Epilepsy is a neurologic disorder that causes hyperexcitability of the neurons and subsequent seizure activity that ranges from mild alterations in consciousness and muscle twitching to severe tonic-clonic muscle activity, respiratory symptoms, and even death. According to the National Institute of Neurological Disorders and Stroke, approximately 2 million people in the United States have experienced a seizure or been diagnosed with epilepsy. Fortunately, approximately 70% of those affected by epilepsy experience a significant improvement of or even complete cessation of seizures when appropriate therapy with anti-epileptic drugs (AEDs) is maintained.

How do AEDs work?
AEDs work three main ways. Some decrease the rate at which sodium enters the cell, others inhibit calcium flow into cells, and some increase the effect of the inhibitory neurotransmitter gamma-aminobutyric acid (GABA). The specific medication prescribed is based on the type of seizures the patient experiences because some drugs are effective against certain types of seizures, whereas others aren’t. Drug selection is based on not only the type of seizure being treated, but also adverse effects, whether monotherapy or combination therapy is needed, dosage forms available, cost, and pregnancy risk/goals.

After AED treatment is started, dosages typically begin low and are adjusted slowly until the desired effect is reached. If the prescribed AED isn’t effective, three drugs are usually trialed before initiating combination therapy. Sometimes after a patient remains seizure-free for a period of time, usually a year or more, the healthcare provider may determine that the medications can be stopped. When this happens, the medications are tapered, one at a time, over a period of months.

There are some key points you should be aware of when a patient is beginning therapy with an AED. Let’s take a closer look.

Be aware of these adverse reactions
Although all AEDs have some adverse reactions, the most common ones for this group of drugs include fatigue, dizziness, weight gain, loss of bone density, skin rashes, loss of coordination, and speech problems. All adverse reactions should be discussed with the healthcare provider. This is especially important during dosage adjustments because an increase in dosage often leads to an increase in adverse reactions. Skin rashes should be discussed with the healthcare provider immediately because they may indicate a life-threatening skin disease called Stevens-Johnson syndrome that’s brought on by an adverse drug reaction. Many adverse reactions may present initially but lessen over time; others, such as bone loss and gingival hyperplasia (overgrowth of gum tissue), will increase the longer the drug is used.

It’s important for your patient to discuss all prescribed and over-the-counter medications with the healthcare provider because many drugs affect the efficacy of AEDs. For example, the herbal supplement evening primrose may cause worsening of seizures. Additionally, alcohol should be avoided because of the risk of central nervous system depression. Newer AEDs typically cause fewer adverse reactions, a decrease in the
need for serum drug testing, decreased dosages, and fewer drug interactions. For a list of commonly prescribed AEDs, their potential adverse reactions, and nursing interventions see All about AEDs.

**General rules for all AEDs**

Nursing instruction is very important when working with patients who are on AED therapy and may lead to an increase in compliance and better outcomes.

First, teach your patients to take medications on a regular schedule and to avoid stopping their prescribed AEDs without first consulting with their healthcare provider. Compliance is imperative in preventing seizures and some adverse reactions. According to the Epilepsy Foundation, up to 50% of patients forget or fail to take their medications as prescribed. Many factors may influence compliance, including adverse reactions, costs, lack of social support, and confusion related to the regimen. Encourage patients to establish a routine for compliance. Strategies such as the use of pillboxes, setting alarms, and cuing (such as placing the medication by a toothbrush) can increase success of seizure control.

Many AEDs require monitoring for therapeutic blood levels to prevent seizure activity. Patients must also have their kidney and liver function monitored because many medications can impact these organs. To detect blood dyscrasias, such as aplastic anemia, patients should have routine complete blood cell counts performed. Instruct your patients to keep all appointments for blood work.

Many patients taking AEDs complain of nausea. If gastrointestinal (GI) upset occurs, encourage patients to take the medication with food or milk, unless contraindicated, and to eat several small meals during the day. Typically, nausea decreases over time. If constipation occurs, encourage patients to increase fluids and fiber in their diet and to exercise. Patients may require a daily stool softener if nonpharmacologic actions don’t alleviate the problem.

Because bone loss with long-term AED therapy is common, it’s also important to encourage your patients, especially women, to increase calcium intake and begin an exercise regimen that includes weight-bearing exercises to prevent bone loss. Foods such as milk, cheese, yogurt, and spinach should be increased and patients will likely need a calcium supplement at a dosage recommended by their healthcare provider. Patients may also need a vitamin D supplement and should be encouraged to get adequate sunlight. Provide your patients with teaching materials to guide them in their dietary choices.

Most AEDs cause dizziness, drowsiness, or confusion, so warn your patients not to drive or operate heavy machinery until the effects of the drug are known. Most states require patients to be seizure-free for a designated time before they’re able to drive a vehicle. Assist patients in planning for transportation needs during this time.

All AEDS are considered to be teratogenic, so women should report immediately if they plan to become pregnant or are pregnant. For patients taking AEDs who are pregnant, folic acid may help decrease the risk of some birth defects. Women should be counseled to use barrier contraceptives because some AEDs may decrease the effectiveness of oral contraceptives. However, the healthcare provider may deem it acceptable to use oral contraceptives.

If your patient is taking a suspension of an AED, instruct him to shake the bottle well to distribute the drug evenly for administration. Calibrated cups should be used so that the exact medication dosage is delivered. Teach patients that drugs shouldn’t be changed between generic and name brand formulations because of the risk of pharmacokinetic differences that may cause alterations in metabolism. This could lead to decreased or increased serum drug levels.

**Age-related concerns**

Children are very susceptible to the sedating effects of AEDs, and these adverse reactions...
## All about AEDs

<table>
<thead>
<tr>
<th>Drug</th>
<th>Indications</th>
<th>Common adverse reactions</th>
<th>Nursing considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Drugs that decrease sodium influx</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| phenytoin       | Tonic-clonic and status epilepticus| Headache, diplopia, confusion, dizziness, ataxia, slurred speech, rash, anorexia, nausea, vomiting, discolorated urine, depression, hirsutism, pink urine | • Maintain therapeutic drug level between 10 and 20 mcg/mL.  
• Instruct patient to seek dental care and brush and floss teeth regularly to help decrease gingival hyperplasia.  
• Encourage weight-bearing exercise and increased calcium intake to prevent osteoporosis.  
• Withhold gastric feedings 30 to 60 minutes before and after administration due to protein binding. |
| fosphenytoin*   | Primarily status epilepticus; prophylaxis for neurosurgery | Nystagmus, ataxia, dizziness, hypotension, pruritis, nausea | • For short-term use.  
• Injection only dosage is based on phenytoin equivalents to facilitate transfer from phenytoin.  
• Don’t confuse with celecoxib or citalopram.  
• Monitor cardiac rhythm and BP during administration and after. |
| carbamazepine   | Tonic-clonic and mixed             | Drowsiness, ataxia, dizziness, nausea, vomiting, hepatitis                                | • Maintain therapeutic drug level between 5 and 12 mcg/mL.  
• Fatal reaction may occur if combined with monoamine oxidase inhibitors.  
• Also used for mood disorders and neuralgia. |
| oxcarbazepine*  | Partial                           | Headache, dizziness, confusion, hypotension, blurred vision, diplopia, nausea, diarrhea, constipation, urinary frequency | • Monitor serum sodium levels for hyponatremia. |
| valproic acid   | Absence                           | Sedation, drowsiness, GI upset, diarrhea or constipation                                 | • Maintain therapeutic drug level between 50 and 100 mcg/mL.  
• Don’t crush tablets or capsules.  
• Also used in mood disorders and neuralgia. |
| levetiracetam*  | Partial and myoclonic             | Drowsiness, dizziness, fatigue, double vision                                            | • Few adverse reactions are linked to this drug.  
• Risk of toxic effects increases with renal dysfunction. |
| lamotrigine*    | Partial and generalized           | Dizziness, headaches, diplopia, blurred vision, GI upset, abdominal pain, dysmennorhea   | • Also used in mood disorders.  
• Has been associated with Stevens-Johnson syndrome. |
| **Drugs that decrease calcium influx** |                                    |                                                                                          |                                                                                                                                                        |
| ethosuximide    | Absence                           | GI upset                                                                                  | • Maintain therapeutic drug level between 40 and 100 mcg/mL. |
| zonisamide*     | Partial                           | Drowsiness, dizziness, ataxia, fatigue                                                    | • Contraindicated if sensitive to sulfonamides.  
• Monitor for renal stones and increase fluid intake to prevent their development. |

(Continued...)
can affect their learning. Instruct parents or caregivers to monitor closely for delays in development or changes in performance at school, and report these to the healthcare provider. Dosage or medication choice may be adjusted to alleviate these issues.

Older adults may also experience more severe adverse reactions to AEDs and may require dosage decreases. They’re also more prone to kidney and liver impairment from long-term use of AEDs, so blood work should be monitored closely. Instruct older adults to wear a medical-alert bracelet in case of emergencies.

Encouraging success
When used as prescribed, AEDs can provide relief from seizures for the majority of your patients. Medication compliance is key to the management of epilepsy, and many strategies can be implemented to improve patient compliance. You play an integral role in educating and supporting patients undergoing AED therapy.

Learn more about it

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