[MUSIC PLAYING]

SPEAKER: This is an interesting case, really rarely performed. It's pediatric auditory brainstem implant. Auditory brainstem implants are indicated for patients who have neurofibromatosis type 2 and bilateral acoustic tumors, so they lose their cochlear nerves as part of their management typically. Also, brainstem implant could, in theory, be helpful for children who were born without cochlear nerves, which, thankfully, is a very rare condition which you are faced here in this case.

So we identified the sigmoid sinus, we drilled a channel that hosts the electrode that connects the device receiver which we drilled a well here, and it's all in the posterior tissues. And again, we did the craniotomy posterior to the sigmoid sinus, and we can see this is basically a retrosigmoid craniotomy.

We can see the dura here held anteriorly with visible suture. This is the post trapezius ridge and the cerebellum is underneath all the tissues here, right? So this is the cerebellum being held back. There's a little retract, I hear a blade retractor. First, we go into the inferiorly in to the cisterna magna to release cerebrospinal fluids. And so that's a process that takes a few minutes.

We placed a retractor and we find the structure of the CP angle. What we can see here is a further retraction of the cerebellum. We get into the CP angle where we can only see one nerve, which is the facial nerve, as expected given that this child has a cochlear nerve deficiency. We further remove arachnoid bands holding really the flocculus, most lateral aspect of the cerebellar vermis in place here.

We can see the IX, X, and XI cranial nerve underneath it. Moving those arachnoid bands again, freeing this part up. And now we have a nice view of the lower cranial nerve, see to the right, and the facial nerve to the left. Again, further removal of arachnoid bands.

And this is the flocculus, the structure I mentioned previously. So you can see nicely cranial nerve IX, cranial nerve X, and to the right here, most fully inferior will be cranial nerve XI. We can see a spinal accessory nerve here. And those are freed up, there are usually some vascular structures in the area.

It's always nice to see the diagnosis of cochlear nerve deficiency confirmed intraoperatively. And this is cranial nerve IX, and cranial nerve IX will serve as a landmark to take us right into foramen of Luschka, into cochlear nucleus where this implant is placed.

So we further retract the flocculus again, really nice view of cranial nerve XII, IX, X, and XI. And we can see the vascular loops is usually a PICA loop, so Posterior Inferior Cerebral Artery, into inferior cerebral artery. Refer to dissect the lower cranial nerves to really allow us to move this part of the brain, retract this part of the brain really posteriorly to give access to the foramen of Luschka.

It's quite a tedious process. It takes a little bit of patience and time. And again, the vascular structure, so you can see here, is quite a common picture. And again dissecting further into foramen of Luschka. Further retracting the flocculus here, really until we see the chorid plexus. Right, the chorid plexus serves as a landmark together with cranial nerve IX. That takes us right into this area.

And as you can see, the difference between cranial nerve IX and X here as well. Anatomic difference; how broad cranial nerve 10 is. So and this shows us some of the soft tissue structures here of foramen of Luschka.

Further remove scar tissue in the arachnoid bands to really get us onto the cochlear nucleus. So do you see how cranial nerve IX take us right in there? That's when you activate the brainstem implant. It's really critical to monitor cranial nerve IX to not cause any stimulation.

So here's dissecting the lateral recess. See the chorid plexus coming up, which is named for its resemblance to coral. Again, opening that lateral recess so we can place our brainstem implant.

Again, quite a tedious process; lot of tissue. We open it up enough to assist the brainstem implants brought into the field. So the receiver stimulator is secured in the post [INAUDIBLE] area, and now we bring the actual brainstem implant in. We see the paddle. The wings have been cut down a bit and we initially place it. Now, nice view of cranial nerve IX here, which we basically follow.

You can see the different electrodes of the paddle of the brain implant. There were 22 electrode contacts. We cut down the area that allows those wings of the ABI basically. Then bringing it up and basically pushing the ABR almost superiorly here into the foramen. Again, onto the cochlea and the cochlear nucleus.

We'd like to stimulate. So what happens then is we stimulate the implant, and we found this to be in an OK but not in a perfect position. So what we do, we repositioned the implant to get more usable channels across the paddle. We do this a few times, so you can't just place an ABI without that electrophysiologic confirmation and the angle that we insert the ABI into the foramen of Luschka seems absolutely critical. And this more superior angle seems almost following the trajectory of cranial nerve IX. Following the placement again, we reconfirm electrophysiologic testing. We just basically close the craniotomy, close the dura.