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SPIOTTA:**

The hemorrhagic stroke of bleeding the brain can cause some damage through a couple of different ways. First is the area that it bleeds into. That part of the brain is destroyed instantly. But then the secondary effects-- as the bleeding increases, it causes pressure on the surrounding structures. This stretches the surrounding structures.

It can also increase the pressure of the entire brain, and that can reduce the blood flow required to those areas. It also causes inflammation. You can have a lot of secondary effects. So while you can't always improve the problems associated with the initial injury where that part of the brain bled, you can prevent a lot of the secondary effects.

Medical management is still the gold standard treatment option for people with hemorrhagic disease-- people bleeding into the brain, and that essentially is not very involved whilst lowering the blood pressure and just monitoring and supporting the patient. And that in the medical management remains the gold standard because the traditional surgeries-- which was an incision, an open craniotomy, a skull window-- caused too much damage. So they showed no improvement actually compared to the medical management.

And the thought is that for areas of bleeding the brain, especially those that are deeper-- in other words, not near the surface of the brain-- in order for the surgeon to get to that part of the deeper part of the brain yet to navigate and negotiate the more superficial parts of the brain, and they always incurring some injury. So while surgery was effective in removing the blood, they actually didn't improve the outcomes of the patient. And for that reason, the medical management remains the gold standard. Of course, that's now being tested with the new technologies that we have available. There's currently three trials that MUCs involved in all of them.

The first one's called a MISTIE trial and that involves making a very small bone window about the size of a piece of spaghetti and placing a catheter into the blood clot. And over time, putting some medication that liquefies the clot. That means just evacuate it. You drain it out. And that was very effective, but it took several days to work, so that was the downside.

The second technique is the Apollo technique, and that's another technique is minimally evasive. You make a very small opening in the skull, and we place a straw-like device actually suctions out the clot. The benefit to that is it doesn't take several days. You can actually get it done at that sitting-- so 30 minutes, 40 minutes. So those benefits are removing the pressure in the brain, and the inflammation that it causes, all the toxicity in the blood that can be removed immediately rather than waiting for several days to work.

The third technique is the brain path of the Nico. It involves just a slightly smaller bone window and placing a larger cylinder-like device and that allows a surgeon with illumination from a microscope to get the surgical instruments into the deep parts of the brain. Again, without having to damage the more superficial parts of the brain. So then you see we are very fortunate and our patients are fortunate that we're involved in all three trials investigating these three different minimally invasive techniques to treat hemorrhagic stroke as opposed to the medical management.

And really, that puts us in the cutting edge. So there's no other center that's involved in all three strategies. There's a number that are involved in one, and a few that are involved in two. We're the only ones who have been leading and really participating in all three technologies.

It's really exciting now with the changes that are happening in hemorrhagic disease. In the past, we really had no options. And if you were a patient or your loved ones were watching you suffer from this, there was really nothing you could really do. And now, we have these three very promising technologies. Each of them has their pluses and minuses.

But now, the critical thing is that we have a solution. We actually can address this problem and give people hope again. So when it comes to hemorrhagic stroke, there's three of us neurosurgeons that deal with these patients exclusively. So we're always on call-- every single day, 24 hours a day. And whenever you call wanting to get a patient referred, and you mention they have a hemorrhagic stroke, they'll put one of us on the line, and we'll help you get the patient over.