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Full Length Research Paper

The pattern of clinical presentation of epilepsy among adolescence Sudanese epileptic patients

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The aim of this study is to describe the clinical presentation of epilepsy among adolescence. It is a cross-sectional hospital based study conducted at Elshaab Teaching Hospital and Sheik Mohammad Kheir neurological clinic (from August, 1999 to April, 2009). The study population included 480 epileptic patients (age 10 to 19 years). The clinical presentation was similar to that which was reported by other researchers worldwide except the fact that the percentage of epilepsy, following infections, increased among the groups used in this study. Epilepsy and its treatment have a direct bearing on major aspects of adolescence lifestyle such as education and employment prospects, driving ability, the use of alcohol and recreational drugs, relationships, contraception, pregnancy and parenthood.

Key word: Sudanese, adolescence, epilepsy.

INTRODUCTION

Epilepsy is a common chronic neurological disorder characterized by recurrent unprovoked seizures (Berkovic et al., 1996; Raymond et al., 1995). These seizures are transient signs and/or symptoms of abnormal, excessive or synchronous neuronal activity in the brain (Taylor et al., 1971). About 50 million people worldwide have epilepsy, with almost 90% of these people living in developing countries (Palmini et al., 1991). Epilepsy is more likely to occur in young children or people above the age of 65 years; however, it can occur at any time (King et al., 1996). On the other hand, over 30% of the people with epilepsy do not have seizure control even with the best available medications (Lüders et al., 1993; Lüders et al., 1998). Africa is a diverse continent and it represents people of different cultural backgrounds. There are approximately 3 to 4 million people living with epilepsy in Africa. There are various traditional beliefs pertaining to epilepsy, its causes and treatments. These beliefs, however, keep 80% of the epileptic patients in Africa from receiving proper treatment. The prevalence of epilepsy in Sudan varies from 0.7 to 4.8%, while in Nigeria, the prevalence of epilepsy varies from approximately 0.53 to 3.7%. The prevalence of epilepsy among African Americans is higher than that of Caucasians and Hispanics, while the prevalence rate is somewhere between 0.010 and 0.012% for African Americans, which is relatively high when compared with 0.007 and 0.009% for Whites and Hispanics, respectively. In addition, the risk of seizures during a lifetime is only 10% among Caucasians; whereas, it is 25% for African Americans.

Puberty involves complex physiologic changes. It is also a time of emotional transition with the development of the desire for independence from parental supervision, increased interaction with peers and emerging sexuality. Adolescence with epilepsy may be complicated by problems in adjusting to a chronic condition that is unpredictable and one that can affect social interactions. Also, they may have inaccurate perceptions about themselves and their seizure disorders, and in addition, fear ridicule and rejection, which in turn will make them withdraw socially. There is a general agreement that most seizure disorders are not altered by the onset of puberty (Engel, 1998; Placencia and Shorvon, 1992). Some researchers report a transient deterioration in seizure control, which is secondary to rapid growth and suboptimal antiepileptic drug (AEDs) levels (Placencia

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and Shorvon, 1992). Certain epileptic syndromes, such as juvenile myoclonic epilepsy and photosensitive epilepsy, characteristically develop around the onset of puberty (Cockrell et al., 1997), whereas other syndromes, such as childhood absence and benign rolandic epilepsy with centrotemporal spikes, tend to remit during adolescence. Catamenial epilepsy refers to seizure exacerbation related to the menstrual cycle. The most common pattern is an increased tendency for seizures just before or at the onset of menstruation. This increased frequency is noted in women with epilepsy who have idiopathic epilepsy and in those with symptomatic seizures. Menses-related seizure is one of the complications associated with reaching adolescent. Alcohol and drug abuse and destructive behaviors, common among adolescents, may have especially negative effects on teens with epilepsy (Woodbury and Woodbury, 1990; Berkovic et al., 1996). A driver's license is regarded by many adolescents as essential to freedom and independence. State laws vary, but adolescents with epilepsy may be denied this privilege unless their seizures are completely controlled. Health care providers may find medication adherence to be more dependable when obtaining a driver's license is the desired outcome. Sports, with the potential of head injury, should be undertaken with caution, since the risk of seizures increased. Adolescents can be encouraged to participate in less risky activities. However, activities that may result in injury if a seizure occurs should be carefully monitored, especially recreational activities involving water (Raymond et al., 1995; Taylor et al., 1971).

The aim of this work is to study the clinical presentation of epilepsy among adolescence Sudanese epileptic patients seen in Elshaab teaching hospital and Sheik Mohammad Kheir neurological clinic (Sudan).

METHODOLOGY

Study area

Subjects with epileptic seizures had been randomly recruited from Sheik Mohammad Khier Neurological Referral Clinic and El shaab Teaching Hospital (a 240 bedded hospital). The study population included 540 epileptic patients referred to the hospital from August, 1999 to April, 2009. The study was a descriptive cross sectional hospital based study and about 60 patients were dropped due to difficulty of follow up, while the rest of the patients were followed by the authors until the end of the study period.

Inclusion criteria

All the patients were Sudanese and their ages ranged between 10 and 19 years.

Exclusion criteria

Non-Sudanese patients were excluded from the study to include those below 10 years and those above 19 years. All the patients gave their verbal consent to participate in the study, and this was approved by the ethics committee. The diagnosis of epilepsy and its subtypes was made by a neurologist. A full detailed medical and personal history including the following factors: psychological (personality and behavior), social (home, school and education), medical (psychiatry, learning disability and physical symptoms and illness), work, personal environment and information on any traumatic life events (loss and bereavement), was followed by physical examinations.

The physical signs were grouped into general, systemic and neurological, while the following investigations such as: random blood sugar, total blood count, L.F.Ts, blood urea, serum sodium, serum calcium and serum magnesium, were done for each patient. All the patients had MRI of the brain and EEG. The diagnosis of the MRI of the brain was made by a neuroradiologist, while the diagnosis of the EEGs was done by a neurophysiologist. A stress was made on the regular monthly follow up of the patients on the following: (1) Whether the patients take their medication regularly or not; (2) whether they experienced an attack of convulsion or not; (3) whether or not a history of symptoms of drugs intoxication was taken and whether proper examination of each patient looking for signs of drug toxicity was done or not.

Data collection

Data were collected by self-administered questionnaires composed of personal data, full detailed history and examination.

Data analysis

All collected data were finally entered into the computer using the statistical package program for social science (SPSS) to analyze the data via simple descriptive statistics.

RESULTS

Out of the 480 patients, 260 were males (54.15%), while 240 were females (45.85%). A large number of the patients used for this study were from Khartoum (288) and they were mostly students. Regarding age distribution, 160 were between 10 and 15 years and 320 were between 16 and 19 years. Regarding the aetiology of epilepsy among the studied group 320 patients (66.7%) had no cause, while other causes included infections like meningitis and encephalitis. Other causes observed were mental retardation, brain tumors, down syndrome, tuberous sclerosis, microcephaly, Sturge Weber syndrome, past history of brain anoxia, infantile hemiplegia, past history of trauma, degenerative brain diseases and alcohol consumption (Table 1).

The study showed that 96 patients (20%) had a family history of epilepsy. It was found that 412 patients (86.4%) had generalized epilepsy, while 68 patients (13.6%) had focal epilepsy. Out of the 412 patients with generalized epilepsy, 68 had secondary generalized epilepsy; whereas in those that had partial epilepsy, 48 (9%) had complex partial seizure and 20 (4.6%) had simple partial seizure. It appeared that out of 412 patients with generalized convulsion, 360 showed no abnormality on clinical examination and out of the 68 patients with partial

Table 1. Showing the aetiology of epilepsy among 480 Sudanese patients.

Idiopathic		Trauma		Tumor		Infection		Cerebral anoxia		Infantile hemiplegia		Alcohol		Degenerative diseases		Mental retardation		Congenital	
No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
320	66.7	20	4	20	4	56	12	12	2.5	8	1.8	8	1.8	12	2.5	24	5	5	4

Microcephaly		Down syndrome		Tuberous sclerosis		Sturge-Weber syndrome		Neurofibromatosis		
No.	%	No.	%	No.	%	No.	%	No.	%	%
8	1.8	4	0.9	4	0.9	4	0.9	4	0.9	2.5

Table 2. Showing incidence of abnormal neurological findings among 480 Sudanese epileptic patients.

Generalized epilepsy				Focal epilepsy			
No. of abnormal signs		Abnormal sign		No. of abnormal signs		Abnormal sign	
No.	%	No.	%	No.	%	No.	%
370	90	42	10	34	50	34	50

Table 3. Showing types of abnormal EEG among 480 Sudanese epileptic patients.

Generalize discharge		Focal discharge	
No.	%	No.	%
272	**86.4**	**44**	**13.6**

epilepsy, 34 showed abnormality on examination (Table 2).

Among the 480 epileptic patients, 312 had abnormal EEG, (Table 3) and thus showed a distribution of abnormal EEG.

The study showed that 370 patients with generalized epilepsy (90%) had a normal MRI of the brain, while 42 patients (10%) had abnormal MRI of the brain. In those that had focal epilepsy, 34 patients (50%) had abnormal MRI of the brain, while 34 patients (50%) had a normal MRI of the brain. The distribution of the 480 epileptic patients according to antiepileptic drugs they received was as follow: 180 patients received phenytoin, 168 received phenobarbitone, 140 received carbamazine and 152 patients received sodium valproate. Out of the 480 patients, 320 (66.6%) took one drug, while 160 (33.3%) received more than one drug. Acne, skin rash, hirsutism and coarse facial appearance were found to be the common idiosyncratic side effect of phenytoin, while the other side effects and dose related side effects can be seen in Tables 4 and 5, respectively.

Out of the 168 patients taking phenobarbitone, 16 had skin rash (idiosynchratic). Table 6 showed that depression and listlessness were the common dose related side effects.

The idiosynchratic adverse effects of carbamazebine were found as follow: 16 patients had skin rash, 4 had a granulocytosis and 4 had aplastic anaemia. However, nausea and vomiting were found to be the common dose related side effects of carbamazebine (Table 7). Out of the 140 patients taking sodium valproate, 4 had thrombocytopenic and 4 had encephalopathy. Weight gain, tremor and menstrual cycle disturbances were found to be the common dose related side effects (Table 8). Most of our patients had normal serum level of AEDs as seen in Table (9). The study showed that 248 patients (52%) became seizure-free during the period of

Table 4. Showing the adverse effects' incidence of phenytoin (indiosynchratic).

Side effects	Acne	Rash	Hirsutism	Coarse facial app	Blood dyscrasia	Lymph adenopathy
No.	20	16	16	16	4	1

Side effects (cid)	SLE like syndrome	Hepato toxic effect	Stevens- Johnsons syndrome	Dupuytren contracture	Teratogencit
No.	1	1	4	4	-

Table 5. Showing the adverse effects' incidence of dose related phenytoin.

Side effects	Nausea	Vomiting	Ataxia	Nystagmus	Gingival hypertrophy	Megalblastic anaemia	Drowziness
No.	16	16	3	12	16	4	16

Out of 180 patients taking phenobarbitone, 16 had skin rash (Idiosynchratic).

Table 6. Showing the adverse effects' incidence of phenbarbitone (dose related).

Side effects	Listlessness	Fatigue	Depression	Insomnia	Irritability	Drowsiness	Distractibility and hyperkinasia
No.	8	20	8	4	4	4	4

Table 7. Showing the adverse effects' incidence of carbamazebine (dose related).

Side effects	Nausea and vomiting	Steepness	Drowsiness	Neutropenia	Dizziness	Diplopia	Headache	Hyponatraemia	Arrhytmia	Orofacial dyskinesia
No. of patients	20	16	12	12	8	1	4	4	1	1

treatment, while 232 patients (48%) still had convulsions.

DISSCUSSION

The study showed that, males are affected more than females. It is a fact that, although epilepsydoes affect both sexes, males are more prone to the condition than females, though the reason for this is not known, but it seems that some of the risk factors, like trauma, are more common among males. Also, it may be due to the fact that diagnosis of epilepsy is a stigma in our society, both for the patient and his family, so female patients do not tend to appear before doctors. It appears that elderly ones are more affected than young people; this is similar to what was mentioned in the literature (Engel, 1998). The study showed that out of the 480 patients, only 96 (20%) had a family history of convulsion. This was similar to that which was mentioned in the literature, but some researchers have discovered that some forms of epilepsy can be linked to the

Table 8. Showing the adverse effects' incidence of sodium valproate (dose related).

Side effects	Tremor	Weight gain	Nausea and vomiting	Menstrual cycle disturbances	Alopecia	Peripheral oedema
No.	12	16	8	12	8	1

Table 9. Showing distribution of the serum level of AEDs.

AEDs	No. of patients with normal serum level of AEDs	No. of patients with abnormal serum level of AEDs
Phenytoin	120	20
Phenobarbitone	120	20
Carbamazebine	120	8
Sodium valproate	92	8

inheritance of specific genes which might help in part to explain why sometimes members of the same family are affected by the condition. However, for most people, there is no family history of the disease at all (Placencia and Shorvon, 1992; Cockrell et al., 1997).

The increased incidence of epilepsy among first degree relatives of epileptic patient may be due to genetic factors (Woodbury and Woodbury, 1990). Regarding the underlying causes of epilepsy in most of the patients, there are no obvious causes. The major risk factor in this study was found to be infection (Raymond et al., 1995), while other risk factors include trauma, brain anoxia, tumors, infantile hemiplegia, congenital abnormalities and degenerative diseases. These results were similar to that which was found in other places, but the percentage of epilepsy following infections increased in our country (14%). This was mostly due to the increased incidence of meningitis and encephalitis, which may scar the cortical mantle resulting in subsequent development of seizures. However, this supported the idea that African children have some of the highest rates of bacterial meningitis in the world. Bacterial meningitis in Africa is associated with a high case of fatality and frequent neuropsychological sequelae as reported by Ramakrishnan and his colleagues (Ramakrishnan et al., 2009). Twenty-four cases were reported to be associated with congenital abnormalities, and this included: microcephaly, down syndrome, tuberous sclerosis, sturge-webber syndrome and neurofibromatosis. Although the commonest type of epilepsy, according to the underlying causes, is idiopathic, this is common among children and elderly ones like that which was mentioned in the literature (Raymond et al., 1995). Most of the study's epileptic patients had generalized epilepsy, while few of them had focal epilepsy, and this was not similar to that which was reported by the UK National General Practice Study of Epilepsy (two thirds focal epilepsy and one third generalized epilepsy) (Taylor et al., 1971), but it approximates that which was reported by WHO about epilepsy in the African region (where the majority of the cases were tonic clonic epilepsy) (Taylor et al., 1971).

The discrimination, from the findings of the UK National General Practice Study of Epilepsy, may be due to the fact that grand mal epilepsy is dramatic in its presentation so that affected people are interested to seek for medical treatment, unlike partial seizures which may go unnoticed especially in the developing countries. However, this might be the same reason for its compatibility with the WHO report about epilepsy in the African region (Taylor et al., 1971). Grand mal epilepsy was found to be the commonest type, although some of the study's patients were presented with tonic epilepsy, myoclonic epilepsy and atypical absence. Most of those who came with partial epilepsy had a complex one which was similar to that which was mentioned in the literature (Palmini et al., 1991). The incidence of prodromal symptoms in patients with generalized convulsion (20%) is less than that in patients with partial epilepsy (45%), although most of the patients with prodromal symptoms have secondary generalized epilepsy rather than primary generalized epilepsy. Nevertheless, the abnormal neurological findings were common among patients with partial epilepsy than those with generalized epilepsy, and this was similar to that which was mentioned in the literature

(King et al., 1996; Lüders et al., 1993). From this study, it did appear that abnormal EEG in patients was 64.8%; although the study's finding did not differ much from that which was reported worldwide (Lüders et al., 1993). There was no real difference in gender distribution of abnormal EEGs, in that the lower number of females when compared with males (65:55) could be due to the stigmatization of epilepsy in denying female epileptics to seek medical advice or might be due to other factors.

Sleep deprivation EEG recording within 48 h of aseizure and seizure frequency of at least one attack per month are all known to increase the chances of finding epileptic disorders. The inability to have EEG recording within the first 48 h was due to practical difficulties, as quite a number of the study's patients were revered from distant Sudanese states and districts. It is thought that the prospect for the future is to do a second recording (during sleep) for every patient with a negative EEG. This hopefully will increase the chance of obtaining more positive EEGs. The study showed that most of the patients with generalized epilepsy had a normal MRI of the brain (90%) and only 10% had an abnormal MRI of the brain. However, most of the patients who had abnormal MRI of the brain had secondary generalized epilepsy rather than primary generalized epilepsy.

Also, a large number of them had late-onset epilepsy rather than early-onset epilepsy. This result is similar to studies done worldwide; at the same time, the incidence of abnormal MRI of the brain increased to 50% among patients with partial epilepsy, so MRI of the brain is indicated in those who have local epilepsy, late onset epilepsy and epilepsy with abnormal neurological findings (Lüders and Acharya, 1998). The study showed that, there is no clear-cut relation between the plasma concentration of AEDs, their effect and toxicity, and since the daily variation in plasma concentration is wide, routine monitoring may not be helpful unless it is correlated with the patients' clinical situation. The study showed that, 160 patients (33.1/3%) had seizures which are refractory to treatment with single antiepileptic drug, many of which have partial seizures or secondary generalized seizure due to an underlying anatomical lesion. Before long term treatment with more than one drug was undertaken, all reasonable options for monotherapy were exhausted. If one drug was ineffective, an alternative drug was introduced gradually, and if the patient responds well to the second drug, an attempt was made to withdraw the original drug. The two drugs were continued when the attempt was unsuccessful. Out of the 480 epileptic patients, 248 patients (52.7%) became seizure free for three years, while 232 patients (47.3) still have recurrent attacks of convulsions. More so, out of the 248 patients who are seizure-free for three years, 160 patients (66%) normally took one drug, while 88 patients (34%) normally took more than one drug. Many patients who received treatment with more than one drug showed an increased incidence of the central nervous system and other toxic effects. It is important to balance the adequacy of seizure control with the quality of life. Little is lost by gradually reducing the number of drugs and simplifying the dose schedules, and paradoxically, this approach often reduces the frequency of seizure. Even for healthy teenagers, coping with emerging adulthood is a major challenge.

A chronic disability such as epilepsy simply magnifies the problems of adolescence and the penalties for seizures at this time are far more severe than in childhood. Epilepsy and its treatment have a direct bearing on major aspects of lifestyle such as education and employment prospects, driving ability, the use of alcohol and recreational drugs, relationships, contraception, pregnancy and parenthood. Self consciousness is paramount and deviations from peer group norms assume great importance, in that epilepsy can be disastrous for an adolescent's self esteem and sense of identity. When anti-epileptic drugs are indicated, the ideal thing to do is to prescribe the lowest effective dose of a preparation that has possibly few side effects, and given once or twice daily. Compliance with drug treatment is a particular problem in adolescence. As at any age, the reasons include denial of epilepsy, over side effects and complacency about good seizure control. Side effects of AEDs are extremely important at this age since even mild cognitive dysfunction may permanently harm education and employment prospects. Cosmetic effects limit the usefulness of certain antiepileptic drugs (such as phenytoin) in young people. Several lifestyle issues merit discussion. Young women taking enzyme inducing antiepileptic drugs must be warned about potential failure of oral contraceptives. More importantly, all women of childbearing age taking antiepileptic drugs need to know of their possible teratogenicity. Complete abstinence from alcohol should be encouraged; while teenagers must recognize its potential for interacting with drugs, impairing the quality of sleep and thus provoking seizures. The risk of exposure to computer screens and flashing lights often concerns patients and parents. Photosensitive epilepsies may be present in teenage years, but such exposure is harmless to most teenagers. Epilepsy affects educational and employment prospects, with career choices being inevitably restricted by the diagnosis. Further restrictions imposed by parents and suggested by peers or initiated by the patient are sometimes inappropriate. Such restrictions can threaten independence, deny opportunities for friendship and encourage social isolation. A common sense approach is needed towards leisure and sports activities, in that both patient and parents often have to accept living with a degree of risk. The problems faced by teenagers with epilepsy often apply to a lesser extent across the range of patients with epilepsy. As the services for this vulnerable group are improved, the lessons learnt can only benefit people with epilepsy as a whole.

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