Seizure Precautions for Pediatric Bedside Nurses

Ellen Thomen Clore

Over the course of their careers, many inpatient pediatric nurses will care for a patient with seizures or who is at risk for seizures. Although often anxiety-provoking, the fear can be diminished by thinking critically about each child’s seizure. The nursing management of pediatric seizures, for which patient safety is the priority, should be driven by the clinical presentation of the child’s event. This article will present an algorithm to assist bedside nurses in safely caring for children with a variety of seizure types. The algorithm can be used as a road map to assist staff nurses in safely and appropriately stocking patients’ bedsides with emergency equipment as needed for children with seizures. However, to understand the clinical symptoms of a seizure, it is important to first review basic pathophysiology and seizure classification.

What Is a Seizure?

A seizure is a paroxysmal electrical discharge of neurons in the brain that results in a change in function or behavior (Blumstein & Friedman, 2007). The area of cortical involvement and the subsequent temporary changes in cerebral function caused by this abnormal discharge contribute to the clinical manifestation of the event (Fagley, 2007). The clinical presentation of that abnormal neuronal discharge varies from twitching lasting two to three seconds to generalized tonic-clonic movements (a brief period of rigidity followed by rhythmic convulsions) that can continue for hours if untreated (Yamamoto, Olaes, & Lopez, 2004). Some individuals may have associated symptoms, such as cyanosis, while others may have very few clinical symptoms that a seizure is occurring.

Approximately 10% of the population will have at least one seizure in their lifetime (Marks & Garcia, 1998). Of this group, 1% to 3% will be diagnosed with epilepsy (Hauser, Annegers, & Kurland, 1993), which is defined as recurrent, spontaneous, unprovoked seizures. Each year 30,000 children will be diagnosed with epilepsy (Blumstein & Friedman, 2007), and 30% of those children will suffer from seizures that are refractory to medical management, a condition known as intractable seizures (Nadkarni, Lajoie, & Devinsky, 2005).

The bedside nurse should obtain a detailed description of the seizure, including duration, frequency, and symptoms (Marthaler, 2004). As in the adult population, seizures that present in childhood are classified by electrographic findings and clinical presentation with a constellation of symptoms noted in each seizure type.

Seizure Classification

Simple Partial Seizures

Simple partial seizures are defined as abnormal neuronal discharges occurring in only one hemisphere of the brain (partial) in which consciousness is preserved (simple). These episodes usually last a few seconds but can last longer, and are often referred to by the individual as an “aura” that portends a second seizure type. Depending on the part of the brain affected by the excessive firing, the symptoms of the aura are varied and may include paresthesias, hallucinations, dysphagia, sweating, flushing, or motor disturbances, such as jerking (Yamamoto et al., 2004). Since the individual is conscious during the seizure, and the clinical symptoms of the seizure are usually very brief, there are fewer safety risks to address. However, it is important for the bedside nurse to know if the patient’s simple partial seizure usually precedes a complex-partial or generalized seizure because these seizure types put the patient at an increased safety risk.

Complex Partial Seizures

A complex-partial seizure is defined as a seizure originating from one hemisphere of the brain with impairment of consciousness (Yamamoto et al., 2004). Most commonly, these seizures originate in the temporal lobe, so common clinical manifestations can be as subtle as automatisms (purposeless, repetitive motions, such as picking motions of the hands) or as obvious as bizarre behaviors (such as undressing in public) (Gambrell &

Ellen Thomen Clore, MSN, RN, is a Pediatric Nurse Practitioner, Children’s National Medical Center, Washington, D.C.

Statement of Disclosure: The author reported no actual or potential conflict of interest in relation to this continuing nursing education article.

Seizures are a common neurologic disorder of childhood, and many pediatric nurses will care for children with epilepsy during their careers. The term “seizure precautions” is used frequently in nursing practice; however, its definition varies among institutions. Childhood epilepsy has many phenotypes, and while some children require airway clearance and ventilatory support in the event of a seizure, many will not. The bedside equipment for a child with seizures should reflect the patient’s symptoms. To that end, an algorithm based on seizure classification and current practice in seizure precautions is presented to aid bedside nurses in safely caring for children with seizures. The algorithm may also be used to assist in educating parents about the safest way to care for their child at home, without sending contradictory messages about different needs for equipment in the hospital and in the home.
Seizure Precautions for Pediatric Bedside Nurses

Flynn, 2004). During complex partial seizures, the individual may appear to be fully awake, but will not respond to commands and will have amnesia for the event. There is a risk of injury to the patient and nurse if the patient becomes combative during an attempt to restrain. Thus, a thorough history of the typical details of the seizure is crucial to the safe delivery of care. Complex partial seizures most commonly last two to three minutes but can extend up to 15 to 30 minutes (Yamamoto et al., 2004), and may secondarily generalize to both hemispheres of the brain.

Generalized Seizures

A generalized seizure is one in which the neuronal discharge occurs in both hemispheres of the brain and may involve a depressed level of consciousness (Blumstein & Friedman, 2007). There are two main categories of generalized seizures: nonconvulsive and convulsive.

- **Nonconvulsive.** Absence seizures are characterized by brief periods of altered consciousness with subtle motor activity, such as eyelid fluttering, staring, or lip smacking (Yamamoto et al., 2004). One study found these episodes to last an average of 9.4 seconds (Sadleir, Farrell, Smith, Connolly, & Scheffer, 2006); once the seizure is over, the individual returns to the previous activity. These episodes are often mistaken for "daydreaming" because of their short length, and these individuals are frequently admitted to the hospital for overnight video EEG monitoring to diagnose the event.

  These events, epileptic or not, usually have no history of respiratory compromise or significant motor involvement, and as such, these patients are at low risk of injury during their seizures. However, the risk of injury does not disappear if the onset of seizure activity coincides with other activities, such as driving or eating.

  Myoclonic seizures usually manifest as sudden, brief head drops and arm flexion, and may occur hundreds of times per day (Blumstein & Friedman, 2007). However, each episode may last only one or two seconds and does not involve respiratory compromise. Conversely, atonic seizures involve a sudden loss of tone and consciousness (Yamamoto et al., 2004), and although the seizures last only for a few seconds without respiratory compromise, these individuals are at extremely high risk for falls and injury because of the clinical presentation of their seizure (Yamamoto et al., 2004).

- **Convulsive.** The most common type of generalized seizure is the tonic-clonic seizure. This event is characterized by a loss of consciousness, a brief period of muscle rigidity (tonic phase) followed by rhythmic jerking of all the patient’s extremities (clonic phase) (Yamamoto et al., 2004). Respirations may be irregular, there may be oxygen desaturation, and there is frequently a pooling of secretions in the oropharynx, which puts the individual at risk for aspiration.

  Other types of convulsive generalized seizures include clonic seizures involving rhythmic jerking of extremities without a preceding tonic phase, and tonic seizures involving full body rigidity (Yamamoto et al., 2004). Both types involve a loss of consciousness as well as the possibility for respiratory compromise.

Special Circumstance: Medication Taper

Children who have intractable partial epilepsy, about 30% of children with seizure disorders (Nadkarni et al., 2005), often undergo evaluation with long-term video EEG monitoring. In many cases, this is performed if surgical ablation of an epileptic focus is being considered (Major & Thiele, 2007). The pre-surgical evaluation process often requires multiple hospitalizations with a goal to identify a discrete and operable seizure focus. The sole means for obtaining this information is by observing the child’s seizure; therefore, the medical staff may decide to quickly (over several days) taper the child’s anti-epileptic drugs in the controlled hospital environment to provoke a seizure. By comparison, neurologists caring for patients who have been seizure-free for at least two years (Sivrin, Sperling, & Wingerchuk, 2003) and who wish to wean these patients off anti-epileptic medication in the hopes that they may no longer require medications, are recommended to do so over an average of three months (Ranganathan & Ramaratnam, 2006). Seizure safety in either of these populations is paramount; however, those children who undergo surgical evaluation due to persistent breakthrough seizures on anti-epileptic medication are already at an increased risk for seizures, which only increases further upon admission to the hospital given their rapid medication taper.

Findings from a study of children and young adults without primary generalized epilepsy showed a fourfold increase in frequency of generalized tonic-clonic seizures between patients whose medication was tapered over four days compared to those whose medication was tapered over 10 days (Malow, Lynch, Blaxton, & Mikati, 1994). Although there is no concrete recommendation regarding length of time to wean medication in the hospital, this study highlights the unpredictability of the seizure type that a child may experience during the taper. Therefore, it is prudent for the bedside nurse to pad the child’s side rails and stock all emergency supplies at that patient’s bedside (Gilbert, Cournsell, Guin, & Snively, 2000).

From Symptoms to Supplies

Often, nurses interpret the phrase “seizure precautions” to mean that the child requires full resuscitation equipment (such as bag valve mask, suction, cardiorespiratory monitor) at his or her bedside, no matter the type of seizures experienced. Alternatively, the bedside supplies chosen might reflect the symptoms experienced and the circumstances under which the child was admitted to the hospital. As will be described, a seizure-focused algorithm can be used to determine bedside needs, with a likely cost-containment advantage (see Figure 1).

By following the algorithm, if a child has staring spells lasting five seconds and is not being weaned off anti-epileptic medications, there is no need for a bag and mask at that child's bedside because there is no risk of respiratory compromise. However, if the child has a complex-partial seizure involving staring spells, which secondarily generalizes to a tonic-clonic seizure, it is crucial to have appropriate supplies at the bedside in the event of cyanosis and/or aspiration of secretions (Pullen, 2003).

If the child has minimal motor involvement with his or her seizures and no respiratory compromise, there is again no need to have a bag and mask on hand at the bedside. However, if the child has seizures with extremity jerking and there is a potential for injury by hitting the bedrails, it would be prudent to apply seizure pads to the railings (Pullen, 2003).

Regardless of the seizure classification, if a child experiences pooling of secretions, oxygen desaturation, or extensive motor involvement (such as rhythmic jerking), there should be
necessary safety precautions in place at the bedside (bag and mask, suction, and seizure pads on the bed rails). Furthermore, if limited information is available regarding seizure classification, the bedside nurse must be prepared for any and all seizure types.

**Patient/Family Education**

A discussion of pediatric seizure precautions and bedside safety would be incomplete without addressing methods to improve patient/family education surrounding the issue. Pediatric epilepsy is a frightening diagnosis for families, and the child’s safety at home is the parents’ primary concern. The message given to parents as they observe their child’s nursing care in the hospital should be consistent with what is prescribed at home. It is contradictory to require a bag and mask and suction equipment at the hospital bedside if the family will not be provided with these supplies upon discharge. The bedside safety algorithm will eliminate this contradiction because it provides nurses with a tool to appropriately and safely care for their children without using unnecessary supplies. By thinking critically about each child and the phenotype of each specific seizure, nurses can simultaneously care for and educate children and their families about seizure safety.

Additional educational topics for children and families about seizure safety at home may include CPR and/or the administration of rescue medication (such as rectal diazepam or buccal midazolam). These can be helpful tools for the family prior to discharge because they empower parents to take their child home safely without unnecessary equipment.

**Nursing Impact**

Aside from the benefits that the algorithm has for children and their families, there is an additional benefit to staff nurses. A constant balancing act occurs between the care bedside nurses provide to their patients and the time spent in that endeavor. Frequently, nurses spend large amounts of time at the beginning of their shift collecting supplies for each patient, some of which are unnecessary. Alternatively, situations may arise in which a particular piece of equipment is needed emergently but is not at the bedside. Both of these scenarios cause anxiety and stress, and neither is efficient for the nurse nor ideal for the patient. Consulting the bedside algorithm when the child is admitted to the unit allows the nurse to anticipate what supplies that child might require during the hospitalization and to prepare for the
admission in a calm, non-emergent way. This saves time for the nurse and minimizes the risk of being unprepared for emergency situations.

Additionally, the bedside nurse should perform a test of the equipment to ensure that all supplies are properly functioning when they are placed at the patient’s bedside. This test should also be repeated at each shift change, when another nurse assumes care of the child.

**Cost-Effectiveness**

A final advantage to this algorithm is that it increases cost-effectiveness of appropriate seizure precautions. The priority for all health care providers is patient safety, and by using the bedside safety algorithm, it is possible to provide the safest care as well as eliminate the unnecessary use of resources. To reinforce the economic scope of the issue, some institutions require that every patient admitted with seizures, as well as those patients admitted to rule out a diagnosis of epileptic seizures, have a bag and mask at the bedside. In an example taken from one pediatric institution, an average of 1000 patients/year are admitted to the video EEG monitoring unit (non-ICU), all requiring a bag and mask as a part of standard admission protocol. Although many children will require the oxygen and/or ventilatory support provided by a bag and mask (and it is important that it be readily available in those situations), there are also children who will not. A patient with childhood absence epilepsy, for example, will not have respiratory compromise with seizures, and therefore, to place a bag and mask at that child’s bedside is an unnecessary use of hospital resources. Implementing the bedside seizure safety algorithm will empower nurses to think critically about their patient’s seizure activity, while at the same time, reduce hospital costs.

Throughout health care, the aim has been to make significant changes in the approach to clinical practice, with a focus on improving patient safety. Nursing education is vital to providing excellent and safe care, and it is crucial to effect change in the inpatient hospital setting.

Bedside nurses are responsible for the safety of their patients. Ensuring that the correct supplies are easily accessible in the event of an emergency is part of that responsibility. Seizure precautions are an important aspect of patient safety; however, they should not be employed indiscriminately because each patient with seizures displays different symptoms. The algorithm presented can act as a road map for staff nurses to help them think critically about their patients’ seizures, and by so doing, stock the appropriate supplies at the bedside. This thought process combines critical thinking about complex medical scenarios with the compassion and empathy for children and families for which nurses strive. By providing excellent care at the bedside, nurses ultimately empower families to feel comfortable caring for their child at home, while simultaneously conserving resources.

**References**


