ORIGINAL ARTICLE

Familial Epilepsy – A Population Based Study in Yanbu Kingdom of Saudi Arabia

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ABSTRACT

Introduction; *Epilepsy is a common and important neurological condition. It effects children & adults and occurs in every major population of the world. Epilepsy is heterogeneous condition, manifesting on its own or as complication of other neurological or systemic diseases and its clinical form, severity and outcome vary widely. Treatment has improved considerably in recent years and the choice of the medical therapy has widened greatly. The following study shows high incidence of familial epilepsy in a Yanbu – one of the biggest industrial city of Kingdom of Saudi Arabia.*

Objectives: *To study the incidence of familial epilepsy in patient population of Yanbu, Kingdom of Saudi Arabia.*

Material and Methods: *This is a retrospective study of epilepsy patients, as well as follow up of new patients of epilepsy who presented in the department of neurology at Royal Commission hospital Yanbu Kingdom of Saudi Arabia. Duration of study was two years; from January 2011 to December 2012. This study included 100 patients with diagnosed of epilepsy.*

Results: *The age range was 10-60 years; there were 39 patients (78%) of age range 10 – 20, 30 patients (60%) of age range 21 – 30, 11 patients (22%) of age range 31 – 40, 11 patients (22%) of age range 41 – 50, and 9 patients (18%) of age range 51 – 61. There were both diagnosed cases of epilepsy as well as those who presented for the first time in the neurology department.*

Conclusions: *It was seen during study that 40 patients out of 100 patients had two or more family members having epilepsy. We have not seen such high incidence in any of the studies done in the past. What could be the probable cause of this high incidence, remains to be elucidated, one possible explanation might have been polygenic inheritance amongst such patients.*

Key Words: *Epilepsy – epidemiology, familial epilepsy.*

Abbreviations: *GTCS, 2nd generalized (focal with secondary generalized). ILAE = International League against Epilepsy. IBE = International Bureau for Epilepsy.*

INTRODUCTION

The study was done to see the incidence of familial epilepsy in patient population of Yanbu city. Yanbu is one of the major industrial cities of Saudi Arabia and has a population of around one million. It was seen that there are multiple inter-marriages among families and there were more than two family members suffering from chronic epilepsy.

Seizures are transient events that include symptoms and / or signs of abnormal excessive hyper synchronous activity in the brain (Fisher et al., 2005). In 2005, the International League against Epilepsy (ILAE) and International Bureau for Epilepsy (IBE) proposed a definition of epilepsy as disorder of the brain characterized by an enduring predisposition to generate epileptic seizures and by neurobiological, cogni-

tive, psychological and social consequences of this condition. Acute symptomatic seizures provoked by metabolic or toxic derangements occurring acutely in the setting of head trauma or stroke do not define epilepsy.

The traditional definition of epilepsy requires at least two unprovoked seizures. The definition proposed by the ILAE (international League against epilepsy) in 2005 suggested that one epileptic seizure is sufficient to diagnose epilepsy if there is additional enduring alteration in the brain that increases the likelihood of future seizures but the proposal did not specify what evidence is sufficient to define such an enduring alterations. The proposed definition has been controversial and has not been widely accepted (Beghi el al., 2010). The definition of epilepsy used in this article requires at least two unprovoked seizures, so a single unprovoked seizure is insufficient to define epilepsy.

We found in our study that patients suffer a variety of seizure. Epilepsy is not a single entity but rather a collection of disorders that have in common the occurrence of seizures. Hence, a need exists for classification of seizures and of epilepsies in the patient population. A brief description of classification of epileptic seizures is as follows;

1. Partial Seizures

1a. Simple partial seizures

Simple partial seizures are defined as partial seizures in which consciousness is not impaired. They are due to focal cerebral disease and can occur at any age. Most simple partial seizures last only a few seconds. The manifestations can include motor, somatosensory or special sensory, autonomic and psychic manifestations. Todd`s paralysis is a term used to refer to a reversible unilateral weakness, lasting minutes or hours that occurs after a partial seizure which involves motor cortex.

1b. Complex Partial Seizures

Complex partial seizures arise from the temporal lobe in approximately 60% of cases, the frontal lobe in approximately 30%, and from other cortical areas in approximately 10% of cases. Complex partial seizures in their complete form have three components which are aura, altered consciousness, and automatisms.

2. Generalized seizures

There are six categories of generalized seizure, in all, consciousness is impaired from the onset of the attack (owing to the extensive cortical and sub cortical involvement), motor changes are bilateral more or less symmetric and the EEG patterns are bilateral and grossly synchronous and symmetrical over both hemispheres.

2a. Typical Absence Seizures (Petit Mal Seizures)

The seizure comprises an abrupt sudden loss of consciousness (the absence) and cessation of all motor activity. Tone is usually preserved and there is no fall. The patient is not in contact with the environment, inaccessible and often appears glazed or vacant. The attack ends as abruptly as it started and previous activity is resumed as nothing has happened.

2b. Atypical Absence Seizures

These take the form of loss of awareness (absence) and hypo motor behavior. They are longer, less complete loss of awareness and with more marked associated tone changes or motor activity than typical absence seizures. The onset and cessation of the attacks are no so abrupt.

2c. Myoclonic Seizures

A myoclonic seizure is a brief contraction of a muscle, muscle group, or several muscle groups due to a cortical discharge, it can be single or repetitive, varying in severity from an almost imperceptible twitch to a severe jerking resulting, for instance, in a sudden fall or the propulsion of handheld objects.

2d. Clonic Seizures

Clonic seizures take the form of clonic jerking which is often asymmetric and irregular. Clonic seizures are most frequent in neonates, infants, or young children, and are always symptomatic.

2e. Tonic Seizures

Tonic seizures take the form of a tonic muscle contraction with altered consciousness without a clonic phase. They occur at all ages in the setting of diffuse cerebral damage.

2f. Tonic – Clonic Seizures (Grand Mal Seizure)

This is the classic form of epileptic convulsion. The seizure is initiated by the loss of consciousness, and

sometimes the epileptic cry. The patient will fall if standing, there is a brief period of tonic flexion, and then a longer phase of rigidity and axial extension, with the eye rolled up, the jaw clamped shut, the limbs stiff and extended, and the fists clenched or held in the *main d`accoucheur* position. Respiration ceases and cyanosis is common. Consciousness is slowly regained and there is postictal headache and confusion. Patient may lose control on sphincters.

2g. Atonic Seizures

The most severe form is the classic drop attack (astatic seizure) in which all postural tone is suddenly lost causing collapse to the ground like a rag doll. The seizures are short and followed by immediate recovery.

OBJECTIVE

The objective of the study was to see the incidence of familial epilepsy in patients of Yanbu, the largest industrial city of Kingdom of Saudi Arabia, we included new as well as follow-up patients of epilepsy who were following in the neurology OPD at Royal Commission hospital Yanbu.

MATERIAL AND METHODS

Study Design

Retrospective and as well as prospective study.

Duration of Study

The duration of the study was one year; from 1st January 2012 to 31st December 2012.

Setting

Department of neurology Royal Commission Hospital Kingdom of Saudi Arabia.

Sample Size

We randomly collected 100 patients for two years; new as well old patients. We started this study on 1st of January 2011 and concluded on 31st of December 2012.

Sample Collection

The study has been carried out at the department of neurology, Royal Commission hospital Yanbu, Kingdom of Saudi Arabia. One hundred patients were randomly selected who were following in the neurology OPD since years for the treatment of epilepsy.

Inclusion Criteria

1. All patients with age 10 years and more were included in the study.
2. All patients underwent imaging where ever needed (MRI or CT brain).
3. EEG was done in all patients.
4. A detailed history was taken and thorough clinical examination was performed in all patients.

Exclusion Criteria

1. All the patients under the age of 10 years were referred to the pediatrics department.
2. Patients with secondary epilepsy were excluded from the study (including stroke, tumours, vasculitis, eclampsia and multiple sclerosis).

RESULTS

There were one hundred patients included in this study. All of them were investigated for epilepsy; a complete history, thorough clinical examination, base line biochemistry, brain imaging, and EEG.

Table 1:

Total number of patients	100
Age range	10 – 60
Males	43
Females	57

Table 2:

Age Range (Years)	No. of Patients	Gender	
		Males	Females
10 – 20	39	17	22
21 – 30	30	16	14
31 – 40	11	4	7
41 – 50	11	3	8
51 – 60	9	3	6
Total	100	43	57

Age Incidence

The age range was 10-60 years; there were 39 patients (78%) of age range 10–20, 30 patients (60%) of age range 21 – 30, 11 patients (22%) of age range 31 – 40, 11 patients (22%) of age range 41 – 50, and 9 patients (18%) of age range 51 – 61 (Table 2).

Sex Incidence

There are 100 patients in the study, out of which 57 (57%) are females and 43 (43%) are males. (Table 1).

Table 3:

Age Range (Years)	No. of Patients	Family History	
		Positive	Negative
10 – 20	39	17	25
21 – 30	30	11	19
31 – 40	11	6	5
41 – 50	11	3	5
51 – 60	9	3	6
Total	100	40	60

Table 4:

Age Range Years	Type of Seizures						
	GTCS	Others	{Absence	Complex Partial	Focal	Atonic	2nd GE}
10 – 20	29	11	{ 4	4		3	}
21 – 30	25	5	{		2		3 }
31 – 40	8	3	{				3 }
41 – 50	7	2	{	2			}
51 – 60	7	3	{				3 }
	{2nd GE – focal with secondary generalization)						
Total	76	24	{ 4	6	2	3	9 }

Table 5:

Age Range (Years)	Neurological Exam.		CT / MRI Scan Brain		EEG	
	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal
10 – 20	37	4	41		15	22
21 – 30	27	4	31		16	12
31 – 40	10	0	10		6	3
41 – 50	9	0	0		5	3
51 – 60	7	2	9		5	2
Total	90	10	81	-	47	42

DISCUSSION

Epilepsy is defined as disorder of brain characterized by an ongoing ability to recurrent epileptic seizures. It is best considered a symptom of brain disease, and as such it has many different causes and forms.

In this study the age range was 10 to 60 years. We had total of 100 patients so it was very easy to calculate percentage. 43 were males and 57 were female patients. Among these patients 39 patients are between 10 – 20 years, 30 patients are between 21 – 30 years, 11 patients are between 31 – 40 years, 11 patients are between 41 – 50 years, and 9 patients are between 51 –

60 years. Most of (76) had generalized tonic clonic seizures, 4 had absence seizures, 6 had complex partial seizures, 2 had focal seizures, 3 had atonic seizures (drop attacks) and 9 patients had focal seizures with secondary generalization. All the patients had thorough neurological examination and it was found that 90 patients had normal neurological examination, whereas 10 had abnormal neurological examination. Abnormal examination meant mental retardation, post encephalitic, and by birth focal neurologic deficits. CT brain was normal in almost all of the cases. EGG was done in all cases of epilepsy irrespective of the fact whether the patients presented for the first time or they were following neurology OPD previously. It was seen that the EEG was abnormal in 42 cases and was normal in 58 patients. The most important aspect of this study was that 40 patients had more than two family members having epilepsy. None of the studies done so far showed this much high incidence to epilepsy. The main reason that was noticed was that these patients had multiple intermarriages. It was further decided that genetic studies should be carried out in such patients but because of expensive and lack of availability of such facilities it could not be carried out.

The diagnosis of epilepsy is based on clinical, radiological and EEG evidence of disease. All the patients had routine studies to identify the more common metabolic causes of seizures such as abnormalities in electrolytes, hepatic or renal disease. All the patients underwent these investigations and had normal results. All the patients who presented with possible diagnosis of seizure disorder were evaluated with an EEG. Our department had facility of both portable and routine EEG. Almost all the patients, with new – onset seizures, had a brain imaging study (CT or MRI brain) to determine whether there is an underlying structural abnormality that is responsible. All the patients had normal imaging.

LIMITATIONS

Almost all previous studies of familial risk of epilepsy have had potentially serious methodological limitations. Our goal was to address these limitations and provide more rigorous estimates of familial risk in a population – based study. Though the patients had excellent follow-up, we need genetic studies to see the genes responsible for this highest incidence of familial epilepsy. The genetic studies are very expensive and for such a big number hospital was not able to sponsor the studies. We, therefore, labeled this study as Familial epilepsy rather than genetic epilepsy. We also could not follow the patients who were referred for surgery – as a treatment option for resistant epilepsy. Even then the outcome of the treatment had been excellent. This is because most of the investigations and treatment was free of cost in Royal commission hospital.

CONCLUSION

This study has been unique in that nowhere in the world there has been such highest incidence of familial epilepsy. As I have already mentioned we need to know what genes are responsible for this big number of patients in a single family or else are these mutations because of industrial wastes in the city.

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