Seizures

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Abstract

Seizures are the result of neuronal dysfunction and any asymmetrical electrical secretions in the brain. This stimulates the uncontrolled contraction and relaxation of the muscles of the body that outcome in shaking, trembling and shivering. Seizures are of various types depending upon the cause of the seizures. It has been observed that major seizures are the result of brain disorders, metabolic imbalance, prolonged stress, depression, and epilepsy. Seizures are unpreventable as the studies are not available to provide evidence in the management and prevention of seizures. EMS responders are the personnel who manage a patient with ongoing seizures and provide pre-hospital treatment to save the patient's life. Advanced researches and studies are required to obtain data for the management and prevention of seizures to reduce burden of the problem.

*Keywords*: Seizures, Convulsions, Epileptic seizures, EMS response, Provoked seizures

**Seizures**

A seizure is an occurrence of nervous dysfunction affected by irregular electrical secretions in the brain. At once stimulation of the cortex produces widespread seizures and is linked with unconsciousness. Incomplete seizures occur due to expulsions in the restricted areas of the cortex, this may not be linked with unconsciousness (Binaghi et al., 2018). It arises due to the excessive coordinated neuronal activity of the brain. Provoked seizures usually occur due to the momentary causes such as low blood sugar levels, and fever. Unprovoked seizures gets activated due to continued stress, anxiety or depression. Brain disorders such as epilepsy are also accompanying seizures.

**Symptoms of Seizures**

Symptoms of the seizures vary based on the type and factors that result in seizures. The most important ones are seizures due to convulsions (Falco-Walter, Scheffer, & Fisher, 2018). There are categories of seizures, focal seizures, and generalized seizures.

**Convulsions**

Convulsion is a medical state in which muscles of the body contract and relax promptly and recurrently, causing in hysterical movements of the body. As the epileptic seizures characteristically comprise of convulsions, the word convulsion is occasionally used as a substitute for the medical word seizure. Though, epileptic seizures not always result in convulsions, and similarly, convulsions not always outcome by epileptic seizures (Falco-Walter et al., 2018). These may occur due to the constant electric tremor or inappropriate enhanced air scuba jumping.

**Focal Seizures**

These frequently occur by some previous experiences; such as migraines, often named as an aura (Falco-Walter et al., 2018). It also comprises of other phenomena such as sensual, motor, olfactory and visual. Jerking, bumping and shaking activities may cause focal seizures because of the muscle activity and that lead to other muscles to become convulsive.

**Generalized seizures**

These types of seizures usually occur without symptoms or warning signs and resulted in unconsciousness. A generalized seizure may happen from a few instants to a further five minutes (Falco-Walter et al., 2018). It has six major types.

1. Tonic seizures
2. Clonic seizures
3. Tonic-clonic seizures
4. Myoclonic seizures
5. Absence seizures
6. Atonic seizures

**Causes of Seizures**

It has been observed in clinical settings that seizures have several different causes. However, 25% to 30% of seizures occur due to epilepsy. Seizures due to prolonged infections, brain disorders, and migraines are also the reasons. Metabolic factors such as decreased blood sugar level and high blood pressure also cause seizures. Other metabolic factors including low calcium count in blood, high urea quantity in the blood also results in seizures. Structural factors such as tumors in the brain, hemorrhage, and abscesses in the localized areas of cortex in the brain can lead to seizures (Madaan et al., 2018). Medications such as overdoses of antidepressants, insulin, and sedative drugs can cause seizures. It has also been suggested by the physicians that certain infections such as meningitis, cerebral malaria can cause seizures in children. Prolonged stress, anxiety, and depression are frequent outcomes of seizures. Other factors comprising eclampsia in pregnancy, head injuries, trauma, and shock may cause seizures.

**Diagnosis**

Seizures can be diagnosed depending on the cause and origin of the seizures. Provoked seizures such as reactive and symptomatic seizures can be diagnosed by performing blood tests, MRI and CT scans (Madaan et al., 2018). For epileptic seizures, electroencephalography is suggested. Blood sugar levels, blood pressure, and blood calcium count can also help to detect seizures (Falco-Walter et al., 2018). Tetanus and cerebral hypoxia in previous medical history can also help in diagnosing seizures and their causes.

**Medication and Prevention**

First-line drugs such as benzodiazepine, diazepam and administering propofol can help patients with active seizures. Various procedures have been endeavored to avoid seizures in individuals at threat. After distressing brain injury use of anticonvulsants can reduce the threat of preliminary seizures but not following seizures. In patients with a medical history of fevered seizures, medicines are not found effective for the prevention of seizures. In these conditions, medicine usually results in harmful side effects. No studies have been conducted so far to provide evidence on the use of antiepileptic medicines in the prevention of seizures. Seizures after brain injuries and stroke are most commonly observed in patients but no clear indication is presented in studies and researches that support the anticonvulsive and antiepileptic medicines that can reduce the probabilities of seizures. (Falco-Walter et al., 2018). Management with bone marrow of mononuclear cells is associated with the reduction and prevention of seizures, and neuronal loss.

**Epidemiology**

About 100,000 novel cases of seizures frequently identified in the United States every year. The occurrence of novel cases of seizures is maximum in aging patients. A most common cause of seizures is observed to be a stroke. Other provoked cases of seizures include brain cancers, and dementia (Binaghi et al., 2018). Patients with shock and systemic disorders such as high blood pressure, low blood sugar level, and low calcium and high urea level in the blood frequently reported in the hospitals. Studies have shown that the children below five years of age often have higher probabilities of getting seizures.

**Management Utilizing EMS Response**

Physical examination of a patient with seizures is very helpful in identification of the causes of seizure and would lead to the management accordingly. EMS is the individual who first respond to patients with seizures. EMS responders normally follow guidelines and practice for quick management of these patients. The appropriate response, skilled training, and medical services are provided to the EMS responders who manage cases of seizures. EMS responders would first do pre-hospital management such as safety of the place, level of consciousness of the patient and time from the beginning of a seizure. Lateral tongue bite signs, blood glucose, and blood pressure measurements are also helpful in diagnosis (Falco-Walter et al., 2018). An organized and systematic approach is needed to manage patients with seizures. Past medical history is also important to be noted. It would help in premature diagnosis.

Treatment and management of patients during an active seizure are crucial and the patient has to be saved from further damage because of the seizure. Patients initially after seizures if found on the floor has to be managed by lifting his chin, jaw thrust to maintain the airway passage. If this is not helpful, managing patients with the assistance of suction to open the airway passage and to avoid obstruction. Inactive seizures, patients need additional care such as safety from sharp edges, staircases, and falling from dangerous tops. Based on the etiology, the patient has to be treated and it is significant to conserve aeration, oxygenation, and circulation. The application of additional interventions such as the use of anticonvulsive drugs to stop seizures and to control the condition is needed. These drugs cannot cure seizures but only helpful in reducing seizure activity in the body (Binaghi et al., 2018). Patients with seizures required to be properly checked and monitored like their regular blood pressure monitoring, blood sugar level, and respiratory track should be observed from time to time.

**Clinical Discussion**

The management and treatment of patients with seizures is a complex topic to be discussed. Clinically, no evidence has been provided to prevent patients from seizures. Early and prompt action for the management of patients having seizures is necessary. For this particular purpose, EMS responders are trained and skilled to provide services before visiting hospitals. One month ago, an EMS responder reached a native store for a 30-year-old female suffering from a seizure. The patient was lying on the ground in a supine position and shaking in a tonic-clonic indication. She was unresponsive to the spoken directions, and with a discharge of blood from her mouth. One of her friends was there stating that they were drinking all day and were enjoying watching a movie. They were about to take more bottles of drinks at the courtyard, patient after saying that the lights are disturbing her, instantly collapsed. When I caught her in my arms she started shaking and trembling to the floor. Shaking remained for almost ten minutes. Her friend said the same incident happened with her last year too when she had an accident and hurt her head. Her vital signs include 112 per minute pulse, blood pressure, blood sugar level 134 mg/dL. The skin of the patient was diaphoretic and warm.

As it has been observed that seizures are of various types. EMS responders would help in the identification and pre-hospital management of this patient (Falco-Walter et al., 2018). As the responder identified that this patient was suffering from a tonic-clonic seizure. This type of seizure includes symptoms of contractions of the limbs along with a cry that can be heard from the chest because of the chest muscle contraction. Limbs shaking and it will last for 10 to 30 minutes. In the case presented, the patient would be managed by suctioning her airway by using an appropriate sized nasopharyngeal airway. To get a pulse more than 95 it is important to administer oxygen with an initial rate of 15 liters per minute. After this 10 ml of midazolam administering via an intramuscular course by the EMS responder. After administering, blood pressure of 90/50 achieved and then saline 250 ml instilled to the patient to treat hypovolemia. After the arrival of the ambulance, a patient at her left lateral reclining is positioned in the ambulance bed. During traveling to the hospital, her sugar level rechecked was 105 mg/dL but still sleepy and exhausted. She admitted to the hospital overnight and discharged in the morning for further administration and management according to her basic medical history.

Management and pre-hospital treatment of a patient suffering from ongoing seizures are significant to save a life, and for that particular purpose, an EMS may be called. As evident from the literature review that seizures are unavoidable as the studies are not available to provide substantial information in the management and prevention of seizures. Decision left with EMS responders, they manage a patient with ongoing seizures and deliver pre-hospital handling to save the patient's life. Progressive studies along with evidence based preventive measures are required for the management and prevention of seizures in patients.

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