Open Q&A on Acute Disseminated Encephalomyelitis (ADEM)

You can watch the video of this podcast at: youtu.be/tA7Mvb5d79s

[00:00:00] **Announcer:** Hello and welcome to the SRNA "Ask the Expert" podcast series. This episode is an "Open Q&A on Acute Disseminated Encephalomyelitis" and was moderated by Krissy Dilger from the Siegel Rare Neuroimmune Association. Our guest is Dr. Linda Nguyen. Dr. Nguyen is an Assistant Professor in the Department of Pediatrics at the University of Texas Southwestern. You can find her full bio in the podcast description.

[00:00:33] SRNA is a nonprofit focused on support, education, and research of rare neuroimmune disorders. You can learn more about us on our website at wearesrna.org. This episode is made possible in part by the generous support of Amgen; Alexion, AstraZeneca Rare Disease; Genentech; and UCB.

[00:01:00] **Krissy Dilger:** Thank you so much for joining us today, Dr. Nguyen.

[00:01:02] **Dr. Linda Nguyen:** Thank you for having me.

[00:01:06] **Krissy Dilger:** Alright. I think we can get started. To start us off, do you mind just giving an overview of what is acute disseminated encephalomyelitis, or ADEM?

[00:01:19] **Dr. Linda Nguyen:** Yeah. I think the name itself speaks volumes in terms of what it is. It's acute, meaning it presents rapidly—usually over a span of a few hours to a few days—of progressive neurological symptoms; disseminated, meaning it affects multiple areas of the central nervous system; and encephalomyelitis, meaning it can affect the brain, spinal cord, and sometimes also the optic nerves.

[00:01:50] **Krissy Dilger:** Thank you. And what causes ADEM?

[00:01:54] **Dr. Linda Nguyen:** Yeah, that's a great question. And it's an evolving question as well, with more recent research finding out about the MOG antibody and such. But underlying it, it starts as an immune-mediated disease where the immune system gets activated and gets confused, such that it starts attacking your central nervous system in a wide variety of ways, whether it be, as I mentioned, the brain, the spinal cord, or the optic nerve.

[00:02:28] **Krissy Dilger:** Who is most commonly affected by ADEM? Is it more common in children than adults?

[00:02:38] **Dr. Linda Nguyen:** Yeah, I'm mainly pediatric-trained and I see a lot of children, less so adults. And so, I see a lot of ADEM because ADEM is more common in children—especially those that are less than 10 years old—than adolescents or, and then adults.

[00:02:55] **Krissy Dilger:** OK, great. So, what are the most common early signs and symptoms of ADEM, and how quickly do symptoms typically develop?

[00:03:13] **Dr. Linda Nguyen:** Great question. And so, a lot of what we know about ADEM is that many cases—the majority of cases, usually 50% to 70%—are preceded by an infectious illness. So, you can have a cold or a GI bug, and then a few days or a few weeks later develop symptoms that we think are part of ADEM, it can include fever and it can include headaches.

[00:03:45] But most of the time, by criteria, it has to include altered mental status or encephalopathy, which is just a big term to say you have altered behavior, whether that be excessive fussiness in a child, excessive sleepiness, confusion, or disorientation. And then you can have other focal neurological deficits, such as a weakness of the legs or arms, vision loss, et cetera.

[00:04:19] **Krissy Dilger:** So, how is ADEM diagnosed? What tests are usually involved?

[00:04:26] **Dr. Linda Nguyen:** Yeah. For the most part, there is a criteria for the diagnosis. And in children, the two main criteria are that you have to have the clinical presentation, which is that you have to have encephalopathy or altered mental status or behavior, and you have to have the imaging findings that are consistent with what we call ADEM, which is multifocal areas of injury usually in what we call the white matter of the brain. But it can also involve other areas, but multifocal meaning multiple areas at least.

[00:05:07] **Krissy Dilger:** So, how has our understanding of ADEM evolved with the expansion of our understanding of MOG antibody disease? What is the connection?

[00:05:18] **Dr. Linda Nguyen:** Yeah. Before MOG antibody disease or MOG antibody was commonly used, there wasn't a separate bucket between what's ADEM and MOGAD. And so, a lot of the cases used this term, ADEM. Some of the cases became multiple sclerosis.

[00:05:42] Some of the cases became labeled with other diseases. Now, with the MOG antibody tests readily available, we're finding that 50% to 70% of the patients are actually diagnosed with MOGAD or MOG antibody disease rather than ADEM, which changes the whole label and also our understanding of the underlying disease or mechanism that we call ADEM.

[00:06:16] **Krissy Dilger:** So, do you foresee that in the future, as developments continue in this area, ADEM might be parsed out into smaller and smaller pieces as the causes and different antibodies that maybe are associated with it are discovered?

[00:06:37] **Dr. Linda Nguyen:** Yes, I think so because when we say ADEM, we are trying to put—when you come into the hospital and the doctor says you have ADEM, we're looking at the picture overall. But we don't actually have the exact cause of it. And I think as we do more research and we find out the underlying biology, ADEM itself is going to be a much smaller and smaller percentage of what the actual diagnosis is. And it's more just a description of what you presented as, rather than what the underlying cause is.

[00:07:19] **Krissy Dilger:** So, should everyone who is diagnosed with ADEM be tested for the MOG antibody?

[00:07:28] **Dr. Linda Nguyen:** I think this is very key in figuring out the underlying biology of this medical diagnosis. And so, I would recommend everyone get tested when they have this diagnosis. It's most important, if possible, to get tested at disease onset because that's the time that the test is going to be most sensitive,

which just means it's most likely going to pick up if you have a positive antibody. But certainly, even if you are six months, a year, or several years out, I think it's still worthwhile to test for that antibody if you haven't already done so.

[00:08:14] **Krissy Dilger:** We did get a question from a member of the community: "If a child is diagnosed with MOG-positive ADEM, what is their relapse rate?"

[00:08:25] **Dr. Linda Nguyen:** That's a great question because we always certainly want to know what to expect in the long term. The literature's evolving on that. If you don't have the antibody, you're thought to have a lower risk of relapse than if you have the MOG antibody. There are different relapse rates published in the different cohorts that are out there, and I think it can vary anywhere from 25% to 50% if you have the MOG antibody. But just speaking in broad terms, if you have the antibody, your risk of relapse is higher than if you don't.

[00:09:04] **Krissy Dilger:** I know you are trained mostly in pediatrics and that's the pat you mostly see, but is there recurrent ADEM in adults as well?

[00:09:18] **Dr. Linda Nguyen:** ADEM itself, whether it be recurrent or just a one-time event, can present in both populations. But it's much rarer in adults. When anyone, whether it be a child or an adult, presents with recurrent ADEM, we always want to try to find out and dig a little deeper about what is the underlying cause is. Is this because it's MOG antibody disease that's presenting as recurrent ADEM?

[00:09:46] Is this multiple sclerosis, et cetera? We feel ADEM by itself as a diagnosis is usually monophasic. When it presents as recurrent, we think of some other things that are ongoing, and we try to investigate a little deeper. And yes, I think just like in children, in adults you can have recurrent presentations of ADEM.

[00:10:13] **Krissy Dilger:** Yeah. I think this is a topic in our community that can be tricky to explain and talk about—that ADEM can be both a diagnosis and a presentation, and those aren't exactly the same. It's a nuance. So, I guess in that vein, what is the difference between ADEM as a diagnosis and ADEM as a presentation? Can a person have both transverse myelitis and ADEM, or ADEM and another disease, or is ADEM just a symptom or presentation of that other disease?

[00:10:59] **Dr. Linda Nguyen:** It can be very confusing because you can initially be called ADEM and then later on they say you have something else like MOG antibody-associated disease. You're wondering which one do I actually have? And as a physician, we think of a diagnosis as what we can call you— what we can put a label on after evaluating all of the information we have: your presentation, your imaging, and your laboratory results.

[00:11:34] And so, a lot of the time when there isn't a specific cause identified or a disease, then we just put together the picture, and the picture best represents ADEM. And so, ADEM itself can be both a presentation and a diagnosis. Now, the diagnosis can change over time, as I mentioned. If you discover that you have the MOG antibody, then your diagnosis changes to MOG antibody-associated disease.

[00:12:05] Or if you have another disease, or another neuroinflammatory disease that is later discovered based on other testing or other presentations, then your diagnosis changes, but still, you presented with ADEM. So again, ADEM can be both a diagnosis and a presentation, but the diagnosis can change over time.

[00:12:31] **Krissy Dilger:** That makes sense. I know also we've talked about how ADEM and MOG are associated, or other things. Can you talk about can ADEM be mistaken for other neurological conditions such as autoimmune encephalitis or NMDA receptor encephalitis? Like other, I guess, encephalitis diseases.

[00:13:03] **Dr. Linda Nguyen:** Yeah. I think that when we think about other things, we think about mimics in our world. And so, in order to be diagnosed with ADEM, it's a diagnosis of exclusion. So, if you don't have any other things—like no infection that was found, no other disease that could explain it—you oftentimes get diagnosed with ADEM. And so, ADEM can be a descriptive sort of thing, but you always have to think about is there something, again, underlying this?

[00:13:41] And so, mimics—things that you have to think about as alternative diagnosis—would be, as you mentioned, autoimmune encephalitis. Because autoimmune encephalitis can certainly meet that criteria that I previously alluded to altered mental status and multifocal brain changes.

[00:14:01] And certainly, if you just check those boxes, you can technically be diagnosed as ADEM. But what is the better diagnosis? Is it autoimmune encephalitis or is it ADEM? And then certainly, other, even not necessarily just neuroinflammatory conditions. Sometimes we have to think about metabolic or mitochondrial conditions as well before we put a label as ADEM. Because we think of ADEM as immune-mediated, and we give all those strong immunotherapies, which wouldn't be good if you had a genetic metabolic condition.

[00:14:38] **Krissy Dilger:** Thank you. What treatments are most commonly used during the acute attack phase?

[00:14:47] **Dr. Linda Nguyen:** Yeah, so during the acute attack period is where we think the inflammation is at its highest level of activity. And so, we try to quiet down and dampen or stop the inflammation, and we do that by giving immunotherapies.

[00:15:06] And so, that includes in the acute setting, most commonly, IV steroids, usually over a course of three to five days. And then oftentimes, depending on the severity of the presentation and the response to the steroids, we then move on to adding either plasma exchange into the regimen and/or IVIG.

[00:15:37] **Krissy Dilger:** And what does—so, what does recovery look like for someone who is newly diagnosed with ADEM?

[00:15:45] **Dr. Linda Nguyen:** Yeah, I think recovery depends on a lot of different factors. And so, it's unique for each patient. But I think, in general, recovery depends on how severe your presentation is. How much was affected? Did you have both spinal cord involvement and brain involvement? And then how quickly the immune therapies were started, because we know that an earlier initiation of immunotherapy improves long-term recovery—not just quickening the recovery, but also improving the amount of recovery.

[00:16:31] But typically, in general, usually you're in the hospital anywhere from a few days, if it's a milder case, to several weeks receiving the acute immunotherapies we talked about. And then if you are able to go home, then you can follow up with outpatient occupational therapy, physical therapy, et cetera. You can do that. But some patients require an inpatient rehab stay anywhere from a few days more to even two to three weeks more.

[00:17:12] And so, that's just the acute sort of hospitalization period, which can span usually a month or less then in more severe cases longer. But the recovery period outside of the hospital can take several months more. Especially for more of the milder symptoms like cognitive function, processing speed, and bowel and bladder function. Those can take much, much longer.

[00:17:47] **Krissy Dilger:** So, would you say long-term wise, are there effects that can last long-term for ADEM even after that initial year or so after the event happened? And can you talk a little bit more about those long-term effects and also how they might differ between children and adults?

[00:18:07] **Dr. Linda Nguyen:** Yeah. So, I think that the good thing is the majority of patients have very good functional outcomes after ADEM, both I think in the child and adult world. This is thought to beget peak severity during the hospitalization, and then you continue to improve, and then you really make good functional recovery, meaning that you're able to return to work or return to school.

[00:18:38] But the residual symptoms we often see that might not be so obvious are cognitive function may be affected, whether that be attention, short-term memory, and processing speed. And so that can certainly affect school and work for children and adults. Sometimes we also see mood symptoms being common following such a major disease and hospitalization.

[00:19:21] And so, we always say to monitor for those—depression, anxiety. And then the other sort of motor deficits, we often see improvements, with the most gains in those areas. And then in terms of recovery comparing children to adults, I think that the child's brain is more resilient, and so I think they do make a more substantial and quicker recovery compared to adults.

[00:19:59] **Krissy Dilger:** That makes sense. I know in the past we've talked about neuroplasticity and how that can affect how someone might recover, and age can be a factor in that, so totally makes sense. So, are seizures common for people with ADEM?

[00:20:21] **Dr. Linda Nguyen:** So, I think in terms of common, yes. I think about maybe a third of children can have seizures, especially if on their brain MRI they have an area called the cortex being involved, because that's where a lot of the seizures originate from. And we see seizures as a presentation. Oftentimes though, in the long-term recovery period, we can often come off seizure medicines or not be on seizure medicines because the idea is the inflammation is gone. And the risk for what we call epilepsy, which is recurrent seizures, is not high enough to justify being on a long-term anti-seizure medicine.

[00:21:21] **Krissy Dilger:** So, someone from the community asked: "How can you tell whether your child's changes in personality or temperament are coming from the ADEM event or just general, maybe stress or aging of the child? How can you tell, and what do you do about that?"

[00:21:51] **Dr. Linda Nguyen:** I think especially in children, it might be difficult to discern, but usually what we would think about in terms of ADEM is a progressive change in behavior or mentation. And so, if they're fussy for a day and then they get better the next day, I wouldn't worry about ADEM. But if they're fussy and they start to become more sleepy, and then their gait is a little off over the course of a few days, then I would be worried that this is a recurrent inflammatory brain hit.

[00:22:34] **Krissy Dilger:** And how can families support a child emotionally during recovery? Do you have any tips or anything that you think parents should know or keep in mind after their child might be diagnosed?

[00:22:52] **Dr. Linda Nguyen:** Yeah, oftentimes the child, as I mentioned, is encephalopathic. So, they might not even remember the hospitalization, but certainly they remember something was wrong. And so, sometimes when they're asking questions about it or whatnot, try to explain it in terms that they can understand. If they have frustrations, certainly validate those frustrations.

[00:23:24] It's always important to look and see—look deeper—if they are developing mood symptoms, whether that be anxiety or depression, because that can certainly be one of the symptoms we commonly see post-ADEM, beyond the cognitive dysfunction. And then making sure whether it be at school or work, there are accommodations in place to help the child or the person be able to function as best as they can out in that environment.

[00:24:06] **Krissy Dilger:** Things like maybe IEPs and 504s for schools, and other disability rights, things that come under accommodations.

[00:24:19] **Dr. Linda Nguyen:** Exactly. It might not be—and it might not necessarily—it can be as simple as breaks with accommodations, because one of the symptoms that we often see in post-neuroinflammatory conditions is fatigue. And having breaks in classroom settings or in the work environment is important.

[00:24:45] **Krissy Dilger:** We did get a question: "How often should patients have follow-up MRIs or neurology visits after their event?"

[00:25:01] **Dr. Linda Nguyen:** Yeah. I think this question depends on the underlying cause of ADEM. If it's just—you know, we didn't find an underlying cause—then typically what we do is we get an MRI three to four months after the initial attack. We get this because we want to get a new baseline in case something happens in the future, and we want a good reference point because,

[00:25:30] ADEM, as I mentioned, is a multifocal brain disease. And the first MRI you get in the hospital may change and evolve over time during the sort of disease course. And so, in the recovery period, we like to get the new MRI just so we can get a new baseline for comparison. And then if you have MOG antibody disease or multiple sclerosis, or something else, the frequency of the MRI is different.

[00:26:02] **Krissy Dilger:** Thank you. So, are there warning signs that might suggest a relapse is potentially coming on or perhaps another neuroimmune disorder is developing?

[00:26:19] **Dr. Linda Nguyen:** Yeah. When you have ADEM, it's thought to be a demyelinating disorder affecting the white matter tracts of your central nervous system, and so you can present with another attack of ADEM, which is unusual, but more commonly it affects other parts of your central nervous system.

[00:26:40] So, oftentimes when we think about potential symptoms of relapse, we think about vision loss that's associated with optic neuritis, weakness of one limb or one arm, trouble walking, or trouble going to the bathroom—whether that be you're not able to go to the bathroom or you're having increasing frequency signaling inflammation of the spinal cord or myelitis. Those are the more common relapsing symptoms. It's unusual to present again with ADEM.

[00:27:24] **Krissy Dilger:** So, we did get another question: "Are fatigue and headaches common after ADEM?" I know we talked about this, but can you talk a little bit more about the treatment for this fatigue and headache?

[00:27:38] **Dr. Linda Nguyen:** Yeah, as I mentioned, with ADEM—or really any other neuroinflammatory condition—fatigue is common, but also headaches. In ADEM particularly, because you have such widespread, oftentimes diffuse involvement of the brain and neural axis.

[00:27:55] So, to try to address these things that we commonly hear patients voice concerns over fatigue, it's very important to address any sleeping issues and optimize sleep hygiene. And then trying to engage in physical activity as much as possible usually helps with the fatigue component.

[00:28:20] And then for the headache component, it's very interconnected, really. Obviously, with headaches, we try to make sure that your lifestyle is addressed—whether you're drinking enough water, avoiding caffeinated beverages, sleeping enough, and sleeping regularly. And also, a big component of fatigue and headaches is mood symptoms, because exacerbated mood can certainly worsen fatigue and headaches as well.

[00:28:56] And so, we try to be holistic and address these common symptoms as a whole, trying to address the whole system rather than giving a medicine for everything. We always try to see how it could interlink and then address multiple things that could contribute to it.

[00:29:30] **Krissy Dilger:** We got a question from someone whose child was diagnosed at the age of five with ADEM and, as a consequence, has paralysis and some other cognitive issues. They were wondering if there are any natural or alternative types of medicines that can potentially help somebody with ADEM years down the road.

[00:30:03] **Dr. Linda Nguyen:** In terms of natural supplements, beyond what we recommend—which is vitamin D and making sure that your vitamin D levels are normal or above normal— there hasn't been great data to say a certain supplement will improve the recovery period or remyelinate the areas of injury. And unfortunately, there isn't one specific thing that has been shown to be beneficial.

[00:30:40] We like vitamin D in general because it's important for immune health.

[00:30:49] **Krissy Dilger:** Thank you. We do get this question sometimes, someone wrote in to ask if there's a relationship between vaccines and ADEM, and how families should think about future vaccinations after a diagnosis. Is there anything you can tell us about that?

[00:31:09] **Dr. Linda Nguyen:** Yeah. I had mentioned earlier that this disease is thought to be immune-mediated, meaning the immune system is activated but it's confused and it starts attacking your brain. So, a vaccine is not necessarily a cause for ADEM, but in very rare instances, it can be a sort of trigger for ADEM because it activated your immune system, which is the appropriate response to a vaccine.

[00:31:44] But for whatever reason for underlying environmental or genetic susceptibility, that specific instance of immune system activation got confused and then decided to attack your own self. So, when we see that or have a patient report that, "I recently got this vaccine and now I have this presentation," obviously every patient and recommendation is individualized, but we often don't say to not get further vaccines, even if that was the sort of trigger for them.

[00:32:35] In the literature, ADEM is commonly also referred to as post-infectious encephalomyelitis. And so again, it's this trigger that we think is, in most cases, not a vaccine, but more likely an infection that activates the immune system in some way that, in a susceptible person, develops into ADEM.

[00:33:04] **Krissy Dilger:** Thank you. Is there any known genetic or hereditary risk associated with ADEM?

[00:33:14] **Dr. Linda Nguyen:** For the presentation itself, versus optic neuritis or transverse myelitis, there isn't a specific genetic predisposition. But if it's part of an underlying disease such as MOG antibody disease or multiple sclerosis, those diseases themselves may have different genetic risk factors.

[00:33:37] **Krissy Dilger:** So, we got this question recently: "Can emotional stress or illness trigger symptom worsening during the recovery, even if it's not a full relapse with new inflammation?"

[00:33:56] **Dr. Linda Nguyen:** Yeah, that's a really great question because sometimes it's hard to discern between what's a true relapse and what we call a pseudo-relapse. And so, when you have ADEM, you have inflammation in the acute period, and then after the inflammation dies down, you have areas of injury. And so, there are always going to be some areas of injury or disrupted neurocircuitry.

[00:34:25] In the recovery period, in times of stress—whether that be an infection and you get a fever, a cough, a cold, a runny nose, or sleep deprivation, or you're preparing for a very big test the next day, or you're overly stressed from work—that neurocircuitry that's been injured and damaged and hasn't fully healed works much harder under stress.

[00:34:55] And so, you can get symptoms coming back because that signal between your brain and your actions is slowed or not as effective in firing. When you're under periods of stress, you can have old symptoms coming back, and that'd be considered a pseudo-relapse. Now, if it's progressive symptoms evolving over 24 to 48 hours, then that can signal to us maybe that's more due to new inflammation that's taking place, rather than the injured network just working a little harder under times of stress.

[00:35:36] And so, how we frame that is: if you remove the stressor—like if you remove the fever and the infection—and your symptoms improve or get better, then that's unlikely to be due to new inflammation.

[00:35:54] **Krissy Dilger:** That makes sense. Yeah. Thank you for that explanation. We got a question: "What role does physical activity play during recovery? Do you suggest someone push themselves physically, or is rest more important? How is that approached after an ADEM diagnosis?"

[00:36:21] **Dr. Linda Nguyen:** Yeah, I think we don't want to overstress the body, because then that can have the counterproductive effect of making things worse because of that neurocircuitry firing a lot harder. But we also don't want to not use our muscles and our skills. And so, there's a balance between that.

[00:36:48] Certainly, in someone that has motor deficits or functional deficits, it's very important to maintain visits with your physical therapist and occupational therapist to continue to work at it. And with the idea of neuroplasticity, the more you work at it, the stronger the signal gets and the stronger you get.

[00:37:11] And so, it's important to continue to work at it, but there's a fine line between continuing to work at it and overstressing your body. And so, for each patient, their level of physical activity is going to be different. Some patients can tolerate going to the gym for an hour, and some patients can tolerate three hours. But I think it's still important to maintain some level of activity, but then also listen to your body.

[00:37:36] **Krissy Dilger:** That makes sense. So, we get a lot of questions regarding research into ADEM and all the rare neuroimmune disorders. I was wondering if you could tell us anything about current research that's being conducted or, alternatively, any kind of factors that you're hoping are most important to look into in the future for ADEM.

[00:38:08] Yeah, research is so important in this field, whether you have ADEM or not, because we're just trying to find ways to improve outcomes and improve prognostication—whether you have another relapse or not. And so, it's very important to try to be engaged and involved in research.

[00:38:35] And at our institution, especially in our demyelinating disease clinic, we keep a biorepository where patients can simply donate their blood or allow us to keep track of their medical data in a bioregistry or data bank. And so, it can be as simple as that in terms of participation.

[00:38:58] And for us, we're very interested in looking at ways to better understand disease biology and also better understand predictors of disease, especially in the context of MOG antibody disease, which is the more recently identified antibody. And we're very interested in seeing what it means if you have MOG antibody-associated ADEM versus not. And so, those are some areas of investigation we're involved in.

[00:39:34] **Krissy Dilger:** Great. That's very interesting and looking forward to seeing what kind of results come out of that study. We did get a question about, I guess, long-term effects again, but are there any indications during that acute phase that might predict whether someone might have a harder time recovering or might have residual symptoms that last, versus someone who might have an easier or shorter recovery and be able to move on without having many symptoms in the long term?

[00:40:16] **Dr. Linda Nguyen:** Yeah. It's always good to know, and it's an important question for parents, especially when a kid comes in: "How will my child look in the long term?" There isn't great evidence to say one specific thing will make your outcome far worse than another because, again, there are so many variables that go into this. It's very interesting because when we look at the MRI of a patient with ADEM, remarkably, even if they have whole spinal cord involvement and very confluent brain involvement, they can go back to 100% and their MRI be normal four months after the attack.

[00:41:11] It's remarkable. And so, MRI data—certainly, we think the more widespread it is, the more likelihood you're going to have long-term functional deficits, but that doesn't always correlate. So certainly, while it's what we think should commonly be associated, in some cases, remarkably, no. But a lot of times, if you're needing more aggressive treatment like plasma exchange because you can't get out of bed, you have a lot of seizures, or you're not following commands, that can signal a longer recovery or more residual deficits, especially cognitive deficits.

[00:41:59] Or if you have a delay in your treatment from the onset of your symptoms because they were worried about infection in the beginning, and so you're going through multiple rounds of antibiotics and not receiving the immunotherapy, which is the treatment, that could certainly make recovery longer and not as great. And so, it's really dependent on a lot of different factors, and so we can't really pinpoint one specific thing that will let us know whether your recovery will be good or not.

[00:42:44] And a lot of times, the patient surprises us. Because we see them two weeks into the hospitalization and they're still really affected, and then three months later in the outpatient clinic and they're back to normal. And stratifying their trajectory in the acute setting is very difficult, and we tell families that.

[00:43:11] **Krissy Dilger:** Thank you. We did get a question about transitioning from pediatric to adult care. So, if a child is diagnosed and then they are going through their teenage years and reaching that moment where they're going to transition to adulthood and maybe switch over to an adult neurologist from their pediatric clinic, what kind of things should they be aware of? Are there any tips or tricks that you like to use in your clinic to help teens prepare for that transition? Are there any factors that they should consider?

[00:43:57] **Dr. Linda Nguyen:** Yeah. I think it depends on what neurology clinic you come from, because some clinics have a sort of transition coordinator where they prepare the teen—starting maybe even at age 16—for that transition eventually, once they turn 18 or graduate high school. And so, some clinics have that, such as our own. But I think as you're transitioning from being a child to an adult, the biggest thing is taking charge of your medical condition, understanding what you have, and not being dependent on your parent to provide the information is important in that transition period.

[00:44:52] So, as you're graduating pediatrics, trying to be the primary person giving the information, the person asking the questions at each visit, and just being a part of the visit is going to be important in that transition period. Because when you transition from pediatrics to the adult clinic, it's a big change. It's a much different vibe as well. And I think that's one thing that our adolescents can certainly do, just to be more a part of the visit.

[00:45:34] **Krissy Dilger:** So, how would you best, I guess, counsel someone who is experiencing weakness and whose muscles don't seem to be moving quite how they used to before? What would your recommendation be for someone who is experiencing those symptoms?

[00:45:56] **Dr. Linda Nguyen:** Yeah, I think it depends on what is possibly contributing to that weakness. Certainly, if it's a residual symptom, continuing to work with physical therapy—not necessarily going to sessions every day or every few days, but checking in with them on occasion—can be helpful as well, just so that they're reevaluating you and making sure that if there are specific exercises that can be done that improves your ability to move those muscles and strengthen those muscles, it's helpful.

[00:46:40] And as you learn from the physical therapist, applying those exercises on your own is important, not just during the sessions. And then if it's a sort of worsening of your underlying weakness, then evaluating what is contributing to that— whether that be because there are other stressors going on, there are mood symptoms that are not being addressed, sleep issues that aren't being addressed, fatigue, or if this is a new sign of disease activity—are all important things to look at.

[00:47:24] **Krissy Dilger:** Thank you. Someone wrote in and said that they have had sleep issues recently and they were wondering if that could be related to the ADEM, and if so, is there any kind of medication or anything else they can try to help them sleep through the night better?

[00:47:46] **Dr. Linda Nguyen:** Yeah. Sleep issues can be a symptom as a result of the brain injury. People that have ADEM are more at risk for developing sleep issues, just like people with other brain injuries, like traumatic brain injury or other neuroinflammatory conditions, are at risk for that. As a sign of disease relapse, it would be unusual in itself.

[00:48:15] So, usually it's more a symptom of prior neurological injury. If it's new sleep issues, it's always important to address the context in which those sleep issues are coming forth and trying to investigate further. A lot of times, as neurologists, we're not sleep experts.

[00:48:42] And so, if we try the common medications like melatonin or something like Trazodone and that's not effective, and if it's not a mood disorder, then we do refer to our sleep medicine colleagues to get even a sleep study to look at the efficiency of the sleep-wake cycles to address the ongoing sleep issues.

[00:49:16] **Krissy Dilger:** Thank you. I actually think that is the end of our questions. I don't see any more coming in, so we can, I think, wrap it up. We covered a lot of ground, and I'm really happy that we were able to do this.

[00:49:35] **Dr. Linda Nguyen:** All right. Thank you so much for all the questions.

[00:49:38] **Krissy Dilger:** So, thank you so much, and we'll see you next time.

[00:49:45] **Krissy Dilger:** Thank you to our "Ask the Expert" sponsors: Amgen; Alexion, AstraZeneca Rare Disease; Genentech; and UCB. Amgen is focused on the discovery, development, and commercialization of medicines that address critical needs for people impacted by rare autoimmune and severe inflammatory diseases. They apply scientific expertise and courage to bring clinically meaningful therapies to patients. Amgen believes science and compassion must work together to transform lives.

[00:50:19] Alexion, AstraZeneca Rare Disease is a global biopharmaceutical company focused on serving patients with severe and rare disorders through the innovation, development, and commercialization of

life-transforming therapeutic products. Their goal is to deliver medical breakthroughs where none currently exist, and they are committed to ensuring that patient perspective and community engagement are always at the forefront of their work.

[00:50:45] Founded more than 40 years ago, Genentech is a leading biotechnology company that discovers, develops, manufactures, and commercializes medicines to treat patients with serious and life-threatening medical conditions. The company, a member of the Roche Group, has headquarters in South San Francisco, California. For additional information about the company, please visit www.gene.com.

[00:51:13] UCB innovates and delivers solutions that make real improvements for people living with severe diseases. They partner with and listen to patients, caregivers, and stakeholders across the healthcare system to identify promising innovations that create valuable health solutions.