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Original Research Article

A Study of Postictal Complications and Co-Morbidities of Status Epilepticus in Emergency Department of Tertiary Hospital of Bundelkhand Region, Central India

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ABSTRACT

Introduction: The postictal state is a temporary condition that occurs after seizures, often characterized by EEG slowing or suppression, and can last from minutes to days. Seizures can be accompanied by various postictal complications, including headache, automatism, delirium, psychosis, functional deficits, neuropsychological deficits, and abnormal behavioral manifestations. Effective management of postictal states requires identification of associated comorbidities and underlying neurological and systemic disorders. However, there is limited information regarding the causes, prevalence, and optimal treatment of postictal complications following status epilepticus. This study aimed to determine the different types of postictal complications and comorbidities.

Materials and Methods: Patients with status epilepticus were observed after their seizure episode subsided, and their medical history and comorbidities were recorded. It was a cross sectional observation study. 100 participants were selected for the study at MLB Medical College, Jhansi, between March 2020 and November 2021. Written informed consent was obtained from all participants after explaining the study's objectives and procedures.

Results: The most common postictal complication observed in our study was headache, experienced by 51% of patients after the seizure subsided. Delirium was observed in approximately 28% of patients, while psychosis and automatism were reported by 9% and 8% of patients, respectively.

Conclusions: The results of our study indicate that individuals with seizures have significantly higher odds of experiencing various comorbid conditions compared to those without seizures. The strongest association was found between seizures and stroke.

Keywords: Comorbidities, Delirium, Postictal, Seizure

INTRODUCTION

Approximately 60% to 70% of individuals with newly diagnosed epilepsy can achieve seizure control through medication (monotherapy or polytherapy). Treatment is usually initiated after the occurrence of a second seizure. The risk of seizure recurrence after a single seizure varies between 27% and 71%.[1] However, there have been few studies assessing the prevalence of postictal neuropsychological changes in epilepsy. Some studies have reported postictal neuropsychological changes in approximately 50% to 74% of patients.[2,3,4] These changes can occur in various types of seizures, including status epilepticus and isolated episodes of epilepsy, and can occur with or without the use of medication to terminate the seizure. A variety of comorbid psychiatric disorders have been reported among persons with epilepsy, including anxiety, attention deficit disorder, bipolar disorder, and psychosis, although depression is the most prevalent.[5,6] Persons with epilepsy are four times more likely to be

hospitalized for depression than are persons without epilepsy, and the risk of suicide is estimated to be ten times higher among persons with seizures than among the general population.[7] Depression and mood disorders in epilepsy may be influenced by the effects of seizures on mood regulation, antiepileptic drug effects, and psychosocial factors such as fear of seizure recurrence, stigma, employment barriers, and driving restrictions.[8] In addition to neuropsychological comorbidities, individuals with epilepsy often experience non-neuropsychological comorbidities such as diabetes mellitus, hypertension, dyslipidemia, renal failure, obesity, liver failure, heart failure, cancer, Parkinson's disease, and stroke.[9] This study aimed to investigate the distribution of different types of postictal complications and comorbidities among participants and their relationship to demographic variables and etiology.

MATERIALS AND METHODS

This observational, descriptive cross-sectional study was conducted at M.L.B Medical College, Jhansi, in the Neurology Department of Medicine over a period of 18 months. For patient's inclusion in study, written informed consent was obtained from the legally authorized representatives of the patients who agreed to participate. The diagnosis of status epilepticus was made by treating physicians, and patients were managed according to Indian Epilepsy Society guidelines and medication availability. Twelve patients with super refractory status epilepticus were excluded from the study, resulting in a total sample size of 88 patients. Data on demographic variables (age, sex), type of status epilepticus, seizure duration, and etiological history were collected. Information on hypertension, diabetes mellitus, and dyslipidemia was obtained from family members. Blood pressure was regularly monitored, and baseline random blood sugar and lipid profile tests were conducted. Patients with status epilepticus due to metabolic disturbances such as electrolyte imbalances, hypoglycemia, uremic encephalopathy, and hepatic encephalopathy were included. Data was entered into an Excel sheet, and analysis was performed using SPSS Statistics version 23. Descriptive statistics such as numbers and percentages were calculated for quantitative data. The chi-square test was used to assess the independence of proportions, and a p-value < 0.05 was considered significant.

RESULTS

The male patients were 52 (59%) and rests were female i.e., 36 (41%). Ratio of Male to Female was nearly 1.5:1. Majority of the patients were found in 18-30 years of age groups i.e., 37 (42%) followed by > 50 years of age group i.e., 28 (31.8%) (Table-1). Anticonvulsant drug withdrawal (ACDW) and CNS infection were the major causes of seizure in our study with 36.4% and 33% of patients respectively. More than half of patients experienced headache (45, 51.1%). The next common complication was delirium (25, 28.4%) followed by psychosis and automatism in 9% and 8% of patients respectively (Table-2). When participants were assessed for comorbidities, 33 (37.5%) patients were hypertensive, 19 (21.6%) were having abnormal lipid levels and 9 (10.2%) patients were diabetic (Table-3).

Table-1: Demographic and etiological profile of study participants

Variables		Total	
		N	%
Gender	Male	52	59.1%
	Female	36	40.9%
Age (in years)	18-30 years	37	42.0%
	31-50 years	23	26.1%
	> 50 years	28	31.8%
Aetiology	CNS Infection	29	33.0%
	Cerebrovascular accident	10	11.4%
	Anticonvulsant drug withdrawal (ACDW)	32	36.4%
	Others (Dyselectrolytemia, Hypoglycemia, Uremic encephalopathy, and Hepatic encephalopathy)	17	19.3%
Postictal Complications	Headache	45	51.1%
	Automatism	7	8.0%
	Delirium	25	28.4%
	Psychosis	8	9.1%
	No complication	8	9.1%
Comorbidities	Hypertension	33	37.5%
	Diabetes	9	10.2%
	Dyslipidemia	19	21.6%
	No	27	30.7%
Total		88	100.0%

There was no sex preponderance of any postictal complications, all of them were nearly equally distributed in both genders (p-value 0.816). The delirium was more common in above 50 years of age group, 9 out of 28 patients (32.1%) of that group developed delirium however, postictal complications were uniformly distributed in all three age groups (p-value 0.983). Headache was the most prevalent in CNS infection group, about 65% of patients who got seizure due to CNS infection have reported headache, followed by CVA group where 60% of patients had headache even though there was no significant association of different etiological factors with any postictal complication (p-value 0.951). Anticonvulsant withdrawal also appears to be a factor to post ictal headache.

Hypertension was the most common comorbidity found in the study population; 37.5% patients had blood pressure above normotensive range. About 21.5% of patients have dyslipidemia and 10.2% patients had diabetes mellitus. The male participants were more hypertensive as compared to female, 40% of males and 33.3% of females had hypertension whereas dyslipidemia was more common in females. 27.7% females had dyslipidemia while 17% of males had dyslipidemia. Comorbidities increased with age, more than 46% of patients had hypertension in > 50 years age groups. In the same age group about 17% have diabetes mellitus and 21% have dyslipidemia. All the patients of CVA groups were hypertensive. Diabetes mellitus was found highest in CNS infection group (17.2%). Dyslipidemia was highest in CVA group. However, no variable was associated with any comorbidities.

Table-2: Age, gender and etiology wise distribution of postictal complications

Variables		Headache		Automatism		Delirium		Psychosis		P value
		N	%	N	%	N	%	N	%	
Gender	Male	24	53.3	5	71.4	14	56.0	5	62.5	**0.816**
	Female	21	46.7	2	28.6	11	44.0	3	37.5	
Age (in years)	18-30 years	21	46.7	3	42.9	11	44.0	3	37.5	**0.983**
	31-50 years	12	26.7	2	28.6	5	20.0	2	25.0	
	> 50 years	12	26.7	2	28.6	9	36.0	3	37.5	
Aetiology	CNS Infection	19	42.2	2	28.6	8	32.0	2	25.0	**0.951**
	Cerebrovascular accident	6	13.3	1	14.3	4	16.0	1	12.5	
	Anticonvulsant drug withdrawal (ACDW)	14	31.1	3	42.8	11	44.0	4	50.0	
	Others (Dyselectrolytemia, Hypoglycemia, Uremic encephalopathy, and Hepatic encephalopathy)	6	13.3	1	14.3	2	8.00	1	12.5	
Total		45	100	7	100	25	100	8	100	

Table-3: Age, gender and etiology wise distribution of comorbidities

Variables		Hypertension		Diabetes mellitus		Dyslipidemia		P value
		N	%	N	%	N	%	
Gender	Male	21	63.6	6	66.7	9	47.4	0.455
	Female	12	36.4	3	33.3	10	52.6	
Age (in years)	18-30 years	11	33.3	2	22.2	8	42.1	0.793
	31-50 years	9	27.3	2	22.2	5	26.3	
	> 50 years	13	39.4	5	55.6	6	31.6	
Aetiology	CNS Infection	8	24.2	5	55.6	5	26.3	0.598
	Cerebrovascular accident	10	30.3	2	22.2	4	21.1	
	Anticonvulsant drug withdrawal (ACDW)	9	27.3	1	11.1	7	36.8	
	Others (Dyselectrolytemia, Hypoglycemia, Uremic encephalopathy, and Hepatic encephalopathy)	6	18.2	1	11.1	3	15.8	
Total		33	100	9	100	19	100	

DISCUSSION

Our study involved a total of 100 patients, with 12 patients excluded due to developing super refractory status epilepticus. Among the remaining 88 patients, 52 (59%) were males and 36 (41%) were females. These gender distribution findings were similar to a study conducted by Ozdilek et al. in 2013, where 53% were males and 47% were females.[10] However, Treiman et al. found a higher percentage of male patients (82.3%) in their study involving 518 participants with status epilepticus in 1998.[11]

In terms of age groups, our study included patients aged > 18 years, and we observed that 42% of cases were in the 18-30 years age group, followed by 22% in the 51-60 years age group, 14% in the 31-40 years age group, 12% in the 41-50 years age group, and 10% in the > 60 years age group. The mean age was 38.33 years. These findings are similar to a study by Archana Verma et al. in 2018 conducted in North India, where the mean age was 41.71 ± 19.72 years and the majority of patients belonged to the 21-30 years age group.[12] In the study by Treiman et al. in 1998, the mean age was 58.6 ± 15.6 years, while Horváth et al. in 2019 reported a mean age of 64.1 ± 13.9 years.[11,13]

When the seizure episode subsided, many patients did not return to their preictal normal state and experienced one or more postictal complications. In our study, we focused on four postictal complications: headache, automatism, delirium, and psychosis. The most common postictal complication was headache, which was experienced by 45 out of 88 patients (51%). Subota et al. in 2019 and Baker et al. in 1998 reported a higher prevalence of postictal headache in their study populations (66%), while Strine et al. in 2005 found postictal headache in 23.2% of patients.[14,15,16] Although migraine and tension-type headache are the most common forms of postictal headache in most studies, we did not differentiate between the types of headaches in our study.

Delirium was the next common postictal complication in our study, with 25 out of 88 patients (28%) developing delirium. A survey conducted by Cockerell et al. in 1996 found delirium in 35% of patients in the British population.[17] In our study, there was no dominance of delirium prevalence between males and females, but patients in the older age group (above 50 years) had a higher prevalence of delirium (32%).

Psychosis, characterized by hallucinatory behavior, delusions, and impaired reality testing, is a condition that can occur after seizures, known as postictal psychosis. In our study, postictal psychosis (PIP) was found in 9% of patients (8 out of 88). A meta-analysis by Tarrada et al. in 2019 reported a PIP prevalence of 5.6%, with the highest prevalence reaching 7% in temporal lobe epilepsy.[18] Automatisms usually start during seizure and may continue into the postictal phase. The Sadleir, L. et al (2009) found 76% prevalence of automatism in absence seizure. The prevalence of automatism is also common in temporal lobe epilepsy.[19] The occurrence of automatism after status epilepticus is not well studied, but in our study, approximately 8% of patients (7 out of 88) exhibited automatism.

Patients with epilepsy are at a higher risk of physical and mental comorbidities. In terms of physical comorbidities, arterial hypertension, diabetes mellitus, dyslipidemia, asthma, and cardiac diseases are commonly observed. In our study, 37.5% of patients had hypertension, which is higher than the prevalence of hypertension among adults in India (about 30%). According to Mathur et al. in 2022, hypertension is nearly three times more prevalent among men than women in the general population.[20] In our study males outnumbered females but not to such a high extent. All cases of cerebrovascular accidents (CVA) were associated with hypertension. No other etiological correlation with hypertension was observed.

The prevalence of diabetes in India in 2019 was reported as 8.9%, while in our study, 10.2% of patients were found to have diabetes mellitus. The higher prevalence may be due to the long-term use of antiepileptic and other medications used to treat epilepsy patients. Ghorpade et al. in 2013 also reported a higher prevalence of diabetes in males compared to females in the general population.[21] Among patients with CNS infections, approximately 17% had diabetes.

Epileptic patients are significantly more prone to developing dyslipidemia. Khuda et al. in 2022 found significantly higher rates of hypercholesterolemia in epileptic patients compared to controls.[22] In our study, 21.5% of patients had dyslipidemia, with a higher prevalence in females (27.7%) compared to males (17%). The prevalence of dyslipidemia, as well as other comorbidities, increased with age.

CONCLUSIONS

In our study, the most common postictal complication was headache followed by delirium. Hypertension was the most common comorbidity among the study population followed by dyslipidemia and diabetes mellitus. The prevalence of comorbidities increased with age.

Recommendations

Our findings suggest that it is advisable for health care professionals to assess psychiatric and physical comorbidities among patients with a history of seizures to improve patient health outcomes. Patients should be kept under observation during postictal period until postictal complications have subsided. Along with managing epilepsy the common comorbid conditions should be treated.

Limitations

The current study is an observational study and not a randomized, controlled trial. Therefore, selection bias might have affected the results. Many other postictal complications and comorbidities were not included. Some of data was based on attainders' reports therefore may be subject to recall bias. Severity of epilepsy and its relations to comorbidities and postictal complications was not assessed.

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