

Treatment Options for Seizures in Older Adults

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Nonepileptic seizures (NES) are a frequent problem in elderly patients, resulting in part from numerous disorders that affect this population such as stroke, brain tumor, or other neurological diseases (see *Facts and Figures from the Epilepsy Foundation*). Unlike seizures in children, which arise from temporal lobe foci, seizures in older adults tend to originate in the frontal or parietal lobes. The signs and symptoms of NES include altered mentation, staring, blackouts, and confusion. In addition it is not unusual for older adults to have a simple partial seizure and present with numbness in a hand or leg.¹

Causes and Consequences of Seizure in Older Adults

Cerebrovascular disease is the most common underlying cause of seizure in older adults, although as many as 25% to 40% of new-onset seizure cases in elderly adults have no obvious underlying etiology.² Status epilepticus appears to occur more frequently in individuals older than age 60, and the morbidity and mortality of status epilepticus is significantly greater in this age group. Additional causes of seizure include neurodegenerative diseases such as Alzheimer's disease; trauma; tumors; metabolic disorders such as uremia, hyperglycemia, hypoglycemia, or hyponatremia; alcohol withdrawal; or infection.³

In comparison to younger individuals, older adults often experience a prolonged impact from the



seizure. In older adults the postictal state is prolonged in 14% of cases and may last longer than 24 hours. A 1-minute seizure, for example, can produce a postictal state that lasts for days or even a week, causing a prolonged confusional state as long as 1 to 2 weeks, temporary paralysis, or a fall. Neuropsychiatric disorders, such as depression and anxiety, are also common in elderly patients with seizures, although often underdiagnosed and inadequately treated. Seizures, therefore, can have a significant impact on quality of life among these individuals. Older adults report quality-of-life concerns about driving or transportation restrictions, role restrictions (eg, grandparenting role), employment issues, social embarrassment, and safety issues.⁴

Differential Diagnosis of Seizure

Seizure presentation in older adults may be somewhat different than that in younger individuals.² A comprehensive seizure workup is recommended; it should include a description of the event, exploration of risks and predisposing factors, and a physical examination with a special focus on neurological evaluation. Laboratory evaluation should include a complete blood count and comprehensive metabolic panel (see *Diagnosis of NES*). Additional tests can be used to further establish the diagnosis and might include magnetic resonance imaging (MRI), electroencephalograph (EEG), evaluation of drug toxicities, and cardiovascular testing (ECG, echocardiogram, or tilt-table testing). If sedation is need-

**Table 1.
Medications for Seizure Management**

Drug	Side Effects	Indication	Advantages	Disadvantages
Older Antiseizure Medications				
Phenytoin (Dilantin)	<ul style="list-style-type: none"> • Osteoporosis • Rash • Slowed thinking • Ataxia 	Partial seizure	Low Cost	Many drug interactions and food/nutrient interactions
Carbamazepine (Tegretol)	<ul style="list-style-type: none"> • Myoclonus • Osteoporosis • Rash • Hyponatremia • Sexual dysfunction • Weight gain • Tremor 	Partial seizure	Minimal sedation and cognitive adverse effects	Ataxia, diplopia, multiple drug interactions
Valproic acid (Depakene)	<ul style="list-style-type: none"> • Platelet function • Tremor • Weight gain • Hair loss 	Generalized seizures	Broad-spectrum efficacy	Extensive protein binding, multiple drug interactions

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ed for MRI testing, benzodiazepines are not recommended because these drugs can have an impact on EEG readings. Chloral hydrate is an alternative drug for sedation.

Syncope, transient ischemic attack (TIA), transient global amnesia (TGA), or vertigo commonly mimic seizure and complicate the differential diagnosis. The length of an NES episode is particularly important in the differential diagnosis. A seizure is believed to last 1 minute. Syncope, however, is briefer than a seizure and usually lasts for less than 1 minute. It also tends to be reproducible in the office setting. Conversely, a TIA lasts several minutes to hours. Like TIA, TGA typically lasts for hours rather than minutes (see *Differential Diagnosis of NES*).

Treatment Options

The decision to initiate treatment with medication for a seizure should be based on evidence of recurrent seizures, onset of seizure, or a clear structural predisposition for seizures.⁵ In particular, medication interventions probably should be initi-

Diagnosis of NES

A comprehensive seizure workup includes:

- Description of the event
- Exploration of risks and predisposing factors
- Physical examination, with focus on neurological evaluation

Laboratory evaluation includes:

- Complete blood count
- Comprehensive metabolic panel
- MRI, EEG, evaluation of drug toxicities, and ECG, echocardiogram, or tilt-table testing

Differential Diagnosis of NES

- Lasts only 1–2 minutes (TIAs: minutes to hours; TGAs: hours; syncope: <1 minute)
- Ends naturally
- Cannot be stopped
- Does not cause pain (however, muscles may be sore afterwards)
- Usually is not life threatening (extra strain on the heart, possible falls, and reduced oxygen intake may increase risk among elderly patients)

ated if the individual has seizures that impact quality of life. However, medication side effects are often greater in older adults than in young

people and can affect treatment choices and adherence.

Pharmacological interventions are the primary management of seizure

Table 1. (continued)
Medications for Seizure Management

Drug	Side Effects	Indication	Advantages	Disadvantages
Second-generation Antiseizure Medications				
Gabapentin (Neurontin)	<ul style="list-style-type: none"> • Tiredness • Pedal edema • Weight gain • Myoclonus 	Partial seizures	No hepatic metabolism; drug interaction only with antacids	Dosage modification in renal disease; TID dosing needed
Tiagabine (Gabitril)	<ul style="list-style-type: none"> • Slowed thinking • Tiredness • Encephalopathy 	Partial seizures	None	Dosage modification in liver disease
Lamotrigine (Lamictal)	<ul style="list-style-type: none"> • Prolonged half-life • Rash • Insomnia • Vomiting • Somnolence • Dizziness • Ataxia 	Partial seizures	Interaction with antiepileptic drugs only	Dosage modification in liver disease
Topiramate (Topamax)	<ul style="list-style-type: none"> • Renal stones • Slowed thinking • Renal stones • Paresthesias • Weight loss 	Partial seizures	Interaction with antiepileptic drugs only	Weight loss; dosage modification if creatinine clearance is <60 mL/min
Levetiracetam (Keppra)	<ul style="list-style-type: none"> • Tiredness • Headache • Asthenia • Behavioral changes • Dizziness 	Adjunctive therapy for partial seizures	Minimal hepatic metabolism; broad-spectrum efficacy	Weight loss; dosage modification if creatinine clearance is <80 mL/min
Felbamate (Felbatol)	<ul style="list-style-type: none"> • Psychological disturbances • Dizziness • Ataxia 	Partial seizures	Interaction with antiepileptic drugs only	Contraindicated in hepatic dysfunction or blood dyscrasias
Fosphenytoin (Cerebyx)	<ul style="list-style-type: none"> • Tiredness • Rash 	Status epilepticus	Substitute for phenytoin	Dosage modification in liver or kidney disease, dysrhythmias, cardiovascular diseases, diabetes
Oxcarbazepine (Trileptal)	<ul style="list-style-type: none"> • Tiredness • Dizziness • Headache • Hyponatremia • Nausea/vomiting 	Partial seizures	Interaction with antiepileptic drugs only	Dosage modification in kidney disease
Zonisamide (Zonegran)	<ul style="list-style-type: none"> • Confusion • Dizziness • Renal stones • Paresthesias • Weight loss 	Partial seizures	Interaction with antiepileptic drugs only	Confusion and falls in elderly patients
Pregabalin (Lyrica)	<ul style="list-style-type: none"> • Myoclonus • Pedal edema • Weight gain • Somnolence 	Partial seizures	Substitute for gabapentin	Dosage modification in kidney disease

Note: Optimal dosage is based on prevention of seizure, not on reaching therapeutic drug levels

Facts and Figures from the Epilepsy Foundation

Epilepsy is the third most common neurological disorder in the United States after Alzheimer's disease and stroke.

- Epilepsy is not a single entity but a family of more than 40 syndromes that affect 2,700,000 people in the US and 50,000,000 worldwide.
- Epilepsy strikes most often among the very young and the very old.
- The number of cases in the elderly population is beginning to soar as the baby boomers approach retirement age. Currently more than 570,000 US adults age 65 and older have epilepsy.
- Epilepsy imposes an annual economic burden of \$15.5 billion on the nation in associated healthcare costs and losses in employment, wages, and productivity.
- The mortality rate among people with epilepsy is 2 to 3 times higher than the general population and the risk of sudden death is 24 times greater.
- This year another 200,000 people in the US will be diagnosed with epilepsy and an estimated 25,000 to 50,000 will die of seizures and related causes.
- Epilepsy and its treatment produce a health-related quality of life—measured in days of activity limitation, pain, depression, anxiety, reduced vitality, and insufficient sleep or rest.
- Thirty percent to 40% of people with epilepsy are severely affected and continue to have seizures despite treatment.
- Epilepsy in seniors may be caused by many conditions that affect the brain, such as stroke, head injuries from falls, chronic alcoholism, heart disease, previous brain surgery, infections affecting the brain, high blood pressure, brain tumors, and Alzheimer's disease.

Source: Epilepsy Foundation (www.epilepsyfoundation.org)

disorders, and treatment choices are generally based on the seizure type, the individual's known comorbidities, and drug side effects^{3,6} (Table 1). Drug therapy is proven to be effective for older adults. Stephen and colleagues⁷ noted that among 117 older patients with evidence of seizure, 62% became seizure-free for at least 12 months on their first prescribed antiepilepsy drugs (AEDs), whereas 26% failed to respond, and 12% did not tolerate the treatment. Following pharmacological manipulation, 79% of patients attained remission, 93% on monotherapy and 7% on 2 or more drugs. No individual drug was more likely to confer seizure freedom than any other. Patients attaining remission were more likely to have had fewer pretreatment seizures than those who did not obtain full seizure control.

The second-generation AEDs—gabapentin (Neurontin), lamotrigine (Lamictal), oxcarbazepine (Trileptal), levetiracetam (Keppra), pregabalin (Lyrica), tiagabine (Gabitril), and topiramate (Topamax)—are generally recommended over the older AEDs.⁸ Despite these recommendations, older AEDs such as phenytoin (Dilantin), valproate (Depakote), and carbamazepine (Tegretol) are the most commonly prescribed treatment options.^{9,10} The specific risks and challenges of these drugs, especially when used in older adults, are related to drug metabolism changes that occur with increasing age, increased likelihood of drug-drug interactions among patients who take multiple other drugs, and serum drug level limits that do not necessarily apply in older adults because they were developed in younger individuals.¹

For institutionalized older adults, diazepam (Valium), administered as a buccal squirt or rectal suppository, provides immediate treatment of seizures. Decisions on drug use must be made based on individual needs and side-effect profiles.

The guideline for drug dosing is to start low and monitor drug effectiveness in preventing seizures. Extended-release formulations may be helpful in improving drug adherence. Consideration can be given to stopping medication if the patient is free of seizures for 2 to 5 years.

Overall, the evaluation and treatment of seizures in older adults should be geared toward helping these individuals obtain and maintain optimal quality of life through seizure elimination, balanced with tolerance of the medication. **ALC**

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