Antiepileptic Drug

Goal

The goal of antiepileptic drugs (AEDs) is seizure control (a contentious term, usually taken as reduction of seizure frequency and severity to the point of permitting the patient to live a normal lifestyle without epilepsy-related limitations) with minimal or no drug toxicity. ≈ 75% of epileptics can achieve satisfactory seizure control with medical therapy [1)]

Outcome

see Antiepileptic drug treatment outcome.

First-line treatment for epilepsy is antiepileptic drug and requires an interdisciplinary approach and enduring commitment and adherence from the patient and family for successful outcome.

Most patients will respond to one or two different medication trials. In up to one third of patients with epilepsy, medications alone will be unable to eliminate seizures, or cause unacceptable adverse effects. In these patients, work up for the feasibility of epilepsy surgery is considered.

Although many patients have seizure control using a single medication, others require multiple medications, resective surgery, neuromodulation devices or dietary therapies.

Elucidating the mechanism of selective regulation of different aquaporins (AQPs) and associated regulatory proteins may provide a new therapeutic approach to epilepsy treatment [2)].

Antiepileptic drugs (AEDs) remain the primary treatment strategy to suppress seizure activity, but do not address the underlying neuropathological process. While surgical intervention— such as neuromodulation or resection— is an option for some of these patients, many require long-term AEDs for seizure control [3)].

Conventional antiepileptic drugs suppress the excessive firing of neurons during seizures. In drug-resistant patients, treatment failure indicates an alternative important epileptogenic trigger.

Anticonvulsants (also commonly known as antiepileptic drugs or as antiseizure drugs) are a diverse group of pharmaceuticals used in the treatment of epileptic seizures.

Anticonvulsants are also increasingly being used in the treatment of bipolar disorder, since many seem to act as mood stabilizers, and for the treatment of neuropathic pain.

Anticonvulsants suppress the rapid and excessive firing of neurons during seizures. Anticonvulsants also prevent the spread of the seizure within the brain. Some investigators have observed that anticonvulsants themselves may cause reduced IQ in children.

However these adverse effects must be balanced against the significant risk epileptic seizures pose to children and the distinct possibility of death and devastating neurological sequelae secondary to seizures. Anticonvulsants are more accurately called antiepileptic drugs (abbreviated “AEDs”), and

are often referred to as antiseizure drugs because they provide symptomatic treatment only and have not been demonstrated to alter the course of epilepsy.

There is increasing emphasis on untangling the interactive forces of new antiepileptic medications from epilepsy/seizures on the neurophysiological, neuropsychologic and psychiatric/behavioral functioning of individuals with epilepsy. The role of GABA in the pathophysiology of seizures and status epilepticus has led to novel therapy proposals.

Anti-epileptic drugs (AEDs) are the main form of treatment for people with epilepsy. And up to 70% (7 in 10) people with epilepsy could have their seizures completely controlled with AEDs. There are around 26 AEDs used to treat seizures, and different AEDs work for different seizures. Here we explain what the different AEDs are, what type of seizures or epilepsy they are used for, as well as some essential information about average doses and common side effects.

There are three ways you can search for information about AEDs:

by the generic name of the AED by the brand name of the particular type of AED or by the type of seizure or seizures you have.

Classification

Antiepileptic drug classification.

Indications

Absence seizures (including typical and atypical absences): Acetazolamide | Clonazepam | Ethosuximide | Lamotrigine | Sodium valproate

Atonic seizures: Phenobarbital | Phenytoin | Primidone | Sodium valproate

Catamenial seizures (menstrual-related): Acetazolamide | Clobazam

Cluster seizures: Clobazam

Episodic disorders: Acetazolamide

Dravet syndrome (severe myoclonic epilepsy in infancy or SMEI): Stiripentol

Focal (partial) seizures: Acetazolamide | Carbamazepine | Clobazam | Clonazepam | Eslicarbazepine acetate | Gabapentin | Lacosamide | Lamotrigine | Levetiracetam | Oxcarbazepine | Perampanel | Phenobarbital | Phenytoin | Pregabalin | Primidone | Retigabine | Sodium valproate | Tiagabine | Topiramate | Vigabatrin | Zonisamide

Focal (partial) seizures with secondary generalisation: Gabapentin | Lacosamide | Levetiracetam | Perampanel | Phenobarbital | Phenytoin | Pregabalin | Primidone | Retigabine | Sodium valproate | Tiagabine | Topiramate | Vigabatrin | Zonisamide

Focal seizures with secondary generalised tonic clonic seizures: Carbamazepine | Eslicarbazepine acetate | Lamotrigine | Oxcarbazepine

Infantile spasms: Nitrazepam | Sodium valproate | Vigabatrin

Juvenile Myoclonic Epilepsy (seizures related to): Levetiracetam

Lennox-Gastaut syndrome (seizures related to): Lamotrigine | Rufinamide | Topiramate

Menstrual-related (catamenial seizures): See: Catamenial seizures (above)

Myoclonic seizures: Clonazepam | Ethosuximide | Phenobarbital | Phenytoin | Primidone | Piracetam | Sodium valproate

Myoclonic seizures in Juvenile Myoclonic Epilepsy: See: Juvenile Myoclonic Epilepsy (above)

Tonic seizures: Phenobarbital | Phenytoin | Primidone | Sodium valproate

Tonic clonic seizures: Acetazolamide | Carbamazepine | Clobazam | Clonazepam | Eslicarbazepine acetate | Lamotrigine | Phenobarbital | Phenytoin | Primidone | Sodium valproate | Topiramate

Tonic clonic seizures in severe myoclonic epilepsy in infancy (SMEI or Dravet syndrome): See: Dravet syndrome (above)

West Syndrome with Tuberous Sclerosis: Vigabatrin

Anticonvulsants have been shown to be effective in managing pain, though high systemic levels and subsequent side effects limit its widespread usage.

Prophylactic anticonvulsants in brain tumors

see Antiepileptic Drug prophylaxis in brain tumor

Patients with epilepsy are frequently required to take antiepileptic drugs (AEDs) for a long period of time. Many studies have shown that AEDs have a negative influence on endocrine function including the thyroid gland.

Female patients with epilepsy and an older age, AED polytherapy, and carbamazepine treatment had a higher risk of low fT4. Thyroid function in these patients should be monitored closely. [4].

Antiepileptic Drug prophylaxis for traumatic brain injury

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Valproate

Valproate

Levetiracetam

Levetiracetam

Lamotrigine

Lamotrigine

Antiepileptic Drug Withdrawal

Antiepileptic Drug Withdrawal

1)
Brodie MJ, Dichter MA. Antiepileptic Drugs. N Engl J Med. 1996; 334:168–175
2)
Salman MM, Sheilabi MA, Bhattacharyya D, Kitchen P, Conner AC, Bill RM, Woodroofe MN, Conner MT, Princivalle AP. Transcriptome analysis suggests a role for the differential expression of cerebral aquaporins and the MAPK signalling pathway in human temporal lobe epilepsy. Eur J Neurosci. 2017 Jul 17. doi: 10.1111/ejn.13652. [Epub ahead of print] PubMed PMID: 28715131.
3)
Kwan P, Schachter SC, Brodie MJ. Drug-resistant epilepsy. N Engl J Med. 2011;365(10):919-926.
4)
Shih FY, Chuang YC, Chuang MJ, Lu YT, Tsai WC, Fu TY, Tsai MH. Effects of antiepileptic drugs on thyroid hormone function in epilepsy patients. Seizure. 2017 Mar 19;48:7-10. doi: 10.1016/j.seizure.2017.03.011. [Epub ahead of print] PubMed PMID: 28364656.