

We diagnose CSWS when a patient comes to our office and the parents tell us that that child is having a change in their behavior or their learning. They may have an increase in inattention. They may have new onset hyperactivity, aggression. They may have trouble learning, trouble retaining something that they learn in the daytime. When we do an EEG we find when they fall asleep they go into a continuous spike wave pattern which looks like seizures throughout the night and we know that this is causing problems during the daytime as they wake. We know that their brains have not had adequate sleep. They haven't had the time to kind of set up the new mechanisms of learning overnight. They haven't had time to kind of reset for the next day.

So the prognosis for CSWS varies widely. It depends on if a child has an abnormal brain MRI, if they have a genetic etiology that we can uncover, or if they had just perfectly normal development prior to its onset.

We currently don't have incredibly effective treatments for CSWS. Each treatment, at least in larger trials, has had an efficacy of under 50% depending on the cause of the CSWS and each child. So we really are continuing to look for better treatments and better algorithms that will help our patients more quickly because the sooner that we effectively treat a child with CSWS, the more likely we will have a full recovery of all of their cognitive functions.

What is very unique about the way we manage CSWS is that we treat for a short period of time and we're treating during the most hyper-excitabile time in a child's development when the brain is really developing and is really has a lot of neurons that are being pruned and directed to the right way. And so we know these treatments can last weeks to months and occasionally sometimes a couple of years, but they are not lifetime treatments. Almost every child will outgrow CSWS, but these treatments help us to reduce the cognitive impact that can occur during the time that they have this spiking and sleep.

So in the future, what we would really like to see is not only earlier identification of CSWS by alerting people, whether they're pediatricians neurologists parents to the existence of this disorder so that we can get those EEGs done sooner.

In terms of treatments that are currently under development in CSWS, we'd really like to see a treatment that is easily given, like an oral medication that we could take once a day for a period of several weeks to months to even years. We'd like to see that have little to no side effects so that we're not having to monitor the child with repeated blood draws or tests.

Additionally we want to see that it is efficacious, that it really stops this EEG pattern soon. Most importantly that we start to see clinical improvement in the children. And improvement and their learning, their memory, the coordination whatever they had seen in the beginning, we want to see that improve significantly.

So when we're diagnosing CSWS, we must see a sleep EEG. If a child has a first-time seizure or just experiences a developmental stagnation or regression, an awake EEG will not capture what we need to know. We can do a sleep EEG even over a nap. And as long as we capture that sleep state, we can identify whether or not CSWS is present.

If a child undergoes an awake EEG and no sleep is captured, we will miss actually the diagnosis of CSWS and that child could separately be diagnosed with maybe an attentional and hyperactivity disorder or a

learning disability. But if the root of it came from CSWS, that's a misdiagnosis and these are the children that we think are out there and that our needing treatment yet have not been identified.