

# Causes of Partial Epilepsy in a cohort of Iraqi epileptic patients

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## **Abstract**

**Background:** Partial (focal or localization related) epilepsy is the most common seizure disorder encountered in patients with epilepsy. These seizures are focal at onset that is emanating from localized region of the brain. Certain structural and metabolic abnormalities in the brain will predictably lower the epilepsy threshold. Seizure can result from either primary central nervous system dysfunction or underlying systemic diseases. The incidence of structural abnormalities was higher with increasing age of the onset of seizure and declined with long duration of history of epilepsy

## **Objectives:**

- 1) Identify the cause of partial seizure.
- 2) Clarify the association of these causes and the age of the patients.

**Study:** Prospective cohort study.

**Setting:** Al-Kademeiyah Teaching Hospital.

**Patients:** 106 patients presented with partial seizure, the age of them ranged between 6-73 years, 52 males and 54 females

**Result:** The abnormal neuroimaging occurred in (61%) of patients. Tumors occurred in about (19.7%) of patients most of them below 40

years of age while infarctions in about (25.5%) of patient above this age.

(83.7%) of complex partial seizure patients had temporal lobe foci and (16.2%) in frontal lobe, while (49%) of simple partial seizure patient had frontal lobe foci, (22%) frontoparietal and (13%) had parietal lobe foci.

(75.4%) of patient with simple partial seizure and (35.1%) with complex partial seizure had brain(structural) lesion.

## **Conclusion:**

1. Infarction is a common cause of partial seizure in patients above the age of 40 and below this age was a tumor.
2. Partial seizure is associated mostly with organic brain lesions.
3. The incidence of structural lesion was decrease in patients with long history of partial epilepsy.

**Key words:** Seizure and Epilepsy

**IRAQI J MED SCI, 2007;VOL.5(3):18-22**

## **Introduction:**

Epilepsy can be defined as an intermittent derangement of the nervous system due to "an excessive and disorderly discharge of cerebral neurones". This was postulated in 1870 by Hughlings Jackson., and modern electrophysiology offers no evidence to the contrary <sup>(1)</sup>.

Partial (focal or localization related) epilepsy is the most common seizure disorder encountered in patients with epilepsy. These seizures are focal at onset that is emanating from localized region of the brain <sup>(2)</sup>.

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Received: 23rd January 2006, Accepted: 11 March 2007.

Approximately 5-10 % of population will have at least one seizure during their lifetime, with highest incidence occurring in early childhood and late adulthood. <sup>(3)</sup>

If consciousness (The awareness of, and ability to respond to the environment) is preserved, the attack is termed, simple. If, however, the activity involves some parts of the brain dealing with awareness (such as the temporal or frontal lobes), then consciousness is affected and a complex partial seizure results. Further spread into the diencephalons and hence throughout the remainder of the cortex leads to a secondarily generalized seizure <sup>(4)</sup>.

In the normally functioning cortex, synchronous discharge amongst neighboring groups of neuron is

limited by recurrent and collateral inhibitory circuit. The inhibitory transmitter is GABA while the excitatory neurotransmitters are acetylcholine, aminoacids glutamate and aspartate<sup>(4)</sup>.

In partial seizure there is paroxysmal depolarization of membrane of a local group of neurons, which corresponds temporally to the finding of a focal spike and wave complex on the EEG<sup>(5)</sup>.

Certain structural and metabolic abnormalities in the brain will predictably lower the epilepsy threshold<sup>(6)</sup>. Seizure can result from either primary central nervous system dysfunction or underlying systemic diseases. This distinction is critical. Since therapy must be directed at the underlying disorders as well as at seizure control<sup>(4)</sup>.

Seizures before the age of 20 years are rarely associated with tumors. If the patient is between 20-30 y of age the risk of progressive lesions goes up slightly<sup>(7)</sup>

From 30 to 60 years, the incidence of primary brain tumor peaks, reaching approximately 15 percent in patients with PSs. After the age of 60, the incidence of tumors starts to fall off again as a vascular cause becomes more likely<sup>(8)</sup>

Approximately 30% of patients with PE have mass lesions like neoplasms or vascular malformations as the cause of their seizure disorders<sup>(9)</sup>.

The incidence of structural abnormalities was higher with increasing age of the onset of seizure and declined with long duration of history of epilepsy<sup>(10)</sup>

The evaluation of the patients with a probable PS includes a variety of diagnostic and clinical evaluation in addition to the history and physical and neurological examination. These include EEG and neuro-imaging

pictures. EEG most commonly used as a diagnostic test in assessment of patients with PE. A yield between 60 and 93 percent has been claimed for this procedure when multiple recordings are used or when recordings are made after 24 hours period of sleep deprivation. Sphenoidal electrodes both the anterior and posterior ones improve the yield in patients with mesial temporal sclerosis whose routine EEG are normal. The CT and MRI are non-invasive studies that can determine the cause of seizure and assist in localizing the epileptogenic area. MRI has been demonstrated to be superior to CT in imaging epileptogenic lesion, like temporal sclerosis and cortical gliosis<sup>(12)</sup>.

The treatment of PE may be either medical or surgical, but medical treatment is the primary approach<sup>(13)</sup>.

#### **Patients and Methods:**

We take all patients referred for neurological consultation in Al-Kahdemyia Teaching Hospital, Baghdad Teaching Hospital & Al-Yarmok Teaching Hospital for the period from (November 2001-May 2003).

The patients with partial seizure and partial with secondary generalized epilepsy were enrolled in this study. This was secured through a detailed history, elaborate generalized examination and examination of the nervous system.

All patients had 16 channel EEG recordings (by use of Nihon Kohden Corporation: 4321F), some times more than one recording is needed with emphasis on activating procedure like hyperventilation, Each recording is for 20 minutes.

All patients had neuroimaging like brain spiral CT (Somatom Plus 4-Siemens, Version C10B) with and without contrast when needed. MRI (Gyrosan NT 1.5 tesla power. Philips

Medical System) was done in patients with no abnormalities revealed by CT.

### **Results:**

One hundred six patients were collected from those who visited neurological department of Al-Yarmok teaching hospital, Al-Kadhemia teaching hospital /Baghdad Teaching Hospital with symptoms and sign goes with partial epilepsy.

The age of the patients ranged between 6-73y. 52 males & 54 females.

In 65 (61%) patients the neuro-imaging study (MRI & CT) was abnormal, while 41(39%) patients no lesion can be defined.

The association between brain lesion and age of the patient was shown in table (1).

Sixty five patients with partial epilepsy had lesions that were revealed on MRI and CT. 21(32%) patients with tumors: 16 patients with glioma, 3 patient, with maningioma, 2 patients with cystic tumor, both of them had a strocytoma,

Twenty-seven (42%) patients complained of infraction, 4 (6%) patients had intra-cerebral hemorrhage. Brain abscess is found in 5 (8%) patients. Encephalitis occurred in 2 (3%) patients, while 6 patients (9%) had mesial temporal sclerosis.

In our study we found that there are 19 patients who had a history of febrile convulsions in childhood, 5 (26%) of them had focal area at fronto-parietal area while 14 (74%) patients had focal area of epilepsy at temporal lobe. In those patients focal area of epilepsy with temporal lobe had changes on brain MRI go with mesial temporal sclerosis in 6 (32%) patients. Neuro-imaging in patients with SPS revealed lesion in 52 (75.3%) patient from 69 patients, while there are lesions in 13 (35.1%) patients complained from complex partial epilepsy.

We found that when there are a long duration of epilepsy the abnormalities on neuro-imaging or structural brain abnormalities decrease

**Table 1: Types of lesion in relation to age:**

<b>Age</b>	<b>No. of all patient</b>	<b>Brain abscess</b>	<b>Hemorrhage</b>	<b>infarction</b>	<b>Mesial Temporal</b>	<b>Encephalitis</b>	<b>Tumors</b>	<b>No of pt. with Lesion</b>
6-15	23	1		1	1			3
16-25	22			2	3		2	7
26-35	20	3		5	2	1	6	17
36-45	8		1	2			5	8
46-55	10			4		1	2	7
56-65	15	1	1	9			4	15
66-75	8		2	4			2	8
Total	106	5	4	27	6	2	21	65

**Table 2: partial seizure and brain structural lesions.**

Types of seizure	No. of patient	Associated brain lesion	% Of brain lesion
Simple partial	69	52	75.4
Complex partial	37	13	35.1
Total	106	65	

**Table 3: Duration of epilepsy and brain lesions.**

Duration of epilepsy	No. of patients	Abnormal MRI and / or CT	%
Less than 1 yr	43	35	81.4
1-2 yr	24	17	70.8
3-5 yr	16	7	43.8
>5 yr.	23	6	26.1
Total	106	65	

### **Discussion:**

In our study there are 65 (61%) patients with partial epilepsy had abnormal neuro-imaging (CT and MRI), while there are no abnormalities in 41 (39%) patients. These results are slightly more than previously (23-55%) reported studies. This could be attributed to the fact that our study was hospital based and more stringent inclusion criteria of the patients in this study<sup>(14)</sup>.

Cerebral vascular accidents or diseases as a cause of partial epilepsy were found in 27 (25.5%) patients and mostly at age above 40 yr., which is more than previous studies<sup>(10,15)</sup>, which revealed that the percentage of vascular disease as a cause of partial seizure is 18%.

While the incidence of tumors a cause of partial epilepsy was found in about 21 (19.7%) patients and most of them are under the age of 40 years in comparison with 20% in previous

reported studies and more than percentage reported in other studies (4-12%)<sup>(7, 8, 16)</sup>. This can be explained by the nature of our study which is prospective with particular attention to find the cause of the partial epilepsy in our patients that were drained from the hospital with their presenting syndrome being partial epilepsy.

We found that the patients with simple partial seizures were 69 (65%) while 37 (35%) patients complained of complex partial seizures these results are comparable previous reported study<sup>(17)</sup>.

There is a high association of structural abnormality in the brain & SPS occurred in about 52 (75.3%), as compared to 13(35.1%) patients with CPS, our figures are comparable (48-71%) to previous reports<sup>(14,18)</sup>

About febrile convulsion, we found there is increasing in its incidence with temporal epilepsy especially mesial

temporal sclerosis (32%) which was less than that of the previous reports (48%). This finding may be attributed to many patients misdiagnosed by the neuroimaging but there is no relation between a degree of sclerosis and atrophy in MRI and a history of seizure<sup>(19)</sup>. These changes may occur in individual that never had seizure. In other study the identification of mesial sclerosis was incidental by MRI but significantly needs investigation<sup>(20)</sup>.

We noticed that when there is a long history of epilepsy the incidence of structural abnormalities of brain lesions decreased while when there is short duration, neuro-imaging abnormalities will increased these result were corresponding to previous reported study<sup>(10,18)</sup>.

### **Conclusion:**

1. Infarction is a common cause of partial seizure in patients above the age of 40 and below this age was a tumor.
2. Partial seizure is associated mostly with organic brain lesions.
3. The incidence of structural lesion was decrease in patients with long history of partial epilepsy.

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