

Kid Gloves: The Challenges of Treating Adolescents with Epilepsy

This ill-defined group is rarely studied in isolation, making targeted care difficult, and physiological and psychological changes in the early teen years add even more complexity.

Depending on the study that is quoted, epilepsy affects one to three percent of the population. The incidence of epilepsy is highest in children under two and in adults over 65 (see Figure 1).¹ This is thought to be due to the kinds of epilepsy that occur at the extremes of life. There are many types of epilepsy that occur in the newborn period, some due to birth injuries. During childhood, several types of “benign” epilepsies may begin, only to remit in adolescence. In adolescence, certain epilepsy syndromes such as juvenile myoclonic epilepsy may emerge. In later adulthood, the most common kind of epilepsy is partial in onset, often due to stroke, head injuries and brain tumors.

Much has been written about the treat-

ment of epilepsy in specific patient populations: children, elderly and women with epilepsy. In fact, several previous installments of *Epilepsy Essentials* have reviewed these topics as well. However, the number of carefully planned, randomized, controlled trials in these specific populations is scant. In the absence of controlled clinical data, the majority of recommendations come from information that is gathered in studies in younger adults. In other words, though certain recommendations are made, much of the information is inferred from populations of patients that could potentially differ greatly from the group in question.

When it comes to adolescents specifically, the information that is known is even more confusing. Some studies in adults include persons over 16. Studies in

children may encompass people up to the age of 18 or 19. The “confusion” over what constitutes a child versus an adult occurs on a daily basis in our hospitals as well. For instance, most children’s hospitals admit “children” up to the age of 18 or 19. Do we really consider an 18-year-old to be a child?

Many physiological and psychological changes occur in adolescence. We might consider the onset of adolescence to coincide with changes in hormones, the cause of the development of secondary sexual characteristics. But when does adolescence end? Is there a clear end point? For most people, these changes occur in the “teen” years. For the sake of simplification in this article, we will use this as a rough definition of adolescence.

This is undoubtedly a gross oversim-

Table 1. Common Causes of Seizures

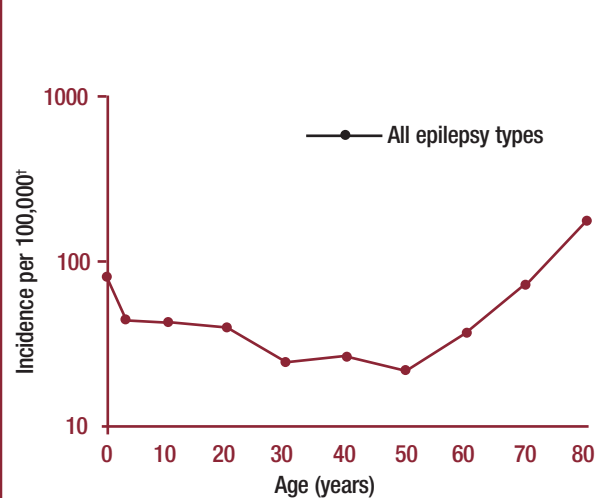
Newborn, Infant, and Child:

- Infection
- Perinatal Injury
 - Hypoxia
 - Ischemia
 - Intracranial Hemorrhage
 - Trauma
- Structural
 - Congenital brain malformations
- Metabolic
 - Hypoglycemia
 - Hypocalcemia
 - Hypomagnesemia
 - Inborn errors of metabolism
- Other
 - Familial
 - Vitamin B6 (pyridoxine) deficiency
 - Febrile convulsion

Adolescent and Adult:

- Infection
- Drugs or drug withdrawal
- Stroke
 - Hemorrhagic
 - Ischemic
- Mass lesion
 - Tumor
 - AVM
- Metabolic
 - Uremia
 - Hepatic failure
 - Hypoglycemia
 - Electrolyte abnormalities
- Other
 - Familial
 - Mitochondrial diseases
 - Neurodegenerative conditions
 - Psychiatric

Figure 1. Incidence of Epilepsy



From: Hauser WA, Annegers JF, Kurland LT. Incidence of epilepsy and unprovoked seizures in Rochester, Minnesota: 1935-1984. *Epilepsia*. 1993;34:453-468.



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By Steven Karceski, MD

plification for many reasons. First, as everyone is different, each person develops at a different rate. We have all met adolescents who appear to be “mature beyond their years.” Similarly, we have met adolescents at exactly the same age who seem to lag behind their peers in terms of psychological and physical development.

If a person has a brain injury, perhaps also the cause of their epilepsy, the injury itself may disturb the delicate pituitary-adrenal-gonadal axis, thereby contributing to delayed maturation. Seizures may disrupt normal hormone production and regulation, interfering with normal development. As we have discussed in an earlier installment of *Epilepsy Essentials* (men with epilepsy, May 2007; women with epilepsy, June 2005), antiseizure medication can impact sex steroid hormones as well, and may play a role in this as well.

Epilepsy in Adolescence

The causes of epilepsy vary widely (see Table 1), and differ with age. For instance, infants and small children may experience seizures as a result of an injury during pregnancy or delivery. One example would be intraventricular hemorrhage, a problem that occurs most often in prematurely born infants. In childhood, certain “benign” epilepsy syndromes may begin. Two examples of this are childhood absence epilepsy and epilepsy with centrotemporal spikes (which used to be called Benign Rolandic Epilepsy because the spikes on EEG occur in the region of the Rolandic fissure). The majority of the benign childhood-onset epilepsy syndromes remit during adolescence. It seems that the problem is genetic, and that the changes in sex steroid hormones that accompany adolescence essentially “turn off” the gene responsible for the seizures.

However, there are several adolescent-onset genetic syndromes as well. In these syndromes, the sex steroid hormones seem to “turn on” or activate the responsible gene, initiating the epilepsy. Examples

of this include juvenile absence epilepsy and juvenile myoclonic epilepsy. Another example is the syndrome of generalized tonic-clonic seizures on awakening. Unlike the childhood benign syndromes, adolescent-onset syndromes do not remit. Often, they require life-long therapy.

Seizures that occur in adolescence may have many causes. They may be a “residuum” of the childhood epilepsy. The epilepsy may be genetic, and starts in the teen years. The seizures could be due to head trauma, childhood and adolescent central nervous system tumors, metabolic disturbances, or drug use, drug abuse and drug withdrawal.

The evaluation of an adolescent with seizures is the same as in childhood or adulthood. It is aimed at understanding the cause of the seizures. This requires a detailed history of the events, ideally from the patient as well as reliable observers. An adolescent must be asked about possible risk factors for epilepsy. A family history of similar episodes might suggest a genetic component. The neurological examination might identify focal neurological signs. Finally, medical testing may delineate the cause of epilepsy.

Treatment of Epilepsy in Adolescents

There are few studies that address the optimal use of antiseizure medications in this group. Adolescents are often included in studies of children or adults: rarely are they studied as a distinct age group. In general, it is believed that children with epilepsy achieve better outcomes than adults. But can be said about adolescents? Most experts equate the treatment of epilepsy in adolescence with that of adults. Medications are the mainstay of treatment. The most important factor in the selection of medication is the epilepsy syndrome or delineation of the seizure types.² In fact, as in adults, certain medications can exacerbate seizures in adolescents if inappropriately chosen. For instance, carbamazepine and tiagabine have been reported to worsen certain seizure types such as absence

and myoclonic seizures.²

As in adults, many other factors contribute to antiseizure medication selection. Compliance is always an issue that must be considered, especially in adolescents who may be less willing to take their medications. Medications requiring fewer doses throughout the day may be preferred in this group. The physician must consider possible drug-to-drug interactions (see *Epilepsy Essentials* June 2007). Side effects can impair school and work performance, an issue that concerns adolescents and adults alike. Finally, the choice of therapy may also depend on any comorbid conditions (see *Epilepsy Essentials* October 2005 on “mood and epilepsy” and March 2007 on “migraine and epilepsy”).

This last point deserves considerable attention. Thirty to 50 percent of people with refractory epilepsy also have a mood disorder. For most, this manifests as depression, anxiety, or both. This is true of adolescents as well: in children aged five to 16 (here is another example where adolescents and children were studied together), 37 to 60 percent had some type of psychiatric illness as defined by the DSM.^{3,4} Twenty to 30 percent of adolescents with epilepsy and depression may attempt suicide.³ It is wrong to assume that moodiness is a part of adolescence. However, this may be a common assumption. In the same studies, only one-third of adolescents with a mood disorder were actually treated for it.³

The goal of treatment for adults with epilepsy can be stated simply: to have the best possible quality of life. If a person has sustained a brain injury, they may experience neurological deficits as a result. Sometimes these deficits are readily apparent, as when the injury involves the motor cortex, causing contralateral weakness. Other times, the deficits may be more difficult to measure, as when the injury involves the frontal lobe. Though therapy may help some of these problems, it may not be possible to fully recover the function that is lost.

When the injury causes seizures, there may be an additional impact on quality of life.⁴ Seizures can disrupt motor and cognitive function. This can persist for minutes, hours, or several days. In fact, studies in adults suggest that prolonged recovery times from seizures have a direct impact on quality of life.⁴ Injuries may result from seizures, requiring hospitalization. Antiseizure medications may cause cognitive side effects. If a person requires two or more medications in order to control their seizures, this problem is magnified, and directly impacts their quality of life.⁴

It is clear that mood impacts quality of life.^{4,5} In fact, Gillam has shown that the treatment of the comorbid mood disorder in people with epilepsy is equally important as treating the seizure disorder. Some adolescent studies have suggested that

mood may be an even more important predictor of poor quality of life.⁴ It seems clear, however, that physicians must address both the epilepsy and the underlying mood disorder in order to achieve the best quality of life.

Discussion

Adolescence is a difficult time of life. Being an adolescent with epilepsy magnifies these challenges, as he or she also must confront issues related to the epilepsy and associated mood disorders. Physicians must be sensitive to this as we treat this age group. To simply write off the moodiness as “part of growing up” may oversimplify and minimize the importance of its impact on the person’s quality of life. The neurologist may carefully consider which is the optimal medication; however, he or she may need to work closely

with a psychiatrist in order to optimize the patient’s quality of life. **PN**

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