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Optimizing VNS Parameters: Keys to Therapeutic Success

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Dr. Aaronson:
This is CME on ReachMD. I'm Dr. Scott Aaronson. Joining me today is Dr. Raman Sankar.

Let's start our discussion with a case. Roberta's a 22-year-old woman who has had a VNS device installed a week ago, and the device has been set at 0.25 mA current at 500 µs pulse width and 30 Hz frequency. She is yet to have her follow-up appointment with her epileptologist and is complaining of intermittent hoarseness and discomfort from coughing.

Dr. Sankar, what are some considerations you can suggest for VNS programming for Roberta and for programming in general?

Dr. Sankar:
Gladly, Dr. Aaronson. One of the interesting ideas here is that the typical adverse events reported are indeed intermittent cough to voice changes such as hoarseness. These were, in fact, found during the initial clinical trials. But what we have to remember is the pivotal trials that were undertaken more than 2 decades ago for FDA approval involved rather aggressive settings. We almost never start a patient with a 500 µs pulse width and the 30 Hz oscillator setting any longer. I typically start patients at 250 µs and some people even go as far down as 125 µs, and the pulse width is really the current density rather than the flow. And likewise, the oscillator can be set lower than 30 Hz, potentially at 25. And with those settings, we can titrate very, very slowly, usually as slow as I used to titrate at 0.25 mA, but you can set the modern device for continued titration at home at even half of that, like 0.125 mA. So starting with a less aggressive pulse width and a lower oscillator frequency, and a gradual titration should substantially improve their tolerability. And usually when I reach about 1.25 to 1.5 mA, I stop to see if that is sufficient. I may pause there for a few weeks.

Dr. Aaronson:
Thank you. Let me add a couple of comments to that. I do want to mention a couple of caveats in terms of use of VNS in a depressive population that we don't have any data to suggest efficacy in psychotic depression, so that's not a recommended treatment. And as well, we do find that if you've already had neurostimulation, those folks tend to demonstrate greater improvement when compared to folks who have a device not turned on.

As well, within psychiatric treatment, I tend to want to maximize my total delivered charge. And the total delivered charge is a combination of what the current is, what the pulse width is, what the hertz is, and what the duty cycle is. I tend to leave my pulse width all the time at 250 for the reasons that that Dr. Sankar is saying, which has to do with tolerability, and tend to leave my frequency at 20. The 2 things I adjust are my delivered current and my duty cycle. And do bear in mind that by going from, let's say, a stimulation of 1.0 mA to 1.25 mA, you're increasing your delivered charge by that change from 1 to 1.25, or by 25%. Whereas if you change the duty cycle, meaning the percent of time that the device is on, you can dramatically change as you go from, let's say, a 5-minute off time to a 3-

minute off time.

Wonderful discussion yet again. And thank you, Dr. Sankar. And thank you for listening.

Dr. Sankar:

Thank you.

Announcer:
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