

## Study on Etiology of First Episode Seizures in Adults

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**Abstract:** Seizures are common disorders found all over the world and are encountered frequently during medical practice in variety of settings. Presently CNS infections like malaria, meningitis, tuberculosis, HIV, neurocysticercosis account for significant number of cases in developing countries. Since these infections vary from region to region, etiology of seizure may also vary from region to region. Aim of the study was done to know the various etiologies of new onset seizures in adults in this region. Present study was conducted in the Department of General Medicine, Government General Hospital/Guntur Medical College, Guntur, AP, India. It is a prospective observational study began on March 2013 and ended on September 2015. The etiology was determined by neuroimaging and appropriate investigations including cerebrospinal fluid examination. Out of 100 cases 89% cases were acute symptomatic seizures. The seizure types were generalized tonic-clonic seizures (GTCS) in 71% and 29% had simple or complex partial seizure (s) with or without secondary generation. 8 (8%) of the cases had status epilepticus (SE). 40% of the cases were SE were caused by neuroinfections. Neuroinfection was the leading cause of seizure, which accounted for 34%, followed by cerebrovascular accidents (29%) and metabolic (9%). Neurocysticercosis is most common cause in neuroinfection (35%), followed by meningitis (29%) and cerebral malaria (17%). 8% of seizures were because of CVT. 14% of seizures were pregnancy related. In cases with cerebrovascular diseases, aged less than 40 years, cerebral venous thrombosis accounted for 79%. This study illustrates that the etiological spectrum of seizures in this part of the world is different from that described from developed countries and CNS infections account for a significant number of cases.

**Key words:** Acute symptomatic seizures, infections of central nervous system, neurocysticercosis, cerebral venous thrombosis.

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### I. Introduction:

Epilepsy is defined by International League Against Epilepsy (ILAE; 1993) as a condition characterized by recurrent (two or more) epileptic seizures, unprovoked by any immediate identified cause (1). According to the World Health Organization (WHO), of the 50 million people with epilepsy worldwide, 80% reside in developing countries. Epilepsy was estimated to account for 0.5% of the global burden of disease, accounting for 7,307,975 disability adjusted life years (DALYs) in 2005 (2).

It is estimated that there are more than 10 million persons with epilepsy (PWE) in India. Its prevalence is about 1% in our population (3). The prevalence is higher in the rural (1.9%) compared to urban population (0.6%) (4, 5). Seizures are common disorders found all over the world and are encountered frequently during medical practice in variety of settings. Presently CNS infections like malaria, meningitis, tuberculosis, HIV, neurocysticercosis account for significant number of cases in developing countries. Since these infections vary from region to region; etiology of seizure may also vary from region to region (12).

Etiology of seizures can be easily made out in most of the older patients. The causes include subdural haematoma, stroke, CNS infections, degenerative disorders like Alzheimer's disease and malignancy, which include malignant gliomas, and brain metastases (7). In stroke seizures occur more commonly with hemorrhagic stroke than with ischemic stroke (6). They also can occur with systemic metabolic conditions like uremia, hyperglycemia, hypoglycemia, hyponatremia and alcohol withdrawal (7). Aim of the present study is to know the various etiologies of new onset seizures in adults in this region. Objectives are to investigate the etiology of first episode of seizures in adults. And to study the clinical course of admitted cases with first time seizures.

### II. Methodology:

This study was conducted in the Department of General Medicine, Government General Hospital/Guntur Medical College, Guntur, AP, India. Present study was conducted in the Department of General Medicine, Government General Hospital/Guntur Medical College, Guntur, AP, India. It is a prospective observational study began on March 2013 and ended on September 2015. The etiology was determined by neuroimaging and appropriate investigations including cerebrospinal fluid examination.

### III. Statistical Analysis:

Collected data was analyzed using the computer programme statistical package for social sciences (SPSS 11.0) and Systat 8.0. Microsoft word and excel have been used to generate graphs tables etc...

Descriptive analysis was used to compute percentage, to calculate mean and standard deviation. New onset seizure is defined as the first seizure (or the first cluster of seizure with in 24 hour period) even experienced by the patient.

### IV. Results:

Age and gender distribution of cases with seizure were shown in table 1. 100 cases of new onset seizures were studied.

Age in Years	Male		Female		Combined	
	N0	%	N0	%	N0	%
<20	3	5.5	7	15.6	10	10
21-30	10	18.2	18	40.0	28	28
31-40	11	20.0	6	13.3	17	17
41-50	13	23.6	6	13.3	19	19
51-60	9	16.4	5	11.1	14	14
61-70	6	10.9	2	4.4	8	8.0
>70	3	5.5	1	2.2	4	4.0
<b>Total</b>	<b>55</b>	<b>100</b>	<b>45</b>	<b>100</b>	<b>100</b>	<b>100</b>
<b>Mean ± SD</b>	<b>44.84±16.15</b>		<b>35.22±15.33</b>		<b>40.51±16.42</b>	

In the present study cases age ranged from 17 years to 80 years, with mean of 40.51 years of age. Majority of the cases were in the age group of 21-30 years (No=28, 28%) followed by 41-50 years (No=19, 19%). 78% of the cases were in the 2<sup>nd</sup> – 5<sup>th</sup> decade. 12% of the cases were in the age group of >60 years. Out of 100 cases 55 were cases of males and 45 were cases of females, with male to female ratio of 1.22: 1.0 Majority of males were in 5<sup>th</sup> decade and females were in 3<sup>rd</sup> decade.

Table 2 shows the distribution of etiology in cases with seizures. Neuroinfection is leading cause of seizure, which accounted for 34%, followed by cerebrovascular accidents (29%) and metabolic (9%). In 9% of cases cause is idiopathic (cryptogenic). Among Neuroinfection (n=34): majority of seizures were because of Neurocysticercosis accounted for 35% (12) followed by meningitis 29% (10) and cerebral malaria 17% (6). Among cerebrovascular accidents (n=29): stroke accounted for 55% (16) (infarct-10, Haemorrhage-6), followed by cerebral venous thrombosis 34% (11). 14% of seizures were pregnancy related. (CVT-11+Eclampsia-3). In metabolic seizures (n=9) 55% were because of hypoglycaemia (5).

Etiologies	Number with Percentage
<b>1. Neuroinfection</b>	<b>34 (34.0)</b>
<b>Meningitis</b>	<b>10 (10.0)</b>
<b>Meningoencephalitis</b>	<b>3 (3.0)</b>
<b>JN eurocysticercosis (JNCC)</b>	<b>12(12.0)</b>
<b>Cerebral malaria</b>	<b>6(6.0)</b>
<b>Tuberculoma</b>	<b>3(3.0)</b>
<b>2. Cerebrovascular accidents</b>	<b>29(29.0)</b>
<b>Infarct</b>	<b>10 (10.0)</b>
<b>Haemorrhage</b>	<b>6(6.0)</b>
<b>Cerebral venous thrombosis</b>	<b>11(11.0)</b>
<b>SAH</b>	<b>1(1.0)</b>
<b>Subdural haemorrhage</b>	<b>1(1.0)</b>
<b>3. Idiopathic</b>	<b>9(9.0)</b>
<b>4. Metabolic</b>	<b>9(9.0)</b>
<b>Hypoglycemia</b>	<b>5(5.0)</b>
<b>Hyperglycaemia</b>	<b>1(1.0)</b>
<b>Hypocalcaemia</b>	<b>1(1.0)</b>
<b>Hyponatraemia</b>	<b>2(2.0)</b>

<b>5. Tumor</b>	<b>6(6.0)</b>
<b>Meningioma</b>	<b>1(1.0)</b>
<b>Glioma</b>	<b>2(2.0)</b>
<b>Secondaries</b>	<b>1(1.0)</b>
<b>Glioblastoma</b>	<b>2(2.0)</b>
<b>6. Miscellaneous</b>	<b>6(6.0)</b>
<b>A-V malformations</b>	<b>2(2.0)</b>
<b>Post dialysis</b>	<b>1(1.0)</b>
<b>Alcohol withdrawal</b>	<b>3(3.0)</b>
<b>7. Poisoning</b>	<b>4(4.0)</b>
<b>OP compound</b>	<b>2(2.0)</b>
<b>Strychnine</b>	<b>1(1.0)</b>
<b>Yellow oleander Poisoning</b>	<b>1(1.0)</b>
<b>8. Eclampsia</b>	<b>3(3.0)</b>

Table 3 shows the correlation with age group. Most common etiology is neuroinfection 34 %, followed by CVA 29%. 59% of neuroinfection were seen in 3<sup>rd</sup> and 4<sup>th</sup> decade. 27.5% of CVA occurred in 3<sup>rd</sup> decade were because of CVT. 61% of stroke

Etiology	Age in years							Total- 100
	17-30	21-30	31-40	41-50	51-60	61-70	>70	
<b>1.Neuroinfection</b>	5	11	9	5	2	2		<b>34</b>
<b>2.CVA</b>	3	8	3	4	5	2	4	<b>29</b>
<b>CVT</b>	3	8						
<b>Infarct</b>			2	1	4	1	1	
<b>Haemorrhage</b>			1	2	1	1	2	
<b>SDK</b>							1	
<b>3. Idiopathic</b>		1	3	3	2			<b>9</b>
<b>4. Metabolic</b>	-	1	1		4	3		<b>9</b>
<b>5. Tumor</b>	1	1		2	1	1		<b>6</b>
<b>6. Miscellaneous</b>		2		4				<b>6</b>
<b>7. Poisoning</b>	-	2	1	1		-		<b>4</b>
<b>8. Eclampsia</b>	1	2						<b>3</b>

occurred after 50 years. 45% of metabolic seizures occurred in 5<sup>th</sup> decade.

### V. Discussion:

Etiological spectrum depends on age, sex, geography and medical setting (13). In the present study seizers were observed in 26% of the elderly cases in both cases of male and female. Sinha (2013) et al. evaluated 64 elderly patients (32%) who presented with new-onset cluster attacks and/or SE (8). Cluster seizures were observed in 26.4% and SE in 17% of the 201 elderly patients with seizures. Reducing preventable causes, viz. perinatal insults, parasitic diseases, and head injuries, could reduce the burden of epilepsy in India by alleviating poverty. Empowering primary healthcare workers to diagnose and start treatment might significantly reduce the treatment gap and the disparities between rural and urban areas.

Neuroinfection is leading cause of seizures which accounted for 34%, followed by cerebrovascular accidents 29% and metabolic 9%. In 9% of cases is idiopathic (cryptogenic). In neuroinfection neurocysticercosis accounted for 12% of seizures followed by meningitis 10% and cerebral malaria 6%. Stroke accounted for 16% (Infarct-10, Haemorrhage-6), followed by cerebral venous thrombosis 11%. Neuroinfection occurred in 2% of the cases in Sander et al., 1990 (10) 15% in Annegers et al. 1995 (9) and 32% in a study by Narayanan et al. 2007 (11). In our study etiology is comparable to Indian studies.

In the present study 59% of neuroinfection were seen in 3<sup>rd</sup> and 4<sup>th</sup> decade, 27.5% of CVA occurred in 3<sup>rd</sup> decade, 17% occurred in 5<sup>th</sup> decade. All CVA occurring in 2<sup>nd</sup> and 3<sup>rd</sup> decade were CVT. 61% of stroke occurred after 50 years of age. 45% of metabolic seizures occurred in 5<sup>th</sup> decade. Etiology spectrum of seizures in different age group was significantly different in our study, when compared to Annegers et al. 1995 (9) study. Seizures due to Neuroinfection were leading cause in age group of 15-35 years of age and 35-64 years of age in our study, where as alcohol related seizures in Hauser et al. study.

## **VI. Conclusion:**

In the present study “Etiology study of new onset seizures” the following conclusions were made. 89% of seizures were acute symptoms were acute symptomatic seizures in which underlying etiologies can be made. Majority of seizures occurred in cases <50 years of age. etiology spectrum of seizures were varied and included neuroinfection, CVA, tumor, metabolic, poisoning and alcohol withdrawal. Neuroinfection and cerebrovascular accidents accounted for significant number of seizures in all the age groups. Neurocysticercosis is most common cause in Neuroinfection. Cerebral venous thrombosis is an important cause of acute symptomatic seizures among young patients with cerebrovascular diseases.

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