Thermal Laser Ablation Reduces Risk

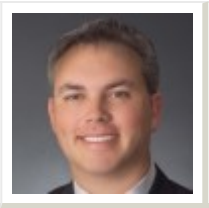
Drug-resistant temporal epilepsy can now be treated with minimally invasive Stereotactic Laser Amygdalohippocampectomy (SLAH).

This same technology also is being used to treat certain brain tumors, further expanding treatment options for children.

The state-of-the art technology allows patients to remain neurologically intact and be discharged home within one day of the surgery.

The technology dramatically can reduce risks, morbidities and length of hospital stay.

Learn more from Dr. Christian Kaufman on this edition of Transformational Pediatrics.



Featured Speaker:

Christian Kaufman, MD

Christian B. Kaufman, MD is a pediatric neurosurgeon with Children's Mercy Kansas City, Assistant Professor of Pediatric Surgery at the University of Missouri-Kansas City School of Medicine and Clinical Assistant Professor of Neurological Surgery at the University of Kansas Medical Center. Dr. Kaufman received his medical degree from St. Georges University School of Medicine, Grenada, West Indies, residencies in Neurological Surgery at the University of Missouri - Columbia, University Hospital and Clinics Columbia, MO and University of Rochester Medical Center Rochester, NY as well as a fellowship in Pediatric Neurosurgery from Emory University School of Medicine/Children's Healthcare of Atlanta (CHOA) Atlanta, GA. His specialties include Epilepsy Surgery, Neurotrauma, Spasticity, Tumors of Brain and Spine, Cerebral Vascular Surgery, Congenital and Craniocervical Spine Diseases, and Spinal Dysraphism.

Learn more about Christian B. Kaufman, MD

(http://www.childrensmercy.org/Clinics_and_Services/Clinics_and_Departments/doc=17467)

Transcription:

Dr. Michael Smith (Host): Our topic today is thermal laser ablation. My guest is Dr. Christian Kaufman. Dr. Kaufman is a pediatric neurosurgeon with Children's Mercy Kansas City and he's an assistant professor of pediatric surgery at the University of Missouri Kansas City School of Medicine. Dr. Kaufman, welcome to the show.

Dr. Christian Kaufman (Guest): Thank you.

Dr. Smith: So, let's just start off with real simple question, alright? What exactly is thermal laser

ablation?

Dr. Kaufman: Well, what we usually call "stereotactic or laser thermal ablation" is essentially a technique wherein we can access small structures in the brain, either deep or superficial, apply a laser current that heats the tissue and essentially causes cell death in the region that is heated thereby destroying the tissue.

Dr. Smith: Now, this is, obviously, MRI-guided, correct?

Dr. Kaufman: This is guided directly in the MRI. So, the key is, as opposed to older stereotactic techniques, we see what's going on exactly while it's happening. We see it live as opposed to older techniques where they would use radio frequency ablations or radiation ablations. Those techniques destroy the cells but it's kind of some guesswork involved because those times when those techniques are used, you don't know exactly how much tissue damage is occurring.

Dr. Smith: So, just to review that real quick. Being able to visualize, basically, exactly the results when it's happening--obviously that's a huge benefit, right?

Dr. Kaufman: Huge benefit because, again, we are often talking about deep critical structures in the brain and seeing that live thermal map that shows exactly the area in tissue involvement is fundamentally extremely important and vastly increases the safety and accuracy of what we can do with it.

Dr. Smith: Who is the key candidate for this procedure?

Dr. Kaufman: Essentially, it was initially intended for use in targeting small, deep tumors. So, patients who have small, deep tumors often to get there surgically from a traditional open surgery requires a large exposure, a large craniotomy, requires moving the healthy brain in a way that could cause damage to that tissue and by, instead, targeting it in a very small tube and getting down with minimal adjustment to the brain allows for kind of an ideal situation where you don't disturb the healthy brain and only target specifically, the deep, abnormal tissue. So, again, patients with deep, somewhat smaller tumors are ideal candidates. We've also found that certain patients who have certain forms of epilepsy that arise from deep structures in the brain also benefit greatly from having that abnormal tissue damaged intentionally with the thermal ablation and it helps significantly improve their seizure control.

Dr. Smith: Let's look at it from a patient perspective. What is it like for them in preparing for this, the actual procedure, how quickly do they get out of the hospital? Run us through what it's like for the patient.

Dr. Kaufman: Sure. Again, it helps to understand what the traditional way of approaching many of these things is. If you look at a traditional open craniotomy for, say, epilepsy, often times it requires up to two surgeries or more to implant the electrodes, to map cortical areas, define targets. Those are situations where families are spending up to three to four days in intensive care units, sometimes longer, 7-8 day hospital stays. In comparison with the targeted thermal ablation, patients come in for their procedure and it's performed in the magnetic resonance room, the MRI room. Because it's such a

small hole, we are able to close it successfully using usually only one to two small sutures and they go home the next day. So, we're changing a potentially week-long stay including intensive care unit stays into a one-day stay without ICU.

Dr. Smith: So, that benefits not just you as a clinician but you're able to target what you want; you see the results you want. There are better results and it's better for the patient all the way around. So, this is a very positive thing.

Dr. Kaufman: Yes.

Dr. Smith: Why don't we do this? Let's share a little bit of some of your experience using thermal laser ablation and some of the outcomes you've experienced in your practice and at Children's Mercy. So, just talk a little bit about the outcome you see.

Dr. Kaufman: So far, when we talk about use of the thermal ablation system in an epilepsy surgery, again, a traditional epilepsy surgery is a long stay in the hospital. Although the traditional open approach we know is very successful and it works great for properly selected patients and they have very good seizure control outcomes, we are getting comparable results with thermal ablation. Is it quite as good? No. Whereas, we can have excellent seizure control rates in about 80-85% of the time with open surgery. With thermal ablation, those numbers are reduced to, say, perhaps 60-65% of the time. However, in doing so, the complication risk for the thermal ablation is dramatically smaller. The risk to the patient is smaller and if, for some reason, the technique doesn't work, then we can always still do the traditional surgery. So, we don't burn any bridges so to speak surgically or we don't burn any options for the patients--no pun intended--when we do the thermal ablations. It's a technique we can use. If it's successful, great. It's relatively low risk which is also great, the short hospital stay, all the things that are highly desirable. So far, as of now we have not, for the epilepsy patients, we have not yet had to do an open surgery due to essentially a complete failure of the technique, so that's also been great so far. In regards to the tumor patients that we've had, again, the most recent patient we had had a significantly deep tumor surrounded by some very challenging blood vessels that to do an open procedure would have been essentially dangerous. It would have been a very high risk procedure. It could have caused significant stroke or damage to the brain. We were able to successfully navigate between those vessels with the stair tactic laser and completely ablate the entire tumor tissue and, again, the patient was able to go home within a day without any damage to the surrounding brain tissue.

Dr. Smith: Where do you think the future of stereotactic laser ablation is? Where do you see this going in future applications?

Dr. Kaufman: Already we are seeing, both at our institution and around that country, we are seeing a dramatic almost exponential number of cases being performed. Neurosurgeons, both adult and pediatric nurse surgeons, are recognizing this technology immediately for the huge boon that it is. I think we're going to see a dramatic increase in the number of applications just because it's so low risk, because it offers a lower complication rate and again typically comparable results without destroying options for more open techniques. I think it's going to become a front line kind of "go to" procedure for many intracranial pathologies instead of jumping ahead to the bigger surgeries.

Dr. Smith: From the surgeons perspective, what kind of extra training do they go through for this? Pretty extensive? What did you have to go through to be an expert in this procedure?

Dr. Kaufman: Typically, all neurosurgeons are trained by virtue of training to do what we call "stereotactic" which is, again, targeting small areas of the brain through small incisions. It's one of the oldest techniques in all of neurosurgery. It's over 100 years old. Traditionally, it was done with a frame where a metal frame was actually bolted to a patient's skull, as medieval as that sounds, but it allowed for very specific accuracy through a small hole. In the past about 20 years, through technological advances, we've been able to do what we call "frameless stereotactic". With the aid of MRI's and CT scans, we're able to achieve the same sort of results through small holes without having to bolt the frame to someone's skull. So, frameless stereotactic is kind of part and parcel with every neurosurgeons training. Essentially, the only difference between this is it's kind of a technology thing. Instead of passing an electrode or any other device – biopsy needle, what have you--we're just passing a thermal catheter. From a procedural standpoint, it's still the same as many other stereotactic procedures. It's now that know we have a new technology that we can apply these surgical techniques to and use the newer technology to achieve these results.

Dr. Smith: Well, Dr. Kaufman, I want to thank you for the work that you're doing and I want to thank you for coming on the show. You're listening to *Transformational Pediatrics* with Children's Mercy Kansas City. For more information you can go to ChildrensMercy.org. That's ChildrensMercy.org. I'm Dr. Michael Smith. Thanks for listening.