

Navigating Toward Neonatology: Pediatric and Neonatal Seizure Considerations

Benjamin Hopkins, OSMIV, Elba Simon-Fayard, MD

“Welcome back to my third installment. My name is Benjamin Hopkins, and I am currently a fourth-year medical student at Western University of Health Sciences in Pomona, California. When ‘I grow up,’ I want to be a Neonatologist. Look at last month’s journal for my previous article and follow along with this column as I navigate my way to becoming a Neonatologist.”

Welcome back to my third installment. My name is Benjamin Hopkins, and I am currently a fourth-year medical student at Western University of Health Sciences in Pomona, California. When ‘I grow up,’ I want to be a Neonatologist. Look at previous months’ journals for my earlier articles and follow along with this column as I navigate my way to becoming a Neonatologist.

Currently, I am interviewing for pediatric residency programs. Knowing that I am heading toward a fellowship, my application prioritized “Categorical pediatrics” programs with high match rates in Neonatology and programs that will offer me broad exposure to neonatal patients with close connections to multiple hospitals with different levels of neonatal ICUs.

I am currently rotating with a pediatric neurologist specializing in pediatric seizures. It has been a fantastic experience, with various “bread-and-butter” and complex patients and many unique patients in the inpatient and outpatient settings. The attending neurologist I work with is an excellent instructor who offers individualized patient care, exceptional treatment options, and education to each patient and their family. Most of my time was spent treating patients with chronic seizure disorders, along with general pediatric neurology consults.

One of my patients on this rotation is a young man with Juvenile Myoclonic Epilepsy (JME). JME is a seizure disorder that is characterized by myoclonus, absences seizures, and generalized tonic-clonic seizures and is most likely due to an underlying genetic defect (1). This patient had been dealing with JME since he was an adolescent, and only within the past six months has he gotten it under control with a good regimen of Depakote. Although this is a genetic-based disease, the only genetic testing that had been done was a Micro-array, which showed normal results. There was no further genetic workup at the parent’s request, as the symptoms have been well controlled. Genetics plays a significant role in various disease processes and should always be considered part of the whole picture when treating pediatric patients with seizures. JME is a lifelong diagnosis and requires treatment even when asymptomatic (1). It is critical to assess and treat seizures of all types as soon and effectively as possible to mitigate potential damage to the brain.

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Neonatal and pediatric patients are both at risk for seizures and seizure-like activity from a variety of causes. Neonates in the first weeks of life have an increased susceptibility to seizures due to age-depend physiologic features of the developing brain, unique risk factors associated with gestation, delivery, and the immediate post-natal period, as well as a symptom of acute brain injury but are rarely due to neonatal-onset epilepsy syndromes (2, 3). Neonatal-onset epilepsy syndromes are often related to underlying structural, metabolic, or genetic disorders (3). Pediatric seizure patients’ etiologies range from obvious masses to subtle gray matter heterotopias, in addition to metabolic and genetic disorders (4).

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Neonatal seizures are harmful to a developing brain and can be a challenge to identify; in addition, pediatric seizures with status epilepticus carry a substantial risk for morbidity and mortality (2, 3, 5). Healthcare providers should have a high clinical suspicion for seizures in those with increased risk, even without prodromal

symptoms. Early identification and treatment are critical for short and long-term outcomes (3, 6). For suspected seizures, monitoring with electroencephalogram (EEG) should be started as soon as possible (2). EEG will help assess concerning events, screen for sub-clinical seizures, and measure the EEG background (2). In addition to EEG, computed tomography (CT) and magnetic resonance imaging (MRI) can be used to assess for masses, calcifications, cortical dysplasia, and ectopic gray matter (4).

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Initial treatment for acute seizure is similar regardless of etiology; however, long-term treatment and prognosis vary greatly depending on underlying seizure etiology (3). Initial treatment for neonatal seizure is often phenobarbital, while for pediatric seizure, it is often a benzodiazepine (6). Current international guidelines indicate that antiseizure medication be administered as soon as possible but do not guide a specific timeline to follow (5). Numerous studies have shown that infants and pediatric patients who have a documented seizure via EEG and are treated within one hour of seizure onset have the lowest seizure burden and fewer additional seizures in the following 24 hours (6). Seizure burden is similar in those receiving antiseizure medication after the one-hour cutoff, regardless of length past the cutoff (6). Even though the relationship between seizure burden, treatment, and outcomes is not entirely understood, it has been observed that the higher the seizure burden, the worse the long-term outcomes (5, 6). This has been seen even after adjusting for possible confounders such as age, etiology, illness severity, therapeutic hypothermia status, age at initiation of EEG, and age of first seizure (5, 6).

Recognition of seizures remains a challenge, and undertreatment and overtreatment are an ongoing concern, as studies have documented that antiseizure medication can lead to neuronal apoptosis, poor brain development, and later cognitive impairments (2, 3, 6). As there are no clear protocols, neurologists, neonatologists, and pediatricians must develop a systemic approach to precise etiologies (2, 6). The relationship between seizures and outcomes is complex and will depend on numerous individual and generalized factors; however, with advances in genetic medicine, the option for personalized medicine will increase (3, 5). Each seizure must be evaluated for an individual etiology in parallel to treatment initiation; this can help streamline medical decision-making and optimize acute and chronic patient outcomes.

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This month, I had the pleasure of talking with Dr. Elba Fayard, the current neonatal division chair at Loma Linda University Children’s Hospital. We spoke about what makes a great neonatologist, critical care physicians’ mental wellness and feeling of purpose, the current decreased interest in the NICU, and how to increase interest for future providers.*

1. **What qualities are “most essential” to excel as a neonatologist?**

Caring and having an extraordinary feeling for babies with tremendous needs. Those special heartstrings that people feel when they see little innocent babies suffering, those unique caring feelings that overwhelm you, cause you to think, “I want to help them.” Compassion and caring that is primarily directed at innocent, powerless patients.

If you want to go more specifically to Neonatology, someone who thrives in details and likes high-stress situations with rapid outcomes. Type A personalities that enjoy being busy helping but also could work with teams. The work of a neonatologist is not solitary. They need to be humble enough to realize that they cannot do everything by themselves but be able to work with others, receive help and support, and find the common goal of helping the baby and their family.

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Another is going from one patient to the next to see something much bigger than the baby. Which is the family around the baby; they are a unit with the baby itself. Then, in terms of timing, it is

just not here and now. I want to know how my current work will impact the future. All that will help the person to say, this is my work.

I like the track of intense work; it is very stressful and emotional at times, but as overpowered by that compassion and caring, I will selflessly try to work with others to help the baby, the family, and the kid for the future.

2. **What do you now know that you wish you had known before going into Neonatology?**

One thing now that I did not know before, and I wonder if it is good or not, is that technology is constantly changing. It is not just changing access and having increased knowledge but also leading to changes in the business model and health insurance.

Medicine, in general, is changing, and Neonatology is with it. A lot of business impacts Neonatology that was not there before. You see a lot of big institutions merging and a lot of decisions being made, not necessarily based on the better care or the best outcomes for the babies, but just on the survival of the institutions and the medical care that we need to deliver.

Other things that are very different from before are why physicians pick specialties; the reasons differ from what they used to be. If you pick Neonatology for financial reasons, you will be wrong. If you pick it for ease of living a well-balanced life, you must think twice. Decades ago, that did not necessarily impact our field, and we had a lot of good, excellent doctors going to Neonatology because of their passion for helping babies and taking care of babies and their passion for research. Attracting the new generations toward these goals is getting harder and harder. There are different priorities in life, and I do not know that I would have done something different, but it is different now.

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One thing I did not know I would have to do was how much I had to adapt to the changes in society, trainees, and medicine. I thought that whatever I saw in a new medical field would stay like that. Is it society, or is it all the issues we have had to encounter? Of course, COVID is on the top of that. It turned many things upside down, and recruiting trainees for our field is more challenging.

3. **How are you drawing more people toward Neonatology because of the decreased interest in the field?**

I love that question because we are constantly brainstorming about what I am saying. We are presented with different challenges, and

we still believe this to be one of the best medical fields. We are trying to see how the new or future doctors make their choices in different ways than we did in our time. I'm not saying it's better or worse; it is just different. We need to learn to find those who love babies.

We are looking into getting more active with medical schools, for example, exposing the medical schools to these specialties. It's not something terrifying that you eventually are made to rotate through, and you are quivering in your knees to make sure you're not going to break the babies when you touch them, and they're not going to die on your watch. But to get you more acquainted with the good and the positive side of it, having more exposure early in the formation of the physician's training. We want to ensure they know this is out there because there are still people trying to become a physician with this passion for babies. If they were allowed to get more involved, for example, in rotations and electives where the students have more exposure to more direct interaction with the families, the parents, and doctors.

It is a similar thing with pediatricians. The direction in which the Board of Pediatrics and the pediatric residents are moving towards is more and more general pediatrics and outpatient. They think that is what they need to learn; they believe the need to learn in these intensive settings is a waste of time. Yet many people would like to be doing that for their lives and should be allowed to experience it. We are now trying to expose more students to Neonatology and have electives for the residents interested in going for fellowship.

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Another possibility we are opening is that there could be a group of doctors and pediatricians who could not care less about research. Still, they are very passionate about taking care of babies. We are starting a program for neonatal hospitalists. It is a shorter program where you have more clinical experience with the neonates and then work in the NICU. You do not necessarily get the board of Neonatology, but you work with babies and their families, and if that is what you like, it is a beautiful life.

We are very actively coming up with ideas and changing the ways we do rotations and exposures from lectures to expose our students or residents sooner and support the ones that finish as pediatricians if this is something they would like to do without necessarily going through the fellowship. Those are ideas and things that we are trying to do to increase exposure and open

up different venues for people who would like to do this, not necessarily in the traditional way.

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4. How do you think the critical care scenario of the NICU affects the chance of burnout? And how should we counter it?

If you look at statistics, yes, you could have a lot of burnout within physicians. Neonatologists and obstetricians have a high rate of burnout. I have a different view than other people too regarding burnout. People usually equate burnout with a lot of work. In my experience, that is one part of it, but it's not all of it, and I do not wonder if it is the most essential part of it. You get burnout when you do not get what you want. You work a lot and are exhausted, and you need to get out of it what you want.

It might accompany my spiritual life, but burnout correlates with a lack of purpose. When you do not feel that you are there with a special mission accomplishing something for somebody, you do not see why you work extra and get upset and tired. But if you finish your shift and stay an extra two hours to do an exchange transition because you wanted to learn it, and after that, you see the mother crying in the hallway, and you spend an extra half hour calming the mother down and giving them your heart and your mind. You go home with such a sense of satisfaction that if you have an hour less sleep than you wanted, the rest of your sleep will be worth it, and you will feel fulfilled, refreshed, and want to return.

The burnout person is unsatisfied and sees work as a burden, and they want to avoid returning. When you get up in the morning, and it gets tough to get to work, it is a moment to start thinking, what is the problem? Why am I so dissatisfied? It is not necessarily money, at least not all the time, and it's more than just the amount of work. It is what I am getting from it. My emphasis with my faculty and trainees is you have to know why you are here. You have to want to be here. You have to feel that you have been placed here with a purpose. Your purpose in life is to serve; you will be so happy when you do that with compassion, care, and love. That is not burnout that's going to get you down. Of course, that's easier said than done; we have ups and downs, and when we also lose a baby and we have not had a good rest for a whole week, you may cry, and you will need a little rest to recover. We are all human, flawed, you know. I could use purpose and service as the best antidotes for burnout.

Work-life balance is essential. I applaud the new generation, as work-life balance is what you find everywhere, and that is important. Still, again, it is not the most important; you need to have time for family, your time for rest, your time for spiritual activities, your time for work, and all the other aspects in places where I find people who elevate that work-life balance to such a degree. They are jealous to protect their free time that they cannot do anything worthwhile or serve. They are always just looking at themselves and protecting their free time. In saying that, work-life balance is necessary, based on working and enjoying your work.

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5. What are you currently working on?

I do not have as much research because my administrative demands are enormous. However, I am very involved in the nutrition of the newborn; that is one of my passions, so I am looking at how changing the balance of the macronutrients and adding some things like DHA to the diet and increasing phosphorus and other things will also help with the energy and growth in the babies and how that growth will decrease lung disease. That is an area that I find very interesting.

In QI, I have a lot of projects that I am trying to get through, such as hand hygiene, discharge preparedness, and things like that where bringing people together and trying to achieve optimal care are essential things like the use of central lines and the decrease of infections. Hence, all those things are significant projects that we have. We always ask students, nurses, and fellows who would like to participate. There is so much to be done. It is gratifying to see the difference that the little things make in the lives and outcomes of these babies.

Every area of medicine has further research and understanding to be had. Each encounter we get has something to teach us and gives us opportunities to improve on current approaches. I appreciate the NICU's dedication to research and continuous drive

to improve patient outcomes. I also want to send a special thank you to Dr. Elba Fayard for meeting with me this month. Continue to follow along as I navigate my way to becoming a neonatologist.

*Answers paraphrased from video/voice call.

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Corresponding Author



*Benjamin Hopkins, OMS IV
Western University of Health Sciences
College of Osteopathic Medicine of the Pacific
Email: Benjamin.Hopkins@westernu.edu*



*Elba Fayard, MD
Professor of Pediatrics
Loma Linda University School of Medicine
Division of Neonatology
Department of Pediatrics
Loma Linda University Children's Hospital
Loma Linda, CA*

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