

[MUSIC PLAYING]

- NICHOLAS WETJEN:** It's an exciting time in management at pediatric epilepsy patients because of the advances we have in imaging, stimulation, surgery, medications that allow for a lot more options than we had in the past.
- GREGORY WORRELL:** Two decades ago we might not have been able to identify a lesion, an abnormality in the brain, that is the source, the cause of someone's epilepsy. Whereas today, with sophisticated imaging techniques that not only use higher magnet strings but also make use of computational tools to analyze those images, we can identify to within a millimeter of where the seizures are originating.
- LILY WONG-KISIEL:** There are early options that could be curative and eliminate the cost of having medication side effect, continuing to have seizures, and to have better quality of life earlier rather than later. So in the appropriate patients, you have focal epilepsy where a single focus could be identified. We can treat seizure, cure seizure very early on.
- NICHOLAS WETJEN:** Neurosurgery has evolved significantly over the past 20 years to be much safer than it was in the past. And with the combination of imaging together with improvements in surgical technique, morbidity or problems that can result from the operations has declined dramatically.
- GREGORY WORRELL:** We know that epilepsy surgery is very efficacious in carefully selected patients. But unfortunately, it's enormously under utilized.
- LILY WONG-KISIEL:** When the eloquent cortex overlap with the focal onset point, you don't want to sacrifice that motor function, for example. In those cases, we do not do resection, but there are other options where we can do investigative procedures, for example, here at the Mayo Clinic. We have the option of doing subthreshold chronics stimulation.
- GREGORY WORRELL:** So this is where electrodes are implanted on the surface of the brain, or within the brain, and target that region with electrical stimulation, which doesn't destroy the normal function, but controls the seizures in that region of brain.
- Vagal nerve stimulators are a stimulator that's placed in the neck on the vagus nerve, always on the left side. It itself has a role in treating patients in which we can't really figure out where their focus is coming from, or in patients that maybe don't have a focus, like generalized epilepsy. And a certain proportion of those patients, they respond very well, have a reduction in seizures.
- LILY WONG-KISIEL:** There are certain seizures where there is no warning. Kids suddenly drop or have atonic seizures. There are other seizures where one goes into a generalized tonic-clonic seizure, and these are seizures where you cannot protect yourself.
- NICHOLAS WETJEN:** Those kids in particular are at risk of falls and head injuries. Multiple visits to the emergency room because they'll lose tone and then fall, hit their face on something, hit their head on something, break an arm. Those can be pretty devastating seizures. Those patients are really effectively managed by an operation called a corpus callosotomy. In about 80% of the patients that we do that operation on, their atonic seizures go away.
- LILY WONG-KISIEL:** Epilepsy can have high comorbidities, including learning disability, sleep problems, anxiety, depression. And in fact, we know about one in 10 patients with epilepsy may have depression. One in 5 may have anxiety.

- NICHOLAS WETJEN:** Particularly in temporal lobe epilepsy, the amygdala and hippocampus that are kind of in the internal structure of the temporal lobe have a large role in emotion and in memory. And if those things are affected by their epilepsy, it can result in psychiatric type behavior and mood changes.
- LILY WONG-KISIEL:** A third of pediatric epilepsy patients may not respond to anti-epileptic drugs. Patients who have tried second third anti-epileptic drugs-- their odds of becoming seizure free with further medication trials is less than 5%.
- NICHOLAS WETJEN:** The third of patients that are medically intractable, meaning that no longer respond to medical treatment and continue to have seizures-- those are the patients that end up being referred and evaluated for epilepsy surgery. The vast majority of patients that I treat with epilepsy surgery, their epilepsy arises from cortical dysplasia or an abnormality in brain development, and then another fairly large segment are brain tumors. But certainly, autoimmune disorders, previous history of infection, previous stroke-- those are also players in the causes of epilepsy.
- LILY WONG-KISIEL:** Epilepsy surgery in the selected patient can offer an early cure. The child may have reduced seizures or no seizures and be on less medication or no medication. With less seizures, we know that cognition improves, development can potentially achieve its maximum or goal. And these are all things that any parent would want for their child.
- NICHOLAS WETJEN:** I've had experiences where I've come into the room after surgery and the family's in tears because their baby girl is now singing along to cartoons on TV, where she's never done that before in the past. It's pretty amazing in some cases. Epilepsy surgery improves the quality of life. And delaying that opportunity or denying that opportunity to the patient, I believe, is unnecessary and even unfair.
- JAMIE VAN GOMPLE:** The 80% seizure freedom is something that we typically reserve for patients that we see a spot that might be causing their epilepsy on the MRI. Or alternatively, patients that have seizures that start from the inside part of their temporal lobe. And that's a very reasonable expectation in then those two very well described epilepsies. However, there's a fair number of patients that don't fall into those categories that still have excellent treatment options available for them.
- NICHOLAS WETJEN:** Our goal is to make all patients seizure free. Of course, it's not always possible. But at least to significantly reduce their seizure burden and improve their quality of life-- that's a primary objective.