the patients according to social interference of the epilepsy

Social interference of the epilepsy		
Affected social interaction	Positive	30
	Negative	70
Frightened other people	Yes	6
	No	94
Need more supervision	Yes	53
	No	47

For most of the patients treated by monotherapy (63.3%), valproate was the most frequent monotherapy used, as shown in Table (4).

Table (4): Distribution of the patients according to the drug therapy

Drug therapy		NO. (%)
Therapeutic approach(N=90)	Monotherapy	57(63.3%)
	Multitherapy	33(36.7%)
Type of monotherapy(N=57)	Carbamazepine	18(31.6%)
	Valproate	39(68.4%)

Table(5) shows Chi-square test which explains the association between control of epilepsy and patients' characteristics, patients who had idiopathic epilepsy (87.5%, p=0.04) can be controlled by AED more than symptomatic epilepsy. Patients who had few time seizure attacks can be controlled by AED more than patients who had weekly or monthly seizure attacks (97.4%) (p<0.001).

Table (5): Relationship between patients' seizure characteristics and control of epilepsy

seizure characteristics		control of epilepsy		P value
		Free on AED	Refractory	
Causes of seizure	Idiopathic	42(87.5%)	6(12.5%)	**0.04***
	Symptomatic	37(71.2%)	15(28.8%)	
Type of seizure	Generalized	75(81.5%)	17(18.5%)	0.08
	Partial	3(50%)	3(50%)	
	Infantile spasm	1(50%)	1(50%)	
Frequency of seizure	Few time	74(97.4%)	2(2.6%)	**<0.001***
	Weekly	0(0%)	4(100%)	
	Monthly	5(25.0%)	15(75.0%)	

*p<0.05

Table (6) shows student t-test to test the mean difference between control of seizure groups, there was no significant difference for the seizure length between patients with controlled epilepsy and patients with refractory epilepsy.

Table (6): Mean, seizure length, difference between control of seizure groups

Control of seizure	Length of seizure		P value
	Mean	± SD	
Free on AED	8.29	4.84	0.37
Refractory	9.48	7.08	

Table (7), shows Chi-square test for test the Patients who had been treated by monotherapy (94.7%, p=0.012) can be controlled more than patients who were treated by multidrug therapy. However, the type of monotherapy not affect the control of epilepsy, regardless of the type of epilepsy.

Table (7): Relationship between drug therapy and control of epilepsy

Therapy		**Control of epilepsy NO(%)**		**P value**
		Free on AED	Refractory epilepsy	
Therapeutic approach	Monotherapy	54 94.7%	3 5.3%	**<0.001***
	Multitherapy	16 48.5%	17 51.5%	
Type of monotherapy	Carbamazepine	16 88.9%	2 11.1%	0.17
	Valproate	38 97.4%	1 2.6%	

*p<0.05

Table(8), shows the association between control of epilepsy and patients' social and mental factors. Affected social interaction and need more supervision were factors that detected more in patients with refractory epilepsy, p=0.04, 0.01 respectively. While there was no association between frightened other people and epilepsy control.

Table (8): Relationship between patient's social and mental factors and control of epilepsy

social and mental factors		**Control of seizure**		**P value**
		Free on AED	Refractory	
Affected social interaction	Positive	20 66.7%	10 33.3%	0.04*
	Negative	59 84.3%	11 15.7%	
Frightened other people	Yes	4 66.7%	2 33.3%	0.6
	No	75 79.8%	19 20.2%	
Need more supervision	Yes	37 69.8%	16 30.2%	0.01*
	No	42 89.4%	5 10.6%	

*p<0.05

Discussion

Epilepsy of childhood often has a fluctuating course, also experience alternating periods of seizure freedom and seizure relapses despite adequate treatment so the control of seizures is the optimal goal of antiepileptic drugs [12]. Current results reported slight female predominance, similarly[13] found that females were more than males.

A present study found that there was no sex predominance and no age difference regarding epilepsy control, [13] and [14] found the same results.

Scores for weight-for-age and body mass index for age did not show any significance by [15] and [16], current results showed that most of the patients with epilepsy lie within normal weight \age scores.

A current study found that most of the patients with epilepsy lie within normal height \age scores, while[15] and [16] reported that children with epilepsy presented lower scores for height-for-age.

Similar to [13] a current study found that patients without developmental delay can be controlled by AED, also [14] found that a history of delayed milestones was found more in patients of intractable epilepsy.

A present study found that generalized epilepsy was the most frequent type of epilepsy, [15] and [16] studies found the same results.

A current study found that the most common cause of seizure was symptomatic, this result agreed with [17].

In the present study, the most common symptomatic cause was asphyxia and this result is in agreement with [18].

A current study found that patients who had idiopathic seizures can be controlled by AED, also [13] reported that idiopathic etiology was significantly detected more in the controlled group.

A present study found that patients who had few time seizure attack can be controlled by AED, similarly [13] reported infrequent seizures were detected more among the group with controlled epilepsy, [14] study found that intractable epilepsy had more daily seizure attack. There was no significant mean seizure length difference between patients on AED and patients with controlled epilepsy.

In the current study, the most common types of seizure in both the refractory and controlled epilepsy groups was a generalized seizure, and types of seizure are not associated with control of epilepsy, [19] study found that generalized seizures were more frequent in the group with drug-responsive epilepsy. While [20] reported that generalized seizures were more common in patients with controlled epilepsy. And [14] found that in the intractable group most of the patients had partial seizures, also in the well-controlled group patients presented with partial seizures, type of seizure was significantly associated with control of seizure, this difference may be due to sampling size difference and age group used in a later study (large sample size and different age group).

This study found that most of the children with epilepsy were needed more supervision, it affected their social interaction,and patients with refractory epilepsy were affected their social interaction and needed more supervision, [19] showed that behavioral

disorders were reported more in the group with refractory epilepsy[14] found that behavioral disorders were not found to be significantly different from the two groups [19] reported that mental deficiency was more common in the group with intractable epilepsy and demonstrated statistical significance.

In the present study, most of the patients were treated by monotherapy, while[15] and [16] reported that most of the patients were treated with multidrug therapy. Similar to the current study [16] found that valproate was the most frequent monotherapy used in treatment.

The present study found that patients who had been treated by monotherapy can be controlled more than patients who were treated by multidrug therapy, this is in agreement with [20] findings.

Conclusions

Most of the patients characterized by treatment approach were monotherapy, less affected by social interaction, and needed less supervision. Patients with refractory epilepsy had opposite factors, which were affected by social interaction and needed more supervision, patients controlled by AED are those who had an idiopathic seizure, normal development, and get an infrequent seizure. Early detection and assortment of the patients according to treatment response allows their referral to specialized neurosurgical or surgical centres. Early selection of cases in their clinical course for surgical treatment and allow proper parental counseling.

Recommendations

New drug regimen must be introduced followed to continuous seizure attacks of the refractory epilepsy cases, taking into consideration drug interaction and side effects.

Early selection of cases in their clinical course for surgical consultation and treatment.

Proper parental counselling regarding genetic causes of epilepsy especially refractory cases.

Introduce more sophisticated investigation for refracting epilepsy such as functional MRI, genetic test, mass spectrophotometry, searching for underlying causes.

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Ethical clearance: This study was approved by medical ethics committee of college of medicine ,university of Diyala.

Conflict of interest: Nill

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