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Original Article

A Study on Clinical Profile and Etiology of Partial Seizures in Adults at Tertiary Care Centre

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Abstract
Objective: *To Study the Clinical Profile and Etiology of Partial seizures in Adults at Tertiary care centre.*
Method: *In this Descriptive, cross sectional study, a total of 135 patients were selected over 1 year. All patients with partial seizures in adulthood were included. Patient below the age of 18 years, seizure type other than partial seizures, Pseudo seizures and patients with history of seizure before the age of 18 years were excluded. Data was entered and analyzed on SPSS software.*
Results: *Maximum number of cases were due to Neurocysticercosis (NCC) (36.30%). Maximum showed simple partial seizure (45.19%), followed by complex partial seizure (33.33%) and complex partial seizures with secondary generalization (21.48%). Of the 135 cases of partial seizures 100 (74.07%) were males and 35 (25.93%) were females with male to female ratio of 2.8:1. Maximum cases were in the age group of 18 -30 years (males = 20.74% and females = 31.85%). Common symptoms of patient during partial seizures were frothing from mouth (60%), headache (52.59%), aura (51.85%) and uprolling of eye balls (43.73%).Symptoms of patients in postictal phase were headache (62.22%), post ictal confusion (55.56%) and focal deficit (26.67%). Family history was present in 6.67%.Cases of trauma (2.22%) were diagnosed on non contrast computed tomography (NCCT) head. 7.78% of NCC were picked up on NCCT head. Infection (0.74%), mesial temporal lobe epilepsy (MTLE) (0.74%), posterior reversible encephalopathy syndrome (PRES) (0.74%), tumor (3%) were all diagnosed on magnetic resonance imaging (MRI).Electroencephalogram (EEG) was done in 69 (51.11%) cases and 49.28% were abnormal.*
Conclusion: *NCC still account for a significant number of cases. Males are more prone to partial seizures in our region with more episodes seen in younger age. Every case of partial seizures must be evaluated with EEG and radiological scan – either MRI brain, CECT brain or NCCT brain.*
Key Words- *Simple partial seizure (SPS), Complex partial seizure (CPS), Neurocysticercosis (NCC), Mesial temporal lobe epilepsy (MTLE), Posterior reversible encephalopathy syndrome (PRES), Cerebral calcified CT lesion (CCCTL).*

INTRODUCTION

Seizure disorder affects about 50 million people worldwide. Partial seizures are estimated to constitute 17-30% of all seizure cases, with significant inter-regional variation[(1)]. The etiology of seizures is different in India as compared to the developed world [(2)]. Causes of acute symptomatic seizures can be head injury, neurocysticercosis (NCC), tuberculoma, brain abscess, encephalitis, cerebrovascular accident (CVA), hepatic or renal failure, drug toxicity, alcohol withdrawal, metabolic derangements and causes of remote symptomatic seizures can be old CVA, post traumatic gliosis, calcified lesion, operated brain tumour, treated encephalitis, birth asphyxia[(3)]. Thetriggering factors for seizures can be sleep deprivation, alcohol (particularly withdrawal), recreation drug misuse, physical and mental exhaustion, flickering lights, television and computer screens (for primary generalized epilepsies), infection and metabolic disturbances, uncommonly: loud noises, music, reading, hot baths [(3)]. The Electroencephalogram (EEG) along with neuroimaging techniques (CT/MRI), is the most important investigation in the diagnosis and management of epilepsies[(4,5)]. Determining the type of seizure that has occurred is essential for focusing the diagnostic approach on particular etiologies, selecting the appropriate therapy, and providing potentially vital information regarding prognosis. Hence, there is a need for a clinical study of partial seizures to establish the proper etiology and clinical profile in adults having partial seizures.

MATERIAL AND METHODS

The present study was a single-centre retrospective study conducted over 1 year period after obtaining the clearance from ethical committee and informed consent from the study participants. Patients below the age of 18 years or having seizure history before it or patients who had any seizure type other than partial seizures, patient diagnosed to have pseudo seizures were excluded. A thorough clinical history and detailed physical examination was done for every patient. All patients were investigated with view of establishing the pattern and cause of partial seizures. Seizures were classified as per classification suggested by international classification of the epilepsies and epileptic syndromes. Only partial seizures were included in the present study [(6)]. Interpretation and analysis of obtained data was done in percentages. Data was entered and analyzed on SPSS software.

RESULTS

A total of 135 patients were recruited in the present study, out of which 100 (74.07%) were males and 35 (25.93%) were females with male to female ratio of 2.8:1 (maximum number of males and females in the age group of 18 -30 years). Males are more prone to partial seizures as compared to females in our region with more episodes seen in younger age group (less than 50 years of age). Maximum number of people had seizure episodes in first 50 years of age (males = 59.26% and females = 78.51%). As age increases, risk factor for stroke increases contributing to higher percentage of stroke as etiology of partial seizures in elderly (table 1).

The maximum number of cases were of Neurocysticercosis (NCC) (36.30%) with males (30.37%) outnumbering the females (5.93%), followed by calcified granulomas (12.60%), metabolic (11.11%), tuberculomas (8.89%), gliosis (6.67%). Maximum people had simple partial seizure (45.19%) followed by complex partial seizure (33.33%) followed by complex partial seizures with secondary generalization (21.48%) (table 2). Males had maximum number of simple partial seizures (34.07%) and females had equal number of simple partial seizures (11.11%) and complex partial seizures (11.11%) table 3). Common symptoms of patient during partial seizures were - abnormal body or limb movement in (100%), frothing from mouth (60%), headache (52.59%), aura (51.85%), uprolling of eye balls (43.73%) (table 4).

MRI brain was done in 45.19% of cases, followed by NCCT brain (40%), and CECT brain (20%). 6.67% of MRI, 2.22% of CECT and 2.22% of NCCT came out to be normal. NCCT head diagnosed all Trauma cases (2.22%) and 17.78% of NCC. Infection (0.74%), MTLE (0.74%), PRES (0.74%), Tumour (3%) was all picked up on MRI. Maximum number of calcified granuloma were picked up on NCCT head (8.19%) as compared to CECT (2.96%) and MRI (1.48%). MRI was done to see for metabolic cause (3.7%) and gliotic changes (4.44%). 6.67% and 2.96% of tuberculoma were diagnosed on MRI and CECT respectively (table 5). EEG was found to be abnormal in 49.28% of cases (table 6).

Table 1. Demographic profile of cases, both males and females (n = 135).

Age group (Years)	Male (n = 100)		Female (n = 35)		Total	
	No.	%	No.	%	No.	%
18-30	28	20.74%	15	11.11%	43	31.85%
31-40	26	19.26%	8	5.93%	34	25.18%
41-50	26	19.26%	3	2.22%	29	21.48%
51-60	13	9.63%	3	2.22%	16	11.85%
61-70	3	2.22%	3	2.22%	6	4.44
71-80	4	2.96%	3	2.22%	7	5.18%
81-90	0	0%	0	0%	0	0%
91-100	0	0%	0	0%	0	0%
Total	100	-	35	-	135	-
Percentage	74.07%		25.93%		100%	-

Table 2. Etiology of partial seizures in male and female cases (n = 135).

Etiology	No.	%	Male (n = 100)	%	Female (n = 35)	%
Neurocysticercosis (NCC)	49	36.30%	41	30.37%	8	5.93%
Calcified granuloma	17	12.60%	10	7.41%	7	5.19%
Metabolic	15	11.11%	12	8.89%	3	2.22%
Tuberculoma	12	8.89%	8	5.93%	4	2.96%
Gliosis	9	6.67%	6	4.44%	3	2.22%
Infarct	6	4.44%	5	3.70%	1	0.74%
Cryptogenic	6	4.44%	4	2.96%	2	1.48%
Brain metastasis	5	3.70%	4	2.96%	1	0.74%
Cerebral calcified CT lesion (CCCTL)	4	2.96%	3	2.22%	1	0.74%
Haematoma (trauma)	3	2.22%	3	2.22%	0	0%
Tumour	3	2.22%	2	1.48%	1	0.74%
Thrombosis	3	2.22%	1	0.74%	2	1.48%
Infection	1	0.74%	0	0%	1	0.74%
Mesial temporal lobe epilepsy (MTLE)	1	0.74%	0	0%	1	0.74%
Posterior reversible encephalopathy syndrome (PRES)	1	0.74%	1	0.74%	0	0%
Total	135	100%	100	74.07%	35	25.93%

Table 3. Percentage of different types of partial seizures in males to females (n = 135).

Type of partial seizure	Number of patients (n = 135)		Male (n = 100)		Female (n = 35)	
	No.	%	No.	%	No.	%
Simple partial seizures (SPS)	61	45.19%	46	34.07%	15	11.11%
Complex partial seizures (CPS)	45	33.33%	30	22.22%	15	11.11%
Complex partial seizures (CPS) with secondary generalization	29	21.48%	24	17.78%	5	3.70%

Table 4. Symptoms of patients during seizure episode (n = 135).

Symptoms during the seizure episode	Number	%
Aura	70	51.85%
Abnormal movement of limb	135	100%
Headache	71	52.59%
Uprolling of eye ball	59	43.73%
Frothing from mouth	81	60%
Lock jaw	17	12.59%
Tongue bite	22	16.30%
Urinary and stool incontinence	7	5.19%

Table 5. Various radiological findings of patients with partial seizures (n = 135).

Etiology	MRI	%	CECT	%	NCCT	%
NCC	18	13.33%	9	6.67%	24	17.78%
Calcified granuloma	2	1.48%	4	2.96%	11	8.19%
Metabolic	5	3.7%	1	0.74%	0	0%
Tuberculoma	9	6.67%	4	2.96%	0	0%
Gliosis	6	4.44%	1	0.74%	2	1.48%
Infarct	1	0.74%	0	0%	5	3.7%
Cryptogenic	0	0%	0	0%	0	0%
Brain metastasis	1	0.74%	3	2.22%	2	1.74%
CCCTL	1	0.74%	2	1.48%	1	0.74%
Haematoma (Trauma)	0	0%	0	0%	3	2.22%
Tumour	3	2.22%	0	0%	0	0%
Thrombosis	3	2.22%	0	0%	2	1.48%
Infection	1	0.74%	0	0%	0	0%
MTLE	1	0.74%	0	0%	0	0%
PRES	1	0.74%	0	0%	1	0.74%
Normal	9	6.67%	3	2.22%	3	2.22%

Table 6. Percentage of normal and abnormal EEG findings in patients (n = 135).

EEG	Not done	Done	Normal	Abnormal
Number	66	69	35	34
Percentage	48.89%	51.11%	50.72%	49.28%

DISCUSSION

As per the etiology of partial seizures, our study showed that maximum number of cases were due to neurocysticercosis (NCC) (36.30%) with males (30.37%) outnumbering the females (5.93%), followed by calcified granulomas (12.60%), metabolic causes (11.11%), tuberculomas (8.89%), gliosis (6.67%), infarct (4.44%), cryptogenic (4.44%), brain metastasis (3.70%), CCCTL (2.96%) with equal number of cases due to trauma (2.22%), tumour (2.22%), thrombosis (2.22%) and another equal number with infections (0.74%), MTLE (0.74%), PRES (0.74%). Contrary to our result, Mani et al in his study reported a diagnosis of NCC in 2% of unselected series of epilepsy [(7)]. In another study at a tertiary referral centre in New Delhi, NCC constituted 2.5% of all intracranial space occupying lesions, which is also contrary to our result[(8)]. Similar to our result, seizure incidence was reported to be as high as 91.8% (Scharf et al), and cysticercosis is considered to be the main etiology of late onset epilepsy in endemic areas (Sakamoto et al, Medina et al) [(9)]. According to Murthy et al, CNS infections (32%), metabolic causes (32%) and cerebrovascular accidents (21%) are common etiology for acute symptomatic seizures [(10)] in which percentage of CNS infections causing seizures was approximately similar to our result. Cerebrovascular diseases were the etiological factor in 64% of patients aged > 40 years in South India, as reported by Murthy et al [(11)] however in our study 4.4% of patients of more than 50 years of age had cerebrovascular accident.

In our study, out of 135 people having partial seizures 100 (74.07%) were males and 35 (25.93%) were females with male to female ratio of 2.8:1. Similar to our study, study by Panagariya A et al showed overall male preponderance, male to female ratio being 2:1.[12] Similar sex ratio has been observed in the series of Zielenski [13] and Singhvi et al [14]. Contrary to our study, Rwiza et al [15] in their study in Tanzanian population have shown a reverse ratio, with female: male ratio around 1.5: 1 and Heancey and MacDonald[16] reported equal incidence among male and female.

Acute symptomatic seizures with stroke are rare in persons less than 45 years of age, but the incidence increases rapidly with increasing age[17], similar to our study. In this study, cortical sinovenous thrombosis accounted for 37% of strokes contrary to our result. Early seizures occurred with high frequency, 46-79%, in many patients with cortical sinovenous thrombosis. Seizures may be partial or generalized. In India the majority of cases are related to pregnancy and purperium [18], similar to our study.

Our study showed that the maximum people had simple partial seizure (45.19%) followed by complex partial seizure (33.33%) followed by complex partial seizures with secondary generalization (21.48%). Males had maximum number of simple partial seizures (34.07%) and females had equal number of simple partial seizures (11.11%) and complex partial seizures (11.11%).In study published by RR Das et al., on analysis of Neurocysticercosis they showed that seizures were the commonest presentation in 92.2% of cases of which 60% had simple partial seizures which was similar to our study. Out of these 65(34.2%) had generalized tonic seizures, 114 (60%) had simple partial and 11(5.8%) had complex partial seizures [19].

Out of the total patients, our study showed that 58.52% were new patients and 41.48% were follow up patients. Out of 41.48%, 83.93% of patients were taking treatment regularly and 16.07% were on irregular treatment.

In our study on symptoms of patients during seizure episode, it showed that abnormal body or limb movement was present in 100% of cases. 60% of patients have frothing from mouth, followed by headache (52.59%), aura (51.85%) and uprolling of eye balls (43.73%) similar to the study conducted by Nitin Joseph et al in tertiary care hospitals in Karnatka, [20]. Contrary to our study, a study published by RR Das et al on analysis of neurocysticercosis they showed headache, papilloedema, optic atrophy, incoordination, dementia, cranial nerve palsy, meningitis, psychiatric disturbances, stroke like presentation, and coma as other presenting features. Headache was seen in 52(25.2%), increased intracranial tension in 26 (12.6%), visual changes in 18 (8.7%), limb weakness in 5 (2.4%), meningeal symptoms in 4(1.9%), incoordination in 4 (1.9%), dementia in 3(1.4%) and psychiatric symptoms in 1 (0.48%). Papilloedema was present in 34 (16.5%). Focal deficit was found in 4. Out of these 3 (1.4%) had stroke like presentation [19].

Regarding our study on precipitating cause of seizures, maximum number of people have abnormal sleeping pattern (32.59%) followed by physical exertion (23.70%), sleep deprivation (21.48%) and acute stress (17.04%). Other precipitating cause included irregular intake of antiepileptics (6.67%) and watching television for long time (5.93%).

The metabolic parametres of patients in our study showed, serum sodium to be normal in 89.63% of patients, serum potassium was normal in 94.07% and serum magnesium was normal in 72.59% of patients. More people had hypocalcemia (56.30%), although corrected calcium was not calculated and few people had serum calcium of less than 8 (16 people – 11.85%). Random Blood sugar was normal in 52.53% of patients and abnormal in 47.41% of patients keeping normal range below 120mg/dl. Few people had blood sugars of above 150mg/dl (28 people – 20.74%).

In study conducted by Das K et al in 2007 results were contrary to our study as blood investigations

done showed a fall in bicarbonate levels in this study followed by hypochloremia and hyponatremia as the most common findings among epileptic patients [21]. This was different from the observations of a study done in Egypt where it is hypercalcemia, hypernatremia and hypokalemia. The findings were contrary to our results. [22].

Further our study also showed that 6.67% of people has family history of seizure. Similar results were shown in study conducted by Nitin Joseph et al, in a study on pattern of seizure cases in tertiary care hospitals in Karnatka, state of India which showed a family history of 8.4%[20]. Family history of epilepsy in a study carried out in Sudan was present in 20% cases, which were higher than our observations [23].

Different radiological studies done in our study were MRI brain in 45.19% of cases, followed by NCCT brain (40%), followed by CECT brain (20%). 6.67% of MRI, 2.22% of CECT and 2.22% of NCCT which came out to be normal. NCCT head diagnosed all cases of seizure due to trauma (2.22%). Infection (0.74%), MTLE (0.74%), PRES (0.74%), tumour (3%) were all picked up on MRI. 17.78% of NCC were picked up on NCCT head, 13.33% on MRI and on 6.67% on CECT. 6.67% and 2.96% of tuberculoma were diagnosed on MRI and CECT respectively. Maximum number of calcified granulomas were picked up on NCCT head (8.19%) followed by CECT (2.96%) and MRI (1.48%). MRI was done to see for metabolic cause (3.7%) and gliotic changes (4.44%). 1.48% of gliotic changes were seen on NCCT head. 1.48% of CCTL were seen on CECT brain and MRI and NCCT head showed 0.74% of CCTL each. In study conducted by Das RR et al on NCC, calcifications were seen in 76 (36.9%) cases. Among the active cases the commonest CT findings was ring / disc enhancing lesion in 125 (60.6%). Number of lesions varied from 2 to more than 10 (2-5 in 36.9%, 5 – 10 in 33.5% and more than 10 in 29.6%). Forty (19.4%) cases had both cysts and calcifications. Edema surrounding the lesion was found in 116 (56.3%) [19].

As per our study EEG was done in 69 (51.11%) number of cases out of which 49.28% were abnormal. A study done in Jaipur [38] and Sudan [23] found that EEG was abnormal in 58.9% and 64.8% epilepsy patients respectively, which was slightly more than our study. CT was abnormal in 33.5% cases in Jaipur based study [39] which was similar to our study which showed that out of total 40% of NCCT brain done in our study only 2.22% came out to be normal, but the Sudan based study [23] found it in 16.7% cases, which was lower than our observations.

SUMMARY AND CONCLUSION

There are hardly any major studies in India evaluating the etiology and clinical profile of partial seizures in adults. Our study illustrates that the maximum number of cases were due to Neurocysticercosis (NCC). Males are more prone to partial seizures as compared to females in our region with male to female ratio of 2.8:1 and with more episodes seen in younger age group (less than 50 years of age). Maximum people had simple partial seizure followed by complex partial seizure followed by complex partial seizures with secondary generalization. Our study showed decreasing trend as age increases. Maximum number of people had seizure episodes in first 50 years of age (males = 59.26% and females = 78.51%). As age increases, risk factor for stroke increases contributing to higher percentage of stroke as etiology of partial seizures in elderly. NCCT head diagnosed all Trauma cases and some of NCC. Infection, MTLE, PRES, tumour, metabolic cause and gliotic changes were all picked up on MRI. Tuberculoma was diagnosed on MRI and CECT. EEG was found to be abnormal in almost half of cases.

Thus, in the light of above facts, despite relatively less number of cases in our study, we can recommend that every case of partial seizures must be evaluated with EEG and radiological scan – either MRI brain, CECT brain or NCCT brain

which may have therapeutic and prognostic significance.

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