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NEUROLOGY BOARD REVIEW MANUAL

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Update on Antiseizure Drugs: Case Studies

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I. INTRODUCTION

Antiseizure drugs (ASDs) are mainstays of therapy for most of the approximately 2 million patients with epilepsy in the United States. As with treatments for other neurologic conditions, ASDs must be taken on a daily basis, typically for years. Short- and long-term adverse drug effects are therefore of critical importance: A drug that causes drowsiness or dullness on a daily basis is not helpful, even if the agent is completely effective in preventing seizures.

During the past 8 years, 8 new ASDs have been approved by the U.S. Food and Drug Administration (FDA). Also available are 2 new intravenous preparations of existing ASDs. These important advances have expanded treatment options for patients with epilepsy; however, the sheer number of such agents often makes distinguishing between them difficult for many neurologists, particularly members of practices who do not focus solely on treating epilepsy. New ASDs differ considerably in indication, effectiveness for various seizure types, adverse effects, and pharmacology. Furthermore, new ASDs generally differ from older ASDs because of a broader spectrum of action, more diverse mechanisms, and fewer or no drug–drug interactions. **Table 1** lists agents that have been approved since 1993. An overall listing of drugs effective in various seizure types is given in **Table 2**. This review highlights distinguishing

characteristics among new ASDs and their differences from conventional ASDs. However, use of these agents is expanding rapidly, and FDA indications often do not describe all appropriate uses.

II. SELECTION OF AN ANTISEIZURE DRUG: GENERAL PRINCIPLES

TYPE OF AGENT

The first and most important part of choosing an ASD is checking its appropriateness for the type of seizure the patient is experiencing. Several drugs are effective only against partial seizures (simple, complex, or secondarily generalized; *see* Table 2). All of these ASDs are also effective against primary generalized tonic-clonic seizures. Many agents in this group block rapid firing of voltage-sensitive sodium channels (*see* Section V. “Characteristics of Specific Antiepileptic Drugs”). Other ASDs are “broad-spectrum” drugs that seem to be effective against many seizure types. Many broad-spectrum agents have multiple mechanisms of action, including enhancement of gamma-aminobutyric acid (GABA)-ergic transmission, inhibition of excitatory transmission (α -amino-3-hydroxy-5-methyl-4-isoxazolepropionate [AMPA] or kainate receptor mediated), or blockade of sodium channels.

Despite the existence of broad-spectrum ASDs,