

Adolescents and Epilepsy

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Target Audience

This CME activity is intended for physicians, medical students and nurse practitioners. Pediatric emergency department physicians, emergency physicians, pediatricians, and family practitioners will find this information especially useful.

Learning Objectives

After completion of this article, the reader will be able to:

1. State why pediatricians should pay extra attention to teenagers with epilepsy.
2. Recognize common social issues faced by adolescents with epilepsy.
3. Discuss the different epilepsy syndromes.
4. Summarize possible side-effects and benefits of anticonvulsants.
5. Identify non-pharmacologic therapies for teens with epilepsy.

Abstract

Epilepsy in adolescents is under recognized and poorly described in the medical literature. Although these sometimes challenging patients require extra time and consideration, their care can be very rewarding. There are several important social issues adolescents with chronic disease face that influence treatment and that need to be discussed, often in private with the patient. Pediatricians and neurologists must be aware of specific epilepsy syndromes affecting teenagers, such as juvenile myoclonic epilepsy (JME), progressive myoclonic epilepsies, and juvenile absence epilepsy (JAE). Adolescents often benefit from treatments with infrequent daily dosing, limited laboratory monitoring, and minimal cosmetic and cognitive side-effects. Recognizing the high prevalence of comorbid migraine also influences medication choices. Nonpharmacologic options that allow for a sense of control and independence over their epilepsy, including vagus nerve stimulation, ketogenic diet, and epilepsy surgery, are very attractive to most adolescents. In this review, these issues affecting adolescents with seizure disorders will be discussed. *Int Pediatr.2005;20(2):78-82.*

Key words: adolescents, epilepsy, anticonvulsant drugs, independence

Editor's Note: This is the second of four articles to be published in 2005 for which a total of up to 4 Category 1 CME credit hours can be earned. Instructions for how credit hours can be earned appear inside the front cover of the journal. Exam questions will appear after the article.

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Introduction

Adolescents are a very demanding population. They often have disorders that are different from toddlers and school-aged children yet unique in comparison to adults. Many have a sense of invincibility, despite occasionally overwhelming chronic disease, and may be noncompliant with clinic visits and medications. Visits often require separate time with the adolescent, their parents, the entire family, and occasionally phone conversations with schoolteachers, nurses, and coaches.

So why should we spend extra attention on teenagers with epilepsy? Adolescents are certainly under recognized and poorly described in the epilepsy literature, with only scattered publications.^{1,2} Many neurologists find their issues and seizures challenging and when successfully treated, quite rewarding. Knowing that this is a crucial time in a person's life to create self-image and make career and relationship decisions, imparts a strong sense of responsibility and importance to their care. Adolescents certainly can be among the most loyal and appreciative of patients in a neurologist's practice as well.

Epilepsy is most common in the pediatric and elderly population, but the incidence of seizures is still quite high in the 10-20 age group, approximately 50 per 100 000, and higher than in patients aged 20-60.³ There are many unique issues to adolescents in dealing with their seizures, and also several very specific epilepsy syndromes afflicting teenagers. These issues and treatment options will be discussed in this review.

Social Issues

Stigma, or the issues regarding being labeled as different for having epilepsy can be a large problem for adolescents.² Stigma is perceived by one-third of adolescents with epilepsy and is highly correlated with poor self-esteem. Nearly 85% of adolescents are embarrassed about their epilepsy and do not tell all of their friends. Perhaps some of the reason for this may stem from common myths about epilepsy by adolescents without seizures. In one survey, 40%-50% of adolescents without seizures were not sure if other children with epilepsy were dangerous and contagious.⁴

In a difficult middle and high school setting for the average teenager, in which the desire not to be different and to "fit in" is overwhelming, having an unpredictable neurologic condition can be devastating to self-esteem. Many of the anticonvulsant drugs have cosmetic side effects as well (e.g. valproate with weight gain and hair thinning, phenytoin with

facial hair growth and gum hyperplasia), which can impact self-image. Dating can be significantly affected by epilepsy, with its obvious restrictions on driving and potential embarrassment in a social situation. In a survey, 69% of adolescents without epilepsy would not date another teenager with seizures.⁴

Driving, a measure of independence and significant aspect of social lives of many adolescents is another large issue for teens. In fact, the fear of losing their license may be one of the strongest influences on treatment compliance. Being able to drive, which is individually controlled by each state, affects dating, the ability to have an after-school job, and deciding between a college in a large city (without a need for a car) and one in the country that does require a car.

Academic pressure dramatically increases when children reach middle and high school, and many adolescents have difficulty with school if they have to miss classes due to seizures. Most anticonvulsants are poorly studied, unfortunately, in regards to their cognitive effects on children.⁵ Using single agents, with lower cognitive side-effect profiles at lower doses, can be beneficial. It is always advisable to obtain an individual education plan (IEP) prior to the adolescent's senior year of high school in order to address any issues early.

Sports for many adolescents are not just an enjoyable after-school activity, but also a means to obtain college scholarships, and should not necessarily be discouraged due to epilepsy. Sports can improve self-esteem and potential weight gain from anticonvulsants. Although we typically discourage more risky sports such as scuba diving, boxing, hunting, and rock climbing, the decision is ultimately up to the adolescent and protective gear is warranted in all contact sports.

Substance abuse, although typically suspected in adolescents with new-onset seizures, is relatively infrequent. Most adolescents are forthright about their drug abuse when alone in a clinic situation. Alcohol and marijuana have conflicting evidence for seizure worsening.⁶

an adolescent who may not be compliant with all clinic visits. Third, is target convenience. TID does not mean three times a day, it truly means “truly impossible dosing” for an adolescent in school. It is advisable to use an agent that is available twice a day or even once a day if possible. Fourth, realizing that 10 times more adolescents have migraines than epilepsy, using an agent such as valproate, topiramate, or gabapentin with anti-migraine benefits, can be doubly helpful in some cases.

Most importantly, considering an adolescent may never return if an anticonvulsant drug causes side effects, it is important to choose a drug with relatively low side-effects. In this regard, some of the newer anticonvulsants may have some advantages (Table 1). Lamotrigine, oxcarbazepine, and levetiracetam are weight neutral, and topiramate and zonisamide may in fact lead to weight loss. Some of the older anticonvulsants (valproate, carbamazepine, phenobarbital, phenytoin) can affect hair negatively and also are likely more teratogenic. Cognitive side-effects are probably higher with the older agents as well, but topiramate can cause word-finding difficulties at high doses.⁸

Nonpharmacologic Options

There are several therapies that can be beneficial for adolescents in whom medications are ineffective or intolerable. In addition, each of these nonpharmacologic therapies allows for the teenager to have a sense of control over

their seizures. They include the ketogenic diet, vagus nerve stimulation, and epilepsy surgery.

The ketogenic diet has been available for 80 years for intractable epilepsy.⁹ This high fat, moderate protein, low carbohydrate diet is traditionally used in younger children due to its restrictiveness, but in a recent study from two institutions, 45 adolescents were not only able to stay on the diet for months, but had similar efficacy to overall children.¹⁰ The ketogenic diet allows for control and independence and probably has a superior side-effect profile to anticonvulsants, especially in terms of weight and cognition. Active investigations into the Atkins diet as a less restrictive alternative for adolescents with epilepsy are also underway.¹¹

Vagus nerve stimulation (VNS) has been available since 1997 for pharmaco-resistant epilepsy.¹² The left vagus nerve is stimulated by an implanted, battery-charged device in a periodic manner and seizures are reduced. A small magnet worn on the wrist can be used to additionally activate stimulations during a seizure aura and potentially abort it. VNS allows for control, has few side-effects (hoarseness to voice), compliance is assured, and privacy (unseen under a shirt) is quite unique to most therapies.

Epilepsy surgery, the ultimate decision for an adolescent to make, is not an option for all patients with epilepsy. However, although morbidity exists, when an option and successful, the adolescent is cured of their seizures. The impact of becoming seizure-free for life on an adolescent's self-image cannot be underestimated. The adolescent must be a part of the decision and giving them the ability to talk to other teenagers who have undergone a similar procedure is very valuable. Discussions about hair shaving prior to surgery are important as well.

Support Networks

Many support networks, both in the form of local Epilepsy Foundations support groups and Internet chatrooms, exist for adolescents specifically. Pamphlets are available from both

Table 1 – Anticonvulsants available since 1993

Year	Generic Name	Trade Name
1993	Gabapentin	Neurontin™
1994	Lamotrigine	Lamictal™
1996	Topiramate	Topamax™
1997	Tiagabine	Gabitril™
1999	Levetiracetam	Keppra™
2000	Oxcarbazepine	Trileptal™
2000	Zonisamide	Zonegran™
2005	Pregabalin	Lyrica™

the Epilepsy Foundation and many pharmaceutical companies just for adolescents with epilepsy, and a recent campaign called “Entitled to Respect” with N’Sync™ raised awareness of the social issues faced by teenagers with seizures.

Conclusion

In conclusion, adolescents are an under recognized, but very important subset of the population at large with epilepsy. Their care can be challenging and all the issues and management decisions mentioned in this review take time and energy, but at this crucial time in a person’s life, it’s time well spent.

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Adolescents and Epilepsy.

Kossoff EH. *Int Pediatr* 2005;20(2)78-82.

QUESTIONS

1. **Common issues regarding dating and epilepsy can be related to all EXCEPT:**
 - a. Cosmetic side effects of anticonvulsants
 - b. Ability to drive a car with epilepsy
 - c. Misperception of many teens without epilepsy that it is contagious
 - d. Seizures due to the light from a movie projector at a drive-in
 - e. Embarrassment of a seizure during a date

2. **Which of the following sports is generally to be discouraged for adolescents with epilepsy?**
 - a. Scuba diving
 - b. Football
 - c. Basketball
 - d. Volleyball
 - e. Swimming

3. **Juvenile myoclonic epilepsy (JME) is typically associated with which EEG finding?**
 - a. 3 per second spike and wave discharges
 - b. Periodic centrotemporal spike waves
 - c. Occasional left temporal sharp waves
 - d. 4-6 Hz polyspike and spike-wave discharges
 - e. Occipital slowing

4. **An important issue to consider when using valproate in adolescents is:**
 - a. Potential weight gain
 - b. Risk of teratogenicity
 - c. Possible combination efficacy for migraines
 - d. Benefits for JME
 - e. All of the above

5. **Proven non-pharmacologic therapies for teens with epilepsy include all EXCEPT:**
 - a. Ketogenic diet
 - b. Biofeedback
 - c. Vagus nerve stimulation
 - d. Temporal lobectomy
 - e. None of the above

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2. Were the selected article and related questions relevant to your practice?

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