

Review Article

Falls in the geriatric population with epilepsy: a narrative review

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ABSTRACT

Epilepsy is a common neurological disorder in older adults, with incidence rising significantly after 60 years of age. Falls represent a major source of morbidity and mortality in this population and occur more frequently in individuals with epilepsy than in age-matched controls. The increased risk is multifactorial, resulting from seizure-related events, adverse effects of antiseizure medications (ASMs), and age-related physiological changes such as impaired balance, frailty, cognitive decline, and comorbidities. Seizures may directly precipitate falls through loss of consciousness, impaired awareness, and postictal confusion, while ASMs contribute via dizziness, sedation, ataxia, and visual disturbances. Evidence from systematic reviews demonstrates a clear association between ASM use and increased fall risk in older adults. Fall-related injuries, including fractures and traumatic brain injury, lead to functional decline, reduced independence, and increased healthcare utilization. Effective management requires a multidisciplinary approach focused on optimizing seizure control, minimizing medication-related adverse effects, improving balance and mobility, and addressing environmental hazards. Early identification of high-risk individuals and implementation of targeted preventive strategies are essential to reduce fall-related complications and improve clinical outcomes in the geriatric epilepsy population.

Keywords: Epilepsy, Older adults, Falls, Antiseizure medications, Fractures

INTRODUCTION

Falls are a leading cause of injury, disability, hospitalization, and mortality among older adults and represent a major global public health concern. Approximately 28–35% of individuals aged 65 years and older experience at least one fall annually, with incidence increasing further in advanced age groups. Fall-related injuries, including fractures and traumatic brain injury, contribute substantially to functional decline, loss of independence, increased healthcare utilization, and reduced quality of life. Globally, the burden of falls continues to rise, driven largely by population aging and increasing life expectancy.^{1,2}

Epilepsy is one of the most common neurological disorders in older adults, and its incidence increases markedly after the age of 60 years. Owing to the rapid growth of the aging population and improved survival of individuals with chronic neurological diseases, the number of older adults living with epilepsy is expected to increase substantially in the coming decades. Cerebrovascular disease, neurodegenerative disorders, brain tumors, traumatic brain injury, and metabolic disturbances are among the most common causes of new-onset epilepsy in this age group.³

Older adults with epilepsy are at a considerably greater risk of falls than age-matched individuals without epilepsy.

This increased risk is multifactorial and results from the combined effects of seizures, adverse effects of antiseizure medications (ASMs), and age-related physiological changes. Seizure-related loss of consciousness, impaired awareness, postictal confusion, and motor manifestations may directly precipitate falls, whereas ASM-related adverse effects such as dizziness, ataxia, sedation, blurred vision, and impaired coordination further compromise balance and gait. Frailty, sarcopenia, osteoporosis, cognitive impairment, visual deficits, cardiovascular disease, and polypharmacy further increase the likelihood of falls and fall-related injuries in this vulnerable population.⁴

The consequences of falls in older adults with epilepsy extend beyond physical injury. Hip fractures, traumatic brain injury, fear of falling, prolonged hospitalization,

institutionalization, and increased mortality contribute significantly to functional decline and diminished quality of life. Despite these serious consequences, fall prevention remains an underrecognized component of epilepsy management, and most clinical care continues to focus primarily on seizure control (Figure 1).⁵

This narrative review summarizes the current evidence on the epidemiology, mechanisms, risk factors, clinical consequences, assessment, management, and prevention of falls in the geriatric population with epilepsy. It also highlights practical strategies for identifying individuals at high risk and emphasizes the importance of a multidisciplinary approach to reduce fall-related morbidity, preserve functional independence, and improve long-term clinical outcomes.

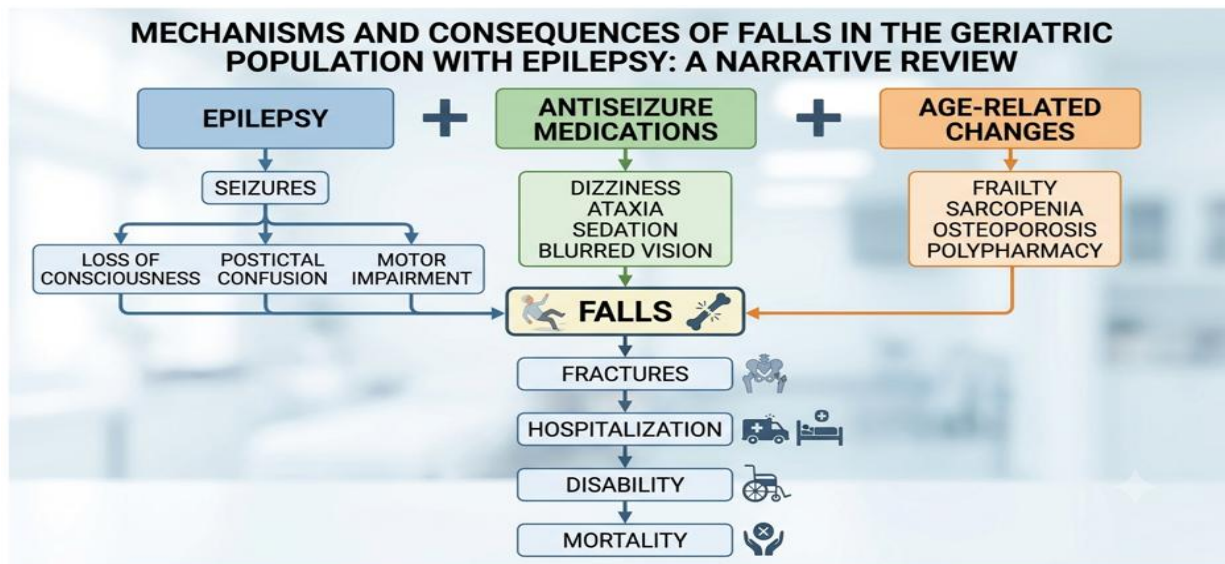


Figure 1: Mechanisms contributing to falls in older adults with epilepsy.⁵

LITERATURE SEARCH STRATEGY

This narrative review was based on literature retrieved from PubMed, Scopus, Web of Science, and Google Scholar. Articles published in English between 2005 and 2025 were searched using combinations of the keywords "epilepsy," "older adults," "elderly," "falls," "fall risk," "antiseizure medications," and "fractures." Relevant systematic reviews, clinical guidelines, observational studies, and narrative reviews were included based on their relevance to the topic.

EPIDEMIOLOGY

Epilepsy is one of the most common neurological disorders in older adults, with its incidence increasing markedly after the age of 60 years. Although epilepsy has a bimodal age distribution, the highest incidence of newly diagnosed epilepsy occurs in late adulthood, largely due to

cerebrovascular disease, neurodegenerative disorders, traumatic brain injury, brain tumors, and metabolic abnormalities. As the global elderly population continues to grow, the burden of geriatric epilepsy is expected to increase substantially.⁶

Falls are a major cause of injury, disability, hospitalization, and mortality among older adults. Approximately one in three individuals aged 65 years or older experiences at least one fall annually, and the risk increases with advancing age. Older adults with epilepsy are particularly vulnerable because seizures, postictal confusion, impaired balance, and gait disturbances substantially increase the likelihood of falling.⁷ Antiseizure medications (ASMs) further contribute to fall risk through adverse effects such as dizziness, ataxia, sedation, blurred vision, and impaired coordination.⁸ Fall-related injuries in elderly patients with epilepsy commonly include fractures, traumatic brain injury, prolonged

hospitalization, functional decline, and loss of independence. These findings highlight the importance of incorporating fall-risk assessment and preventive strategies into the routine management of older adults with epilepsy.⁹

ETIOLOGY AND RISK FACTORS

Falls in older adults with epilepsy arise from the interaction of neurological, pharmacological, systemic, and environmental determinants, with cumulative effects increasing vulnerability to injury. Seizure-specific characteristics play a central role. Events involving abrupt motor activity, transient neurological deficits, or postictal states can impair protective reflexes and spatial orientation, predisposing individuals to sudden instability and recurrent falls. Greater seizure frequency and longer disease duration further amplify this risk.¹⁰

ASMs also play an important role in increasing fall risk. Older adults are particularly susceptible to adverse drug effects because of age-related changes in drug metabolism and the presence of multiple comorbidities. Common adverse effects of ASMs, including dizziness, ataxia,

sedation, blurred vision, impaired coordination, and orthostatic hypotension, can adversely affect balance and gait. A systematic review reported that ASM use was associated with an increased risk of falls, with relative risks ranging from 1.29 to 1.62 and odds ratios ranging from 1.75 to 6.20 among older adults.¹¹

Several age-related factors further contribute to fall risk. Frailty, sarcopenia, osteoporosis, impaired vision, cognitive decline, peripheral neuropathy, reduced muscle strength, and balance disorders are common in older adults with epilepsy. Polypharmacy and chronic medical conditions, particularly stroke, Parkinsonism, diabetes mellitus, and cardiovascular disease, further impair mobility and increase susceptibility to falls.¹²

Environmental factors such as poor lighting, slippery floors, loose rugs, uneven walking surfaces, inadequate handrails, and inappropriate footwear may precipitate falls, particularly in individuals with impaired mobility or postictal confusion. Identification and modification of these risk factors are essential components of comprehensive fall prevention in older adults with epilepsy (Tablet 1).^{13,14}

Table 1: Risk factors for falls in older adults with epilepsy

Category	Examples
Seizure-related	Generalized tonic-clonic seizures, impaired awareness, postictal confusion
Medication-related	Polytherapy, dizziness, ataxia, sedation
Patient-related	Frailty, sarcopenia, osteoporosis
Comorbidities	Stroke, Parkinsonism, diabetes
Environmental	Poor lighting, slippery floors

CLINICAL CONSEQUENCES

Falls in older adults with epilepsy are associated with significant physical, psychological, and socioeconomic consequences. Compared with older adults without epilepsy, they are more likely to sustain serious injuries because seizures, impaired balance, and antiseizure medication (ASM)-related adverse effects increase both the frequency and severity of falls.^{15,16} Fall-related injuries commonly include fractures, particularly hip and wrist fractures, traumatic brain injury, soft tissue injuries, and intracranial hemorrhage. Hip fractures are associated with prolonged hospitalization, loss of mobility, functional decline, institutionalization, and increased mortality in older adults. Chronic use of some ASMs may further increase fracture risk by reducing bone mineral density and promoting osteoporosis. Beyond physical injuries, recurrent falls often lead to fear of falling, anxiety, depression, reduced physical activity, and social isolation. These psychological effects contribute to reduced quality of life, loss of confidence, and increased dependence on caregivers for daily activities. Recurrent falls also increase healthcare utilization through emergency department

visits, hospital admissions, rehabilitation, and long-term care placement, resulting in a substantial economic burden. Given these serious consequences, early identification of high-risk individuals and implementation of comprehensive fall-prevention strategies should be considered an integral component of epilepsy management in older adults.^{17,18}

DIAGNOSIS AND FALL RISK ASSESSMENT

Evaluation of falls in older adults with epilepsy should focus on identifying both seizure-related and non-seizure-related causes. A detailed history should include the circumstances of the fall, seizure characteristics, loss of consciousness, postictal confusion, medication history, previous falls, comorbidities, and environmental hazards. A comprehensive physical examination should assess gait, balance, muscle strength, vision, cognition, cardiovascular status, and neurological deficits. Medication review is an essential component of fall-risk assessment. Older adults frequently receive multiple medications, and ASMs may contribute to falls through adverse effects such as dizziness, sedation, ataxia, blurred vision, and orthostatic

hypotension. Regular review of medication type, dosage, drug interactions, and treatment adherence is therefore recommended.¹⁹ Several clinical tools are available to assess mobility and fall risk. The Timed Up and Go (TUG) test is one of the most commonly used screening tests. It evaluates functional mobility by measuring the time required for an individual to stand from a chair, walk 3 meters, turn around, return, and sit down. In addition to the TUG test, gait speed, the Berg Balance Scale, Functional Reach Test, and single-leg stance may be incorporated into a comprehensive assessment. However, no single test should be used in isolation, and these tools should be interpreted alongside clinical history and physical examination.²⁰ Laboratory and imaging investigations should be guided by clinical findings. Complete blood count, serum glucose, electrolytes, vitamin D levels, and renal and hepatic function tests may help identify reversible causes of falls. Brain imaging and electroencephalography should be considered when recurrent seizures, head injury, or new neurological deficits are suspected. Bone mineral density assessment is recommended in older adults receiving long-term ASM therapy because of the increased risk of osteoporosis and fractures.²¹

MANAGEMENT

The management of falls in older adults with epilepsy requires a multidisciplinary approach aimed at optimizing seizure control, reducing fall risk, and preventing fall-related injuries. Treatment should begin with identification and correction of reversible risk factors while maintaining adequate seizure control. An individualized management plan involving neurologists, geriatricians, physiotherapists, pharmacists, and caregivers is recommended.²² Optimization of antiseizure medication (ASM) therapy is a key component of management. Older adults are more susceptible to adverse drug effects because of age-related changes in drug metabolism and the frequent presence of multiple comorbidities. ASMs should therefore be initiated at low doses and titrated gradually, with regular review of drug interactions and adverse effects. Newer ASMs with favorable tolerability profiles are generally preferred when clinically appropriate. Polypharmacy should be minimized whenever possible to reduce dizziness, sedation, and gait instability.²³ Management should also include treatment of associated

medical conditions that contribute to falls. Visual impairment, orthostatic hypotension, cardiovascular disease, osteoporosis, vitamin D deficiency, diabetes, and cognitive impairment should be identified and appropriately managed. Patients receiving long-term ASM therapy should undergo periodic assessment of bone health, and calcium and vitamin D supplementation may be considered in individuals at risk of osteoporosis or fractures.^{24,25} Physical rehabilitation plays an important role in improving mobility and reducing fall risk. Balance training, muscle-strengthening exercises, gait training, and supervised physiotherapy improve functional performance and confidence in older adults. Assistive devices such as walking sticks or walkers may be beneficial for selected patients with gait instability. Patient and caregiver education is an essential component of management. Education should include medication adherence, seizure first aid, recognition of seizure triggers, home safety measures, and the importance of reporting recurrent falls. Regular follow-up allows reassessment of seizure control, medication tolerability, and fall risk, thereby improving long-term outcomes in older adults with epilepsy.²⁶

PREVENTION OF FALLS

Effective fall prevention in older adults with epilepsy requires an individualized and multifaceted approach integrated into routine care. Optimization of antiseizure medication (ASM) therapy is essential, including regular review, dose adjustment, and minimizing polypharmacy to reduce drug-related adverse effects. Maintaining adequate seizure control remains a key preventive priority.²⁷ Structured exercise interventions, particularly balance training, muscle strengthening, and gait rehabilitation, improve stability and functional capacity, thereby reducing fall risk. Selected patients may benefit from assistive devices to enhance mobility and safety. Environmental risk reduction is equally important and includes improving home safety through adequate lighting, removal of hazards, and installation of supportive features such as handrails. Routine assessment of vision, hearing, and comorbid conditions further supports prevention efforts.²⁸ Additionally, maintaining bone health through appropriate screening and supplementation strategies helps reduce fracture risk. Education of patients and caregivers plays a critical role in promoting adherence, awareness, and long-term safety.

Table 2: Strategies for fall prevention in older adults with epilepsy

Interventions	Benefits
Optimize ASM therapy	Reduces medication-related falls
Balance training	Improves gait stability
Home modification	Reduces environmental hazards
Vitamin D and calcium	Improves bone health
Physiotherapy	Improves mobility
Caregiver education	Improves adherence and safety

CONCLUSION

Falls represent a significant yet often underrecognized complication in older adults with epilepsy, contributing to injury, functional decline, and increased healthcare burden. Evidence indicates a clear association between antiseizure medication use and elevated fall risk in this population. Effective prevention requires integrated care focusing on individualized risk assessment, medication optimization, rehabilitation, and environmental safety. A coordinated multidisciplinary approach is essential to improve outcomes and preserve independence. Future research should prioritize the development of epilepsy-specific risk prediction models and targeted preventive strategies supported by large prospective studies.

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