

ORIGINAL RESEARCH

Assessment of risk and outcomes of diabetes in patients with epilepsy

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ABSTRACT

Background: Epilepsy is a neurological disorder characterized by recurrent, unprovoked seizures. Seizures are episodes of abnormal electrical activity in the brain that can cause a wide range of symptoms, including convulsions, loss of consciousness, altered sensations, or unusual behaviors. The present study was conducted to assess risk and outcomes of diabetes in patients with epilepsy. **Materials & Methods:** 70 patients with epilepsy of both genders were selected. Assessment of glycated hemoglobin, fasting and random blood glucose level was done. Coexisting medical conditions such as hypertension COPD, asthma, traumatic brain injury, stroke etc. were also recorded. **Results:** Out of 70 patients, males were 38 and females were 32. Age group 20-40 years had 27, 40-60 years had 10 and >60 years had 33 patients. Coexisting medical conditions were hypertension in 7, stroke in 4, traumatic brain injury in 9, COPD in 13, asthma in 5, ischemic heart disease in 6, heart failure in 1 case. Diabetes mellitus was present in 48 and mortality was seen in 19 patients. The difference was significant ($P < 0.05$). **Conclusion:** Diabetes control is crucial for individuals with epilepsy since diabetes and epilepsy are linked, and uncontrolled diabetes makes epilepsy worse.

Keywords: diabetes, epilepsy, hypertension

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INTRODUCTION

Epilepsy is a neurological disorder characterized by recurrent, unprovoked seizures.¹ Seizures are episodes of abnormal electrical activity in the brain that can cause a wide range of symptoms, including convulsions, loss of consciousness, altered sensations, or unusual behaviors.²

Epilepsy and diabetes mellitus (DM) are two distinct medical conditions that can coexist in the same individual. While they are not directly related to each other, there are several factors to consider when managing both conditions simultaneously.³ Some antiepileptic drugs (AEDs) used to treat epilepsy can affect blood sugar levels and may interact with medications used to manage diabetes.⁴ For example, certain AEDs like carbamazepine and phenytoin can lower blood sugar levels and may require adjustments in diabetes medications to prevent hypoglycemia. Conversely, some diabetes medications, such as sulfonylureas (e.g., glyburide), can increase the risk of seizures in patients with epilepsy. Seizures can be triggered by low blood sugar levels (hypoglycemia), particularly in individuals with poorly controlled

diabetes.⁵ Therefore, it's important for people with epilepsy and diabetes to maintain stable blood sugar levels through regular monitoring, proper nutrition, and timely administration of diabetes medications. Seizure management should also include strategies to prevent and manage hypoglycemia, such as carrying glucose tablets or snacks for emergencies.⁶ The present study was conducted to assess risk and outcomes of diabetes in patients with epilepsy.

MATERIALS & METHODS

The present study was conducted on 70 patients with epilepsy of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. Assessment of glycated hemoglobin, fasting and random blood glucose level was done. Coexisting medical conditions such as hypertension COPD, asthma, traumatic brain injury, stroke etc. were also recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS**Table I Distribution of patients**

Total- 70		
Gender	Males	Females
Number	38	32

Table I shows that out of 70 patients, males were 38 and females were 32.

Table II Assessment of parameters

Parameters	Variables	Number	P value
Age group (years)	20-40	27	0.95
	40-60	10	
	>60	33	
Coexisting medical conditions	hypertension	7	0.05
	stroke	4	
	traumatic brain injury	9	
	COPD	13	
	asthma	5	
	Ischemic heart disease	6	
Diabetes mellitus	Yes	48	0.04
	No	22	
Mortality	Yes	19	0.01
	No	51	

Table II shows that age group 20-40years had 27, 40-60 years had 10 and >60years had 33 patients. Coexisting medical conditions were hypertension in 7, stroke in 4, traumatic brain injury in 9, COPD in 13, asthma in 5, ischemic heart disease in 6, heart failure in 1 case. Diabetes mellitus was present in 48 and mortality was seen in 19 patients. The difference was significant ($P < 0.05$).

DISCUSSION

Generalized seizures involve abnormal electrical activity throughout the entire brain.^{7,8} Subtypes include tonic-clonic (formerly known as grand mal) seizures, absence seizures (formerly known as petit mal), atonic seizures (also called drop attacks), and myoclonic seizures.⁹ Partial (Focal) seizures begin in a specific area of the brain and may cause localized symptoms or spread to involve other regions.¹⁰ Subtypes include simple partial seizures (with preserved consciousness) and complex partial seizures (with altered consciousness). In many cases, the cause of epilepsy is unknown, and it is thought to have a genetic or hereditary component.^{11,12} Epilepsy may result from brain injury, such as trauma, stroke, infection (e.g., meningitis, encephalitis), brain tumors, or developmental abnormalities. Provoked seizures may occur in response to certain triggers or conditions, such as fever (febrile seizures), alcohol withdrawal, drug intoxication, or metabolic disturbances (e.g., hypoglycemia, electrolyte imbalances).¹³ The present study was conducted to assess risk and outcomes of diabetes in patients with epilepsy.

We found that out of 70 patients, males were 38 and females were 32. Schober et al¹⁴ calculated the frequency of epilepsy and potential risk factors in children and teenagers among 45 851 patients (52% male) with type 1 diabetes mellitus; the patients' ages range from 13.9 ± 4.3 years (mean \pm SD) to 5.4 ± 4.2 years. 705 epileptic individuals were found, with a

frequency of 15.5 per 1000. 330 patients did not receive anticonvulsive therapy, while 375 patients received antiepileptic drug treatment. Compared to individuals without epilepsy, those with epilepsy were shorter and younger when diabetes mellitus first appeared. They also had similar body mass indices and weights. Regarding the prevalence of B-cell-specific autoantibodies, insulin dosage, insulin therapy method, and metabolic control, no differences could be shown. Patients had severe hypoglycemia less frequently.

We observed that age group 20-40 years had 27, 40-60 years had 10 and >60 years had 33 patients. Coexisting medical conditions were hypertension in 7, stroke in 4, traumatic brain injury in 9, COPD in 13, asthma in 5, ischemic heart disease in 6, heart failure in 1 case. Diabetes mellitus was present in 48 and mortality was seen in 19 patients. Yan¹⁵ meta-analysis showed that type 1 diabetes mellitus was associated with an increased risk of epilepsy with HR = 3.29 (95% CI: 2.61-4.14; I² = 0, p = 0.689). Similar results were observed in type 1 diabetes mellitus patents younger than 18-years-old with HR = 2.96 (95% CI: 2.28-3.84; I² = 0, p = 0.571). Meta-analysis of 2 studies that adjusted for potential confounders yielded an increased risk of epilepsy with HR = 2.89 (95% CI: 2.26-3.70; I² = 0, p = 0.831). The meta-analysis indicates that type 1 diabetes mellitus is associated with a statistically significant increased risk for epilepsy compared to those without type 1 diabetes mellitus.

Chou et al¹⁶ contained 2568 patients with type 1 diabetes, each of whom was frequency-matched by sex, urbanisation of residence area and index year with ten patients without type 1 diabetes. In patients with type 1 diabetes, the risk of developing epilepsy was significantly higher than that in patients without type 1 diabetes. After adjustment for potential confounders, the type 1 diabetes cohort was 2.84 times as likely to develop epilepsy than the control cohort was (HR 2.84 [95% CI 2.11, 3.83]). The shortcoming of the study is small sample size.

CONCLUSION

Authors found that diabetes control is crucial for individuals with epilepsy since diabetes and epilepsy are linked, and uncontrolled diabetes makes epilepsy worse.

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