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Seizure Type Change in Temporal-Lobe Epilepsy: A Case Report

Congdro Jessica[1], Sumada I Ketut[1], Yuliani Desie[1], Jayanthi Kurnia D.[1]

[1]Department of Neurology, Wangaya General Hospital, Bali, Indonesia.

Corresponding Author: Congdro Jessica

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ABSTRACT

Seizure type changes or evolution can sometimes occur. The most known seizure type evolution is focal onset to bilateral tonic-clonic seizure while other forms of seizure type changes are rarely reported. A 46-year-old man with generalized tonic-clonic seizure pattern undergo changes in seizure type into motoric patterns (automatism) followed by confused period similar to temporal-lobe epilepsy symptoms. Patient was initially given phenytoin and clobazam for generalized tonic-clonic seizure. After he was diagnosed with temporal-lobe epilepsy, carbamazepine was added and seizure completely ceased afterwards. Patient was discharged after 3 seizure-free days. Epilepsy is defined as a disease which fulfils one of these criteria: two or more reflex or unprovoked seizure with 24-hour interval, one reflex or unprovoked seizure with the probability of another seizure repeating in the next 10 year ≥60%, or epilepsy syndrome. Temporal lobe is the most epileptogenic area in the brain, because seizure-causing injury often occurs in this area. This patient was initially given phenytoin and clobazam to treat his generalized tonic-clonic seizure. After the seizure type change, he was given carbamazepine which is one of the mainstay therapies for temporal-lobe epilepsy. Change of seizure type from generalized tonic-clonic to other types rarely occurs. In this case, we present a generalized tonic-clonic seizure patient which then evolves into temporal-lobe epilepsy. The diagnosis and classification of epilepsy is extremely important as they would ultimately determine patient's treatment.

Keywords: epilepsy, temporal lobe, seizure type change

INTRODUCTION

Epileptic seizure is defined as the occurrence of transient signs/symptoms due to abnormal and excessive neuronal activity in the brain.[1] Epilepsy is defined as a disease which fulfills one of these criteria: two or more reflex or unprovoked seizure with 24 hour interval, one reflex or unprovoked seizure with the probability of another seizure repeating in the next 10 year ≥60%, or epilepsy syndrome.[2]

Epilepsy types are differentiated into focal, generalized, combined focal and generalized, and unknown. All seizure types experienced by patient must be defined and combined to determine the epilepsy type.[2] Additional supporting examinations should be done to search for etiology. Focal epilepsy takes up 60% of all adult epilepsy cases and temporal-lobe epilepsy (TLE) is the most common cause. TLE is associated with hippocampal sclerosis in 60-70% cases.[3]

Changes or evolution in seizure type can sometimes occur. The most known seizure type evolution is focal onset to bilateral tonic-clonic seizure. Other seizure type

changes are rarely reported. This case report will describe a patient with generalized tonic-clonic seizure which then changed into temporal-lobe epilepsy. Patient had seizures with motoric symptoms (automatism) followed by confused post-ictal periods. The diagnosis and classification of epilepsy is extremely important as they would ultimately determine patient's treatment. Inaccurate diagnosis would lead to administration of drugs that may not be as effective.

CASE REPORT

A 46-year-old male patient came to the Emergency Room (ER) with main complaints of feeling weak and difficulty in communicating since waking up. Patient also felt nauseous and vomited at home. Patient had whole body tonic-clonic seizure with eyes rolling upwards for 5 minutes while in hospital room. Patient was asleep for a few minutes post-seizure before waking up with full consciousness. He experienced more seizures with the same pattern for another 3 times in the next 2 days, with seizure duration of 1-3 minutes. Patient was conscious in between each seizure episodes, but was generally confused and forgetful.

On his fourth day in the hospital, patient was frequently reported to stare blankly, glancing to his sides before making chewing motions and eventually being motionless. This episode occurred for 1-2 minutes, with frequency of 1-3 episodes per day. Patient could not communicate during the episodes. Afterwards, he could not recall the seizure episodes but was fully conscious. Patient no longer had generalized seizures since the fourth day. There was a change in seizure pattern, that is the pattern changed from generalized tonic-clonic seizure into motoric (automatism) initial symptoms followed by prolonged confused post-ictal period.

Patient had never had seizures before, and there was no history of seizures in his family. Other symptoms such as fever and headache were also denied. History of head trauma was denied by patient. Patient has history of type 2 diabetes mellitus and hypertension with routine treatment of metformin 3x500mg and candesartan 1x8mg.

In the ER, patient looked moderately ill but fully conscious with Glasgow Coma Scale (GCS) of E4V5M6. Patient's blood pressure was 149/87 mmHg, body temperature of 36°C, respiratory rate of 20x/minute, heart rate of 95x/minute, and oxygen saturation of 96%. Vital signs during hospital stay were within normal limit. Non-contrast head CT scan showed normal findings. Thorax x-ray showed cardiomegaly. Based on history taking and examination findings, patient was diagnosed with temporal-lobe epilepsy.

Patient was initially administered intravenous injection of 5mg diazepam. Patient was then given intravenous phenytoin 3x100mg after the second seizure. Clobazam 1x5mg was then added after the next seizures. Patient then had seizure type change and was given carbamazepine 2x200mg. The frequency of seizures with blank stares and chewing motions decreased after carbamazepine administration. Patient was also no longer confused and disoriented. Phenytoin doses were reduced and ultimately stopped with no seizures. Patient was discharged after 3 seizure-free days and was prescribed carbamazepine 2x200mg and clobazam 1x5mg. During outpatient visit, patient underwent electroencephalogram (EEG) which showed spike waves with brief slowing activity in the left temporal. This result corresponds with the diagnosis of temporal lobe epilepsy.

DISCUSSION

Epileptic seizure is defined as the occurrence of transient signs/symptoms due to abnormal and excessive neuronal activity in the brain. Non-epileptic seizure is defined as signs/symptoms not caused by abnormal or excessive neuronal activity in the brain.[1]

Epilepsy is defined as a disease which fulfills one of these criteria: two or more reflex or unprovoked seizure with 24 hour interval, one reflex or unprovoked seizure

with the probability of another seizure repeating in the next 10 year ≥60%, or epilepsy syndrome.[2]

Internation League Against Epilepsy (ILAE) divides seizure types based on their onset, awareness, and their motoric component. Seizure onset is defined as focal, generalized, unknown, and unclassified. Awareness is differentiated into aware and impaired awareness. For focal seizures, "motoric" terminology can only be used for motoric onset. More extensive seizure classification gives additional classifications into motoric and non-motoric terminologies. Those additional classifications were determined by the first sign and symptoms exhibited.[2]

Patient diagnosed with epilepsy should then be classified based on its type and etiology. Epilepsy type includes focal, generalized, combined focal and generalized, and unknown. Etiology classification includes structural, genetic, infection, metabolic, immune, and unknown causes. Epilepsy causes often cannot be determined (about 50% of cases).[2]

Patient initially had generalized tonic-clonic seizure for 3 days. Patient then had change in seizure pattern on his fourth day of hospital stay, whereby patient often had blank stares, glancing to his surrounding before making chewing motions and eventually became motionless. Patient's family stated that this pattern of seizure only occurs on the fourth day and previously did not precede generalized tonic-clonic seizures for the first 3 days. Patient's diagnosis was then changed into temporal-lobe epilepsy as his seizure patterns fit into seizure patterns of temporal lobe epilepsy.

Temporal lobe is the most epileptogenic area in the brain, because seizure-causing injury (hypoxia and head trauma) often occurs in this area. There are two main types of temporal-lobe epilepsy, mesial (limbic form) and lateral (neocortical form). It is difficult to differentiate the two types clinically, but in general patient with neocortical type has auditory hallucination prior to seizure.[4]

Focal seizures for 1-2 minutes often occur in temporal-lobe epilepsy patients. Patient initially was aware, and most experience epigastric aura. Consciousness will slowly decrease and patient will eventually stop all activities. Patient often seen to stare blankly, have dilated pupils, and automatism such as chewing, lip smacking, or swallowing motions. Ipsilateral hand automatism symptoms (grasping) and dystonic arm posture contralateral to seizure focus are also often observed. Patient commonly seen confused during post-ictal phase. Focal seizure can sometimes evolve into tonic-clonic seizure. Initial symptoms can be divided into autonomic, motoric, cognitive, emotional, or sensory symptoms.[4]

Symptoms seen in this patient are blank stares and automatism motions (chewing). Patient also had confused post-ictal phase. There were no arm and hand automatism symptoms in this patient. The initial symptom seen in this patient is included in motoric symptoms category.

Thorough history taking is usually adequate for diagnosing temporal-lobe epilepsy. Neurologic examination is usually insignificant, which is seen in this case. Supporting examination such as standard EEG can be normal or only showing non-specific abnormalities in about 50% patients. Typical results will show focal epileptiform activity in anterior temporal region, often with combined slowing wave activity. Examination during seizure will show rhythmic spiking activity of 4-7 Hz in the associated temporal lobe.[4]

Brain Magnetic Resonance Imaging (MRI) will show epileptogenic lesion in about 70% patients. Lesion can be glioma, cortical dysplasia, hippocampal sclerosis with hippocampus atrophy and increase in enhancement intensity on T2-weighted series. Positron Emission Tomography examination can show hypometabolism in anterior medial area of associated temporal lobe.[4] MRI and PET examination were not conducted in this case due to their unavailability.

Accurate diagnosis is required for effective treatment. Anti-Epileptic Drugs (AEDs) usually work by increasing inhibition to prevent or stop initiation or spreading of seizure activity.[5] Different AEDs are used for different types of seizure. Most AEDs are effective against focal seizure, while AEDs for generalized tonic-clonic seizure are more limited. One of the most common reasons for treatment failure is misclassification of seizure.[6]

Carbamazepine is the most effective for TLE and hence, most used AED for TLE patients.[7] Carbamazepine therapeutic dose is 400-1600mg with plasma therapeutic level of 4-12 mcg/mL. Other AEDs that can be used for TLE patients include lamotrigine, levetiracetam, and oxcarbamazepine.[8] Administration of carbamazepine must be done with caution as there is risk of Stevens-Johnson Syndrome (SSJ), enzyme induction effect, as well as potential chronic toxicity (which also includes increase in long term cardiovascular disease risk). [4,6,9]

Patient was initially given phenytoin, which is one of the mainstay therapies for generalized tonic-clonic seizure. Clobazam was then added when patient's seizure did not improve. Clobazam is a benzodiazepine often used as adjuvant therapy when AED monotherapy is inadequate.[10] After the change in seizure type, patient was then administered carbamazepine. Carbamazepine is the mainstay treatment for temporal-lobe epilepsy. [4,7] Laboratory and imaging results were normal, and the etiology is still unknown. Further examinations such as MRI may be needed to discover the etiology.

CONCLUSION

Change in seizure type from generalized tonic-clonic type into other types rarely happens. Different AEDs were used for different seizure types. One of the most common reasons for treatment failure is misclassification of seizure. Misclassification of focal onset seizure as generalized onset seizure may result in administration of drugs that are not as effective. EEG is important for accurate classification and AEDs administration. This case described a patient with generalized tonic-clonic seizure which changed into temporal-lobe epilepsy. Awareness of the possibility of seizure type changes or evolution can lead to more accurate classification and hence, more effective treatment.

Declaration by Authors

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