Seizure Disorders in Athletes

Eric D. Parks, MD • University of Tennessee

Although seizures occurring during an athletic event are rare, they can be frightening experiences for spectators, teammates, coaches, and the athletic training staff. It is essential that the athletic training staff be familiar with acute management strategies and current recommendations regarding participation in athletic events. They should also have an understanding of the types of seizure disorders, risk factors, and the diverse symptoms of seizure activity.

It is estimated that 5–10% of the population will have at least one seizure during the course of their lifetime. Approximately 0.5–1% of the population is diagnosed with epilepsy, defined as a tendency to have recurrent seizures. Most of these patients will experience their first seizure before their third decade of life. Because this is a period of life during which many people are involved in athletic activities, it is important for athletes’ care providers to be knowledgeable regarding seizure disorders.

Seizure Classification

A seizure is a constellation of symptoms resulting from abnormal rhythmic discharges from a portion of the brain or the entire brain. Seizures are classified as partial or generalized.

Partial seizures, which involve only a portion of the cortex, can be simple or complex and often go unnoticed by observers because of their discrete manifestations. A wide array of symptoms might occur during a simple partial seizure, including visual, olfactory, and auditory sensations; sudden sweating; piloerection (“goose bumps”); changes in heart rate and blood pressure; and isolated jerking movements of the face, arm, or leg. Because a simple partial seizure involves an isolated area of the brain, consciousness is preserved. In contrast, patients with complex partial seizures, which are often preceded by simple partial seizures, will experience altered but not lost consciousness. In addition to the symptoms of a simple partial seizure, patients might experience repetitive behaviors such as lip smacking, undressing, grimacing, unresponsiveness to commands, and aggression. Symptoms typically last less than 3–5 min. After the seizure, patients typically experience what is called a postictal state consisting of a variety of symptoms such as headache, confusion, somnolence, and/or no memory of the seizure activity.
Generalized seizure activity involves both hemispheres of the brain and induces loss of consciousness. Subtypes of generalized seizures include absence (petit mal), tonic-clonic (grand mal), myoclonic, and atonic. Absence seizures, often seen in childhood, consist of brief lapses in consciousness, such as staring off into space, without change or loss of posture. Consciousness returns quickly with no subsequent postictal state. Individuals are vulnerable to injury during the period of decline because they are unable to protect themselves. In comparison, tonic-clonic seizures begin with abrupt loss of consciousness and stiffening of muscles of the arms, legs, chest, and back. This is followed by jerking of the body and might be accompanied by tongue biting, the production of bloody sputum, and, more seriously, fractures of the clavicle, humeral neck, femoral trochanter, and ankle. The postictal state of drowsiness, sleep, confusion, muscle soreness, and headache can last from minutes to several hours. Atonic seizures are manifested by a sudden, brief loss of postural tone, and myoclonic seizures present as brief episodes of one or more muscles contracting. The loss of tone found in atonic seizures places individuals at risk of fall and injury. Individuals with generalized seizures might also temporarily lose bowel and bladder control during a seizure.

The literature describes multiple risk factors or triggers that might predispose patients to seizure activity. Such factors include abnormalities in sodium and glucose levels, severe head trauma, hypoxia, and hyperventilation. Stress is the most commonly identified trigger for seizure activity. Excessive fatigue, insomnia, and illicit drugs have also been reported as risk factors. Hyperventilation at rest can induce seizure activity, but during exercise, it is a physiologic response and therefore does not appear to be a risk factor. Evidence that exercise might exacerbate seizures is inconclusive. Instead, it is suspected by some that exercise might actually reduce their frequency. By ensuring appropriate hydration, temperature monitoring during hot weather, close blood glucose monitoring in athletes with diabetes, stress management, and appropriate rest, many of these triggers can be avoided.

**Seizure Treatment**

The primary medical treatments of seizures are antiepileptic drugs. Ongoing medical treatment for a single isolated seizure is usually not recommended, however. The classification of the seizure disorder, frequency of seizures, and risk of recurrence are considered in determining when medical treatment is necessary. Valproate (Depakote®) provides adequate control in most patients with generalized seizures. Other agents commonly used for partial seizures include carbamazepine (Tegretol®) and phenytoin (Dilantin®). Barbiturates such as phenobarbital can be used but are very sedating. The different seizure disorders respond very differently to the various antiepileptic drugs. The side-effect profile of each drug is also considered carefully because they can cause sedation, dizziness, nausea, vision changes, concentration difficulties, and fatigue.

In the event of a seizure, prompt care is essential. First, apply the basic rules of first aid by evaluating the athlete’s airway, breathing, and circulation. Help the athlete to the ground or a safer location if the athlete is in a potentially harmful location. Cushion the head if possible. Remove from the immediate area any potentially hazardous objects that could cause injury. Do not restrain a seizing individual—this can actually be harmful and might result in fractures. Likewise, placing anything in the mouth of a seizing individual can be dangerous for the patient and care provider. Most seizures resolve spontaneously within 3–5 min, so the most critical action is protecting the athlete from self-injury. Knowledge of the individual’s typical postictal state is helpful. Have the athlete lie on his or her side during the postictal state to avoid aspiration in the event of vomiting. If seizure activity is experienced