

# Chapter 18

## Epilepsy in Older Adults

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### Case Presentation

A 75-year-old female is seen in the emergency department (ED) due to a subacute onset of severe back pain. The pain is centered in the mid-thoracic area of the back without radiation and is easily exacerbated by movement. She is an established patient and has a history of localization-related epilepsy with recurrent focal seizures. The seizures were caused by a previous stroke that occurred almost a decade ago. The typical seizure manifests as a generalized convulsion. In the past, they had been sporadic and had occurred in both the day and nighttime. The patient also reports persistent imbalance and a feeling of chronic dizziness. She has been adherent to her current dosage of phenytoin taken as directed by her neurologist. She is taking 300 mg per day with a recent serum level of 10 mg/dl. The patient had been on a higher dose of phenytoin in the past but complained that she experienced significant problems with her balance. In the ED, following clinical assessment, a radiograph of the thoracic spine was performed. The interpretation suggested a compression deformity in the appropriate area. An MRI is performed and reveals the following (Fig. 18.1):

### Clinical Questions

1. What does the radiograph show?
2. How should dosing and titration of antiseizure drugs be performed in older individuals?
3. Should certain antiseizure drugs be avoided?

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**Fig. 18.1** MRI of the thoracic spine demonstrating a compression fracture at T8 with evidence of edema reflecting the subacute onset (*arrow*)



4. What does a serum level of 10 mg/dl of phenytoin in this patient suggest about their therapeutic level?
5. What are the implications for bone health in older patients on certain antiseizure drugs?

## Diagnostic Discussion

1. The X-ray demonstrates a compression fracture of the thoracic spine (see arrow in figure). This is likely a result of a pathologic compression fracture as the result of a seizure, given the thoracolumbar location of the abnormality. Individuals with epilepsy, particularly older women, often have a particular predilection towards bone fractures due to osteopenia and osteoporosis. This needs to be considered when treating seizures in all ages, as enzyme-inducing antiseizure drugs (ASDs) such as phenytoin can markedly increase the risk of osteoporosis in patients with epilepsy.
2. When initiating any antiepileptic drug in an older patient with epilepsy, it is important to observe the adage of “go slow and low” when using ASDs. If the dose of ASDs, as well as other medications, is increased too quickly, neurological adverse effects such as ataxia, dizziness, gastrointestinal upset, and cognitive issues will often make the drug intolerable due to side-effects, leading to poor patient adherence or facilitating other medical comorbidities such as falls, weight loss, and memory impairment.
3. Although there are no absolute contraindications to using any of the ASDs in older adults, there are some general caveats. Phenytoin is particularly problematic for the older adult patients and should probably be avoided. This AED often

causes imbalance, increases the risk for osteoporosis, and may lead to cardiac conduction problems. Moreover, there are limitations with respect to regulating serum drug concentrations, a number of drug–drug interactions that are associated with its use. This can make the management of the older adult with epilepsy taking phenytoin quite complex and difficult. Newer ASDs without these difficulties now exist, which permit far better options in selecting an AED.

4. Most laboratory serum levels drawn to assess concentrations of antiseizure drugs are based on younger age groups. The fact that this older patient had a serum level of 10  $\mu\text{g}/\text{dl}$  does not imply that it will be effective or devoid of side-effects. Due to slower metabolic function and delayed renal clearance, serum levels in older adults must be judged in the context of the clinical setting. For example, a patient with a serum phenytoin level of 10  $\mu\text{g}/\text{dl}$  may report significant adverse effects and appear “toxic.” A low total serum concentration may be due to low protein binding or due to drug–drug interactions involving ASDs and non-ASDs. Judging the clinical impact of the AED chosen is most important as opposed to simply adhering to a numerical level.
5. Phenytoin as well as other enzyme-inducing antiseizure drugs can increase the risk factors of osteoporosis in both younger and older adults. Agents such as phenytoin, phenobarbital, primidone, carbamazepine, among other weaker enzyme-inducing antiepileptic agents (i.e., topiramate and oxcarbazepine) may lead to a greater risk of osteopenia and osteoporosis. The mechanism is either through interacting with vitamin D absorption or metabolism preventing calcium absorption or utilization or by other mechanisms that are yet to be identified. Understanding these relationships is important in selecting an AED in older adults with favorable pharmacokinetics such as levetiracetam or lamotrigine that may be effective but that is less likely to produce similar complications.

## Clinical Pearls

1. Seizure incidence becomes more likely with age due to other associated neurologic conditions that are commonly encountered during the process of aging. Stroke is the most common cause of first seizures in people under 60 years of age, although other symptomatic causes including dementia also become notable comorbidities.
2. It is essential that one use lower doses and slower titration to avoid adverse effects. Adverse effects are the most common cause of problems in the older adults, as these individuals tend to be on multiple medications.
3. Choosing medications with the fewest drug–drug interactions and daily or twice daily dosing are good choices for an older adult, given the prevalence of poly-pharmaceutical uses in addition to issues of impaired cognition and the risk of cumulative adverse effects.
4. Enzyme-inducing antiseizure drugs should be avoided in older adults, given the risk of osteoporosis, gait instability, and the risk of pathological fractures.

5. Serum levels in older adults must be judged within the context of the patient's clinical presentation. A "normal" serum AED level does not confirm the absence of clinical toxicity.

## **Bibliography**

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