

Dr. Lam: This is a very hopeful time for patients that we would have considered not candidates for surgery even 10 years ago. There are now more and more options.

Amanda Wilde (Host): Cutting edge, innovative techniques and equipment are transforming care for pediatric epilepsy. So, let's learn more about the leading edge research and technical advances in pediatric epilepsy treatment, including surgical options with Dr. Sandi Lam and Dr. Joyce Wu, renowned Pediatric Epilepsy Specialists at Ann and Robert H. Lurie Children's Hospital of Chicago. This is Precision, Perspectives on Children's Surgery.

I'm Amanda Wilde. Dr. Lam and Dr. Wu, welcome. And thanks for your time. You run one of the busiest pediatric epilepsy programs in the country, and I know at Lurie Children's Hospital on the practical side, you're employing the latest technical advances. And then on the research side, you're working to understand and treat epilepsy better. Dr. Woo. How do you combine those in your philosophy of care?

Joyce Wu, MD (Guest): You know, when a child first presents to Lurie with epilepsy, we look at what's already been tried and really customize the next plan of care. Certainly we start with medications and what might be some of the most appropriate and most effective medications that the child hasn't tried in the past. We certainly also think about, gosh, you know, what's causing the epilepsy? Whether it's something that we can see on imaging, something we can see on genetic test results, something we can see on the video EEG testing that we do and sort of go from there. If medications have already been failed, we then think about really early on, what are some of the alternative therapies which can certainly include dietary therapies, surgical options, and some of the neuromodulation devices.

Amanda Wilde (Host): Dr. Lamb, how does the multi-disciplinary team work together?

Sandi Lam, MD, MBA MD, MBA (Guest): Thank you so much. It's a pleasure to be here. We are very passionate about working with families and children with epilepsy. It does not affect only the child, but the parents, the siblings and the families who deal with this scary illness. And we take a holistic approach and a team-based approach where the epileptologists and the surgeons, and a whole lot of teammates including neuropsychologists, social workers, radiologists, and more, help evaluate the children and their families and let them know that they're not alone. And we look at the entire armamentarium and the toolbox that we have to help treat kids with epilepsy. And that includes medications. It includes diet like ketogenic diet and it

includes surgical options. And we always make sure to look at each case in a tailored way that is patient-centered so that we can look at all treatment options to make sure that we come up with the best treatment plan for every child.

Host: Yes, because every case is individual. So, when a child is new to your practice, how do you assess their situation and come up with a treatment plan?

Dr. Wu: You know, thinking of some of the newest patients that I just saw who first presented to Lurie again, we use that customized approach of, well, what have they tried? What could be improved? What else they haven't tried and really sort of pick the next best option that's appropriate medically, something that the family can do because some of the treatments do need family cooperation and collaboration.

And the other thing that I might want to add is, you know, families and the parents' perspective and their input is super important. I consider the parents as a team member similar to what Dr. Lam just mentioned. Not only all the medical teams and specialists to take care of this particular child, but certainly the parents' perspective and their input is really important.

And so that is all taken into consideration. And then, we talk about what might be the next best options. And I tend to talk about it in a very neutral way, what are the different options so that the families know about all options, not just the one that perhaps one particular physician has mentioned in the past, or, you know, what have you, so that it's a comprehensive view for the parents.

Dr. Lam: We aim to have a team-based approach. And when patients may be candidates for surgery, we have a multidisciplinary conference every week and we are very familiar with coordinating all of the complex information that has been garnered during the patient's epilepsy journey. We look at all of these data points altogether with all these different specialists, so that we come up with ways to address the issues.

And we also aim to empower patients and families with information so that they can help make the choices that are best for the child and the family. So, even when we think about surgical options, we think about the different surgical options and the pros and cons of each. And we discuss those with the family to see what makes the most sense for the patient.

And what would produce the best outcome. So, we do not think that if you have a hammer, everything is a nail. We have a variety of surgical treatment options from the most traditional tried and true options which typically include a larger surgery and resection to the more recent advances, including neurostimulation

and placement of essentially small computers and devices that are medical devices and surgical implants to help treat epilepsy, to other more minimally invasive techniques, such as endoscopic surgery or stereotactic EEG or stereo EEG, and laser ablation, which would be an MRI guided laser interstitial thermal therapy.

Host: How do you determine if and when surgery is necessary?

Dr. Wu: So, the guideline and sort of accepted clinical practice is when and, you know, supported by medical literature and lots of data over the decades is that if a child or an adult really fails two or more medications that are appropriate treatments for that particular type of seizure; we really start to think about what are the alternative therapies and certainly surgery comes to mind as one of the options.

Dietary therapy is another option. And then again, that neuromodulation devices category of which there are now three different neuromodulation devices also comes to mind. How do we choose between the diet therapies of which also multiples options. How do we choose between dietary therapies? The different surgical options and the different devices really depends on sort of the initial workup of what's causing the seizures or the epilepsy. And so for some etiologies or some causes of seizures or epilepsy, oftentimes surgery is a very good option, often a curative option. For other reasons to cause epilepsy, sometimes dietary therapies are the better option. And so it depends on a number of things, and this is sort of the feature of what, you know, once we get to know your child then we have a better sense of what's causing the epilepsy, what might be some of the comorbid conditions even, that comes with epilepsy and how do we best treat not only the epilepsy, but some of the comorbid conditions and essentially the whole child.

Dr. Lam: This fits into the precision theme very well. We have a tailored approach for every child and we continue to make sure that we get best care for the child in front of us while we think about how to incorporate the most recent advances in science, to be able to inform the treatment decisions for each of our patients.

And that's why we're very passionate about our clinical work, as well as our research work. Because we want patient to benefit from really most cutting edge knowledge that we can incorporate into our treatment plans. And as we take a patient-centered approach, we also have a precision type of approach, which means that it is really for each patient and while some patients can do very well and have very good seizure control with medications only, when patients are continuing to have seizures after being on two medications, we think about

initiating a workup to see if surgery may be an option. And for some patients, surgery can actually produce a cure from the seizures and from the epilepsy. And that's why we're very proactive and always looking for more, and looking at all options because no child should have to live one more day with seizures.

Host: So, you mentioned your research and how that's informed what you're doing now. How has the approach to pediatric epilepsy advanced from 20 or even 10 years ago? Are the advances going quickly?

Dr. Wu: That's a great question. I literally was just talking to someone else. I, started my epilepsy fellowship more than 20 years ago. And just looking back, in the last 22 years, the field has advanced so much. In fact, one of the things I tell parents is, you know, it might seem kind of odd, but if you have a child with epilepsy, this is actually the best time because we have so much option compared to just 20 years ago.

So 20 years ago a lot of the medications, more than half of the medications that are currently on the market, weren't even there. So, first off just the medical options is dramatically different and dramatically more options on the market. Having said that, the number of children who continue to have uncontrolled epilepsy, unfortunately remains the same in terms of proportion. And so we do rely more and more on again, what I call alternative therapies and surgery is sort of top of that line, because again, it could be curative. And so just from the surgical options, Dr. Lam just mentioned a number of new advances, like the stereo EEG, like the laser ablation, some of the tools that we use to have a much better sense of where the surgical target might be, how much the spatial extent of that surgical target is, have also been improved a lot by neuroradiology techniques. Some of the EEG and clinical neurophysiology tools, some of the functional imaging tools that really all help us figure out where's the surgical target and how big is that target?

And then including, gosh, you know, if there's no target at all, what might be the next steps to do and that line of technology has also improved significant in the last 20 years, as well as what, if you have multiple targets? How do you know which one to go after? And so all of that has really advanced significantly in the last 20 years.

Dr. Lam: This is a very hopeful time for patients that we would have considered not candidates for surgery even 10 years ago. There are now more and more options. The medical devices including neurostimulators that we are able to use now, did not exist two or three decades ago. The laser technology that we are using in the brain now, did not exist two or three decades ago.

And we are very lucky here to have been part of the development and the early adopters of this technology to try to provide hope and cures for our patients. So, we have a lot of experience with these newer technologies compared to a lot of other centers. And it is humbling for us to see how far the field has evolved and how far the field has yet to evolve.

And we feel that we're able to treat a lot of patients better, that we did not have good medical or surgical options for in the past. And now we're able to provide that additional level of hope and more options. Even when we know that this can be a chronic disease, that we may not have a cure for, but some patients we're able to control the seizures a lot better, or be able to offer the hope of a cure.

We also understand genetic etiologies a lot better now. There's a lot more work to do, but we are able to tailor medical treatments better. And we're also participating in clinical trials. For instance, we have an upcoming clinical trial that is going to be first in human, that is going to be a gene therapy for children with Dravet syndrome. And that is incredible to imagine.

Host: So looking back over the years, we've seen really significant advances. Looking forward as researchers, you just touched on that. What do you think the future holds?

Dr. Wu: Future looks great right now. We haven't mentioned, there's now significant push if you will, to see if genetic conditions, since we just mentioned genetics, if certain genetic conditions could not only get that first in kind human genetic therapy treatments, could certain genetic conditions if they could be diagnosed before the seizure onset be prevented meaning preventative therapy so that could we prevent seizure onset. Could we improve the disease course if we can't prevent the epilepsy onset altogether or improve the functional outcome?

If we can somehow do some kind of preventative therapy, meaning the functional outcomes, the developmental outcome, the child as a whole function and develop better for some of these genetic conditions that we can diagnose before the seizure onset. So, that is actually something that's happening in another genetic condition called tuberous sclerosis complex. And so there's already trial results out from our European colleagues. There's trial results that are pending here in the US. So, it is a very exciting time that there could be genetic therapies as well as preventative therapy.

Amanda Wilde (Host): Dr. Lamb? How is your research influencing treatment for all children with epilepsy.

Dr. Lam: We care about patient-centered research. We care about our communities and we care about public health. So, we are involved with family advocacy groups and also health services research to think about how we can help influence public policy so that we can help more patients and families. So, part of our research looks at patterns of care in pediatric epilepsy and how we can address healthcare disparities, because we know that we have better and better treatments for kids with epilepsy including medicines and including surgery. We also know that a lot of children and their families actually are affected by epilepsy, but do not have access to the best epilepsy centers and the most cutting edge care. And why is that? And in 2022, that's not good enough. And a lot of our research work focuses on how to address those healthcare disparities, especially as it relates to pediatric epilepsy so that we can be a part of that solution.

Host: This is really thoughtful patient-focused, premier care and treatment for pediatric epilepsy. Thank you, Drs. Lam and Wu for sharing your insights today.

Dr. Wu: So much for having us.

Dr. Lam: Thank you very much.

Host: Learn more or book an appointment at Luriechildrens.org/epilepsy. Or call 1-800-KIDSDOC. I'm Amanda Wilde. Stay well.