WILLIAM ALEX VANDERGRIFT: Once we identify that the hippocampus, which is an inside portion or a mesial component of the temporal lobe, is not the primary memory area, then we can do a surgery to try and remove or take that part of the temporal lobe offline-- part of the seizure circuit offline. It's a very common place where seizures start, in the temporal lobe. So there are a couple of ways that we do that, and one is with an open operation where we make a skin incision. We take part of the skull off, and we remove the front part of the temporal lobe, along with the hippocampus. That's called an anterior temporal lobectomy. That surgery's been around for decades. It can be very effective in patients with temporal lobe epilepsy.

In the past decade-- I'd say 5 to 10 years, we've been doing a newer procedure called laser ablation, and the idea behind laser ablation is if we can identify that the hippocampus is the single area that is generating the seizures, anterior temporal lobectomy's removed a fair amount of the normal temporal lobe over above the hippocampus. Not removing that would be ideal, so laser ablation is very precisely putting a laser probe into the brain tissue in that hippocampus, and burning it or cauterizing it with a laser, without injuring the other portions of the temporal lobe.

So every operation has a risk, and there's a balance of risk and benefit. The benefit, obviously, is to try and rid a patient of seizures. And the risks revolve around putting something into the brain. So there's always a chance that when we put the laser probe into the brain, that we injure a blood vessel and cause a stroke or a blood clot. There's a chance of injuring some of the vision pathways that normally course in and around the temporal lobe.

Now, with any operation, there's a risk for infection. We always give antibiotics ahead of time to help fight against that. Your brain has brain fluid around it, and there's a chance that the fluid leaks out of the incision that we make. It's a rare thing to see, but possible. There's a great deal of work that goes into the planning of where that laser goes to try and reduce or mitigate the risk of one of those hemorrhages. So I spend a good deal of time looking at the MRI scans and planning a trajectory for that laser, so that it will go around and miss the arteries and veins inside of the brain.

When we do laser ablation, we make about a centimeter incision, and we make a hole through the skull about the size of a pencil. When you get the whole business done just through that little small, sort of percutaneous or minimally invasive aperture. With open operations, you might take a window of the skull off that's the size of an egg, and you expose the brain to the air and the heat and the light and so forth. And it's just a bigger opening and a bigger chance for infection, a bigger chance for a blood clot, and so forth.

MUSC's an ideal place to have this technology. I am part of a very big team that helps to cure patients with epilepsy. I'm not just a single practitioner. We have over a half dozen dedicated neurologists that take care of patients with epilepsy. That's all they do, is take care of patients with epilepsy. So they don't see patients with headaches or multiple sclerosis or stroke or what have you. And we cover the adult and pediatric spectrum. We have nurse practitioners and physician assistants and nursing crew and coordinators that are all dedicated to treating patients with epilepsy. And we have places in the hospital-- a wing of the hospital that is dedicated to be able to take care of patients with epilepsy, so that they have the monitoring that's required to do video EEGs.

The nursing staff are trained to be able to take care of patients with epilepsy. All those things are essential to be able to have a good, functioning epilepsy department. On top of that, you need surgeons that can deal with epilepsy from a surgical standpoint, and you need to have all the accoutrements that go along with that-- all of the things that are offered. So whether it's open operations, replacement of the grid electrodes on the surface of the brain or strip electrodes underneath the brain, placement of stereo electroencephalographic or SEEG electrodes inside the brain, or depth electrodes for investigatorial purposes.

And then doing operations where we reset portions of the brain, either minimally invasively or openly, doing laser oblations, doing things like cerebral, responsive neuro stimulators, where we put electrodes into the brain and hook them to a small generator and battery that will block electrical seizure activity. All those things are important to be able to take care of patients, because seizures aren't-- every patient is an individual. And you can read chapters in books about temporal lobe epilepsy, but every patient has a little bit different individual requirement. We need to be able to cater to that, and it's important, because patients need individual attention and personal attention. So having a big team is essential in doing that.