

BrainSUITE: Image Guided Cancer Neurosurgery
Webcast
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Dr. Jeffrey Weinberg

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Andrew:

Hello and thanks for being with us once again. I'm Andrew Schorr. This is another edition of Patient Power on mdanderson.org. This is where we are every two weeks bringing you the latest cancer information for you and your family. And every time we cover a new topic and do it with leading medical experts and inspiring patients.

I want you to meet someone, 36-year-old Dean Bukovac who's from Kingwood, Texas, about 40 miles northeast of Houston, if you're a Texan, but you may be far away listening like I am. I am an M. D. Anderson cancer survivor but I live up in Seattle. People are all around the world. But Dean is pretty close by.

And so, Dean, last fall there you were, and you were I think at Starbucks, something like that, with your boss, right?

Dean:

Yes.

Andrew:

And you would sort of zone out, and it wasn't because you didn't get enough sleep, but you would just like be in a conversation and then just sort of disappear for a minute or two?

Dean:

Yes. I would feel a wave come over me is the best way I could explain it. I'd have a normal conversation with someone, and then these waves would just pour over me. I would wait for them to pass, and then I'd pick up where I had left off in the conversation although the person sitting across from me would see me just disappear from the conversation for a second.

Andrew:

Whoa. That would be scary. Now, I understand that maybe even going back five years ago you had this going on before, maybe not as pronounced, and you went to the doctor and the primary care doctor said, well, maybe you were hypoglycemic, right? That it was something related to the balance in your diet?

Dean:

Yes. Just going for a well man exam, just a cursory health exam, they did everything. I went in, I said, I told them my symptoms, they checked me out using normal procedures and said Well, we can't find anything wrong with you. You must be hypoglycemic. You just need to eat more.

Andrew:

Okay. And you just ate as you thought you should. But did these symptoms continue?

Dean:

Yes. They kept going and the times I would get them is when I would be really stressed out or really tired, or both of them at one time together added to the complications.

Andrew:

So somebody might say, Well, you're tired or, Well, you're stressed out, and while it's an unusual symptom, must be related to pressure you're under. And I know you're a project manager, an IT project manager, and somebody would say, Well, maybe that's a high-stress job, or you've got two little kids.

So you just sort of kept on until we get to last fall and you're sitting there with your boss and you sort of disappear and what was your boss and wife saying after that?

Dean:

The interesting thing is we were driving back from Austin, my wife and I, and I had an episode as I'm driving, and she's like, You really need to see somebody. I'm like, I'm fine. I'm fine. And then as I'm sitting there a day or two later with my boss at Starbucks drinking coffee, the same thing happens again. And he looks at me and he goes, Okay, I don't know what happened, but that was odd. And I knew then that I needed to go see somebody to get this checked out.

Andrew:

Okay. So you go to the primary care doctor, and it's very curious symptoms and it's still continuing after all this time. So among the tests you have you have an MRI of your brain. What did it show?

Dean:

It showed a spot, according to my primary care physician. Now, he didn't show me the MRI film. I don't think he felt able to talk about it. He wanted me to go see a specialist, so he recommended I go see a neurologist.

Andrew:

Okay. And you went to the neurologist, and from what I learned they thought, well, could you have some kind of a weird parasite that caused some problem in your brain, or could it be a benign or a nonmalignant tumor or growth or a malignant growth, right?

Dean:

Yes.

Andrew:

So that's got to be scary when somebody says there's something deep inside your brain. That must have been terrifying.

Dean:

It was, especially when you've got two small children and just starting out in life with your wife and just starting a family. So that was one of the hardest phone calls I had to make after the general practitioner called me and said they found something. I had to call my wife and tell her.

Andrew:

Yes, I've been there with my diagnosis of leukemia. So what did you decide to do as far as your follow-up? Were you just going to follow up with that doctor or what did you decide to do?

Dean:

Well, that doctor, since Carol and I had been out on mission trips and had travelled around the world and been to Kenya, he wanted to rule out the parasite. So I had a spinal tap with that doctor. But if it wasn't going to be a parasite I wasn't going to play with this. I was going straight to the best cancer facility in the world, which happened to be in my back yard in Houston. So I made an appointment with M. D. Anderson a week after that spinal tap.

Andrew:

Right. Well, good for you.

I want to also congratulate M. D. Anderson for again being ranked as the number one cancer center in the US News and World Report ranking of all the hospital in all the specialties. So congratulations to my friends at M. D. Anderson.

So that brings you to a neurosurgeon, Dr. Jeffrey Weinberg, right? So Dr. Weinberg becomes your doctor, correct?

Dean:

Correct.

Andrew:

All right. So we're lucky that we have with us today Dr. Jeffrey Weinberg, who is an associate professor of neurosurgery at M. D. Anderson and he's a, for many years now, a number of years he's been a neurosurgeon.

Dr. Weinberg, welcome. So let's pick up the story. You have Dean come to you and he has this unusual spot deep in his brain. So does it become apparent then that he's a candidate for brain surgery?

Dr. Weinberg:

Yes. Well, first of all, thanks for having us on.

Andrew:

Sure.

Dr. Weinberg:

When we saw Dean the idea was to correlate the tumor with the symptoms he was having. And where the spot was located seemed to correlate very typically with the symptoms he was having, and then it became the idea of what kind of treatment he needed. And so at that point the idea of brain surgery was discussed for a number of reasons. One was most importantly to establish a diagnosis and figure out what type of tumor we were dealing with. And the other was to remove as much of it as possible. And then the third would be to try to prevent these events from happening.

Andrew:

So there you are, and this is last fall, and so you had some new technology that you'd been working on, I understand for about five years at M. D. Anderson. And it was becoming a reality called either BrainSUITE or also known more generally as intraoperative MRI. And ultimately in January that's where you did an extended brain operation on Dean.

So help us understand, how does this new technology that M. D. Anderson has, how does that relate to a gentleman like this where there's some kind of growth going on deep in the brain?

Dr. Weinberg:

So when we typically perform brain surgery we have a bunch of technology in the operating room that enables us to plan the operation and to execute the operation. Sometimes for very deep tumors we would like to have the ability to get new images as the surgery is being performed, which would give us the ability to either establish where we are--especially in a case like Dean's where we're deep inside his head as we're doing the surgery--to help us identify where some of the important structures are that we're trying to preserve and get those updates during the surgery.

We have ultrasound devices which we can use in the operation, and those give good pictures, but the further you get away from where the probe is placed on the surface of the brain the less accurate the pictures are. So MRI happens to be the best picture that we can get. It's certainly the picture that we had to define his tumor as he was diagnosed with it, so the idea of having an MRI in the operating room for give us the same quality of pictures is just a great idea.

Andrew:

Okay. Now, let's help people understand what normally happens. So for neurosurgeons around the country and around the world, typically there will be that MRI to understand what's going on, why you need to do the surgery. So that's kind of the map of a person's brain in showing where the problems is, right? So that's typically done before the operation, right? So you have that road map as a basis. But it sounds like the benefit here is then you can update that road map as you're doing the surgery.

Dr. Weinberg:

Yes, that's right. We have a computer device, which is pretty standard in most neurosurgical operating theaters, that will have the MRI that was performed the night before. It's stored in that machine. And so we can use that. I liken it to a GPS system that you have in your car to direct you to where the tumor is. So for something, for a tumor like Dean's which is deep in the brain, we can plan a trajectory to help take us from the outside of his head deep to the center of his brain to get us from the outside directly to the tumor.

The problem is that the GPS system in your car and this computer device is only as accurate as the last time the MRI was performed. So if we've removed 50 percent of the brain tumor, if we've drained spinal fluid and the brain has moved a little bit, which is called brain shift, then at some point that MRI scan, which is the road map that you just mentioned, is not accurate. It's like if somebody blew up a road or built a new road, as you're driving home your GPS system in your car is not going to reflect the reality of what the road map really should read.

So having the ability to update that map with a new MRI scan in the middle of the surgery makes the surgery much more accurate, much safer, and allows us to get out more tumor, which is already established as being of great benefit to the patient.

Andrew:

Yes. We're going to talk in greater detail about removing as much or all of the tumor as you can. But I hadn't really thought about that. You're right. Your road map is shifting because you're moving things around in sort of soft tissue, fluids changing, etc. And I imagine, I don't know what the exact term is, but there's certainly certain parts of the brain, maybe a lot of it, very critical structures that if

the cancer or even if a nonmalignant tumor is there you want to get as close as you can to get that, but you don't want to sort of step on the land mine of harming some vital function.

Dr. Weinberg:

Yes, that's exactly right. So if you've removed 50 percent of the tumor and you're looking at your road map, that MRI which was done the night before, that MRI still shows you a brain with 100 percent of the tumor. And as things are shifting and that land mine is an important blood vessel or an important nerve or an important part of the brain that is critical for some important function, well, part of the goal of brain surgery is to remove as much as possible but as safely as possible. So if we can get out as much as possible as safely as possible and leave those critical elements intact, then any device that we have to do it is of great benefit to us.

Andrew:

Let's go back to Dean. So Dean, you're kind of a computer technology guy, and you were told about this new technology BrainSUITE and intraoperative MRI that M. D. Anderson would have available, and you had a choice. Do you want to go the way they've been doing it for a while or do you want to add this new technology. How did it sound to you as far as a choice?

Dean:

Oh, it's amazing technology. It was just neat to go on line and research it. They have it on mdanderson.org. You can look at the BrainSUITE and learn about it, and what they're doing in that room is just astounding.

Andrew:

I don't want to make a joke, but I guess it was sort of a no-brainer, if you will, to see that that was available to you.

Dean:

Absolutely.

Andrew:

And how did it work out? So in other words, you're basically put to sleep so you're probably not aware of a lot, but when you hear of the technology that was brought to bear, it makes a lot of sense it sounds like.

Dean:

Yes. It was. I don't even have the words to say it. It's just amazing technology. The way it all comes together with the GPS system, the magnet in the ceiling. It's like one and a half tons. Just what they've done in that room is an amazing testament to what Dr. Weinberg is working on in that team.

Andrew:

Right. So we should understand where you are today. So you had the procedure. You're in the hospital for a couple of days. You come out. You're lying low for ten days or so, but then you start doing your computer work from home again, didn't you?

Dean:

Yes. That was one of the benefits of working at my company. They allowed me to work from home for a time. I had to use vacation time before I could go on disability time, so not to use up as much vacation time as possible they allowed me to work from home. So after about ten days I was able to get back online and back to work.

Andrew:

And how are you doing now? So we're months later. Is your life pretty normal now?

Dean:

It is pretty normal now. It's back to normal, whatever normal is after a major surgery like that. But it's back to playing with the kids, hanging out with the wife and, you know, coming home after work.

Andrew:

So is it a little surreal that months ago you had major brain surgery and now you're--is it like it never happened? I don't know if you could ever put that out of your mind or is it just like a dream? Or what is it like?

Dean:

It's odd. You know, you have this major thing in your life. You don't know what's going to happen. You don't know what the next things are going on, and life just stops for that period of time. And then now, looking back on it six months later, you really look at it and go, Okay, I'm getting back at the daily grind and the little things are bothering me again, and it's just what you said, Did I really have this brain surgery? Do I remember it? So these kinds of programs and talking about it just brings it all back to me and reminds me what's really important.

Andrew:

Right. And a blessing.

Well, we're going to continue our discussion with Dean Bukovac and also his doctor, Jeffrey Weinberg, his neurosurgeon, in understanding this new technology at M. D. Anderson and how it can help people like Dean and other kinds of situations in the brain, where it can really aid neurosurgeons in helping them do their best for you.

I'm Andrew Schorr. Stay tuned for more Patient Power brought to you by M. D. Anderson Cancer Center.

Welcome back to Patient Power as we continue our discussion with brain surgery patient Dean Bukovac and also his doctor, neurosurgeon, M. D. Anderson, Dr. Jeffrey Weinberg. And it's important to point out that M. D. Anderson Cancer Center does more cancer neurosurgery operations than any other hospital in the nation.

Dr. Weinberg, is the number about 850 surgeries in a year?

Dr. Weinberg:

Yes, I think that's about right. It's about 850 what we call craniotomies, brain tumor surgeries for all types of brain tumors, primary malignant brain tumors, those that start in the brain, and those that metastasize, spread from another part of the body, another type of cancer, which spreads to the brain and then grows in the brain.

Andrew:

So understanding, first of all, Dean was talking about the technology, his understanding of it. So did we get it right? There's this really heavy magnet in this room and all this technology? Give us a little more of the stats about what make this room so special.

Dr. Weinberg:

So the MRI which is in the operating room is about a 14,000 pound magnet, magnet or MRI machine. It's a standard diagnostic magnet. So when the patient goes to have an MRI in an outpatient radiology center they're having a scan in an MRI machine that's graded on strength of the magnet. And the typical diagnostic magnet is called a one and a half Tesla magnet. And this machine is a one and a half Tesla magnet.

The thing that is novel about ours versus some of the others is that this is a machine that has a very large bore or hole where the patient travels. And the reason why we pushed very hard to get this machine is that it gives us the ability to put patients in all sorts of different positions. And what I mean by that is we can operate on somebody lying face up, face down, even lying on their side. And lying on their side was difficult in some of the other magnets or machines because the hole wasn't big enough. But the new technology, and this is a Siemens machine, that was so special because of the large size is really great for us and for the patients that we take care of.

Andrew:

Okay. Now, I mentioned that you do let's say 850 of these craniotomies a year. So yourself and your peers, you do this a lot. You're very, very experienced. So some would say why do you need this extra road mapping when you guys do this every day? Why wouldn't you ordinarily have the confidence? Or should we look at it the other way, that, yes, you know your way around the brain really well and

you're doing it all the time, but this allows you to do things with yet more precision knowing that as you do the surgery the road map is changing a little?

Dr. Weinberg:

Yes. So the answer certainly to the latter part of your question a very blunt yes is appropriate. The other alternative way to ask that question is, Well, is every patient a candidate for surgery in the BrainSUITE? And the answer is probably yes, but given our experience and given the different locations of some of these tumors that not everybody is going to benefit because of our expertise, because of our experience, because of where the tumor is located that we know with very, very, very good accuracy that we're going to be able to remove everything that we intend to remove.

It's exceptionally good for those patients where the tumor is either very deep, is very large, or because of the type of tumor that it is the interface, or the border between what we would consider the tumor and the normal brain surrounding it is not clearly defined by either its appearance in the operating room or its texture or some of the other features that we use. Or certainly even by the GPS system which we mentioned earlier.

So having the ability to get that scan, particularly in the middle when we're dealing with the tumor that I just outlined for you, it really creates a degree of--it gives us a degree of confidence to continue doing the surgery and remove as much of the tumor as possible.

Andrew:

And that's the name of the game, of course. So typically, then, maybe you'll begin the surgery. You'll do the MRI there in the operating room. Now, you had it, of course, before the surgery. And then do you do it again as you're sort of changing things around where things may be moving a little bit to see how you're doing in the removal of the tumor?

Dr. Weinberg:

Yes, that's exactly right. The decision to do a scan is based purely on the surgeon's opinion. So there is one that's done as the patient wheels into the operating room, which is the MRI that's used to do establish the baseline for the road map and for the GPS system. The second MRI is done at the discretion of the operating surgeon during the procedure at whatever point he or she feels it's necessary.

And the two most common reasons to do it are, one, to make sure that you remove the entire tumor. So just to give you the confidence to say, Okay, we're finished, we can close and come out of the operating room. And the second is that we've been operating for a number of hours, we've shifted things around. We've removed some percentage of the tumor, and we want to reestablish in our own minds

exactly what's left and what the relationships are between the tumor and the sounding structures. And so we go ahead and repeat the MRI at that time knowing with fairly good confidence that we still have further surgery to do.

Andrew:

Dr. Weinberg, there are people listening, and some may be from afar, who have been told by their physicians, maybe initially and maybe they've lost hope, and they say, Well, you know, your brain cancer is inoperable. How does M. D. Anderson view that? I know that there certainly may well be some inoperable situations, but now you have yet more powerful tools. So what would you advise people when they've heard that? Do they just give up, or what do you think?

Dr. Weinberg:

Well, I think it's similar to your own personal story. I think it becomes incumbent on a patient at some point so seek the opinion of an established center that takes care of patients with brain tumors. And obviously M. D. Anderson is one of them.

Certainly there are tumors that are inoperable. They're inoperable because of their location. They may be inoperable because of how big they are or how diffuse they are. They may be inoperable because we know that taking out the only portion that we can reach safely does not provide any benefit. But in fact, because of our experience and because of what we know about brain tumors and because we do this on a daily basis, that level of experience allows us to say for a particular tumor, Hey, you know what, it is operable. We can get to it and the goal is get out as much of it as possible.

So the MRI machine helps us not so much make something that was inoperable operable, but takes it from something that was operable with a degree of confidence that we're going to get out a lot of it to, Hey, we're going to get out most of it if not all of it.

Andrew:

Now, this is really an example of your department, which I think has more than 40 physicians in the brain and spine center at M. D. Anderson, kind of trying to put it all together. So you've got the BrainSUITE, the intraoperative MRI. I understand you're also doing skull base surgery, and then we've previously done programs on proton therapy as far as radiation, bringing that all together. So it sounds like you have some tools now at your disposal.

Dr. Weinberg:

That's right. We created a number of years ago an entity called The Brain Tumor Center, which is a research entity and clinical entity that enables us to devote a number of resources to caring for patients with brain tumors. That includes the laboratory facilities as well as the clinic. And the clinical facilities with the physicians that you mentioned include the neuro-oncologist, the neurosurgeons, the neuropathologists, the neuroradiologists, the whole team of dedicated experts.

And that doesn't include the number of experts that we have who dedicate themselves to taking care of patients with spinal tumors and spinal cancers who are doing complex spine surgery and the like.

Andrew:

Wow. That's quite a group. So this technology is pretty new, now, the BrainSUITE offering at M. D. Anderson. Where are you headed with it? So are you already up to like full speed, or are there new horizons or even new technologists that you see being added?

Dr. Weinberg:

Sure. Are we up to speed. Up to speed is a good question. I think that there's been a learning curve with using this machine. It's not that you just take a patient and you say that we're going to do surgery in the BrainSUITE and, okay, let's go, and you're done three hours later. The learning curve comes with understanding how best to put a patient in the room, how best to have them positioned during the operation, when to get the scan.

And realizing of course that this--doing surgery in this room adds a considerable amount of time to surgery. So if somebody has a tumor that would under normal circumstances require seven or eight hours of surgery, we're talking about adding an additional hour or two just by nature of the fact that you're operating in the BrainSUITE. So for a complex skull-base tumor or a very large tumor the surgeon has to realize that there's going to be additional time to do surgery in there.

As far as research purposes, I look at this not just as a surgery laboratory--because it's really not, we do surgery the same way--but it's really an imaging laboratory. So we have involved in this neuroradiologists who are at every operation helping us to perform new MRI scans and helping us interpret them. So the future of the use of this room is going to come with correlating, for example, different types of imaging sequences with what actually the tumor looks like under the microscope. And figuring out better what MRI sequences or tests we can do to help identify brain tumors.

And all of this will correlate with the work that's being done in The Brain Tumor Center with genetics and proteomics and determining if we can figure out blood markers that help us identify tumors even before they grow. And that's the research for the BrainSUITE as all part of the comprehensive center in trying to figure out where these tumors come from, how best to treat them and hopefully one day cure them.

Andrew:

Amen. So Dean, you listen to this, so you drove 40 miles but it sounds like--I know I went 2,000 miles to M. D. Anderson. I bet you're glad that you made the trip down the road, though.

Dean:

Absolutely. Absolutely. It was worth it completely. There was no doubt in my mind, especially since I used to work down at the Houston Medical Center. My mother is a physical therapist, she worked down there. And just growing up in Houston I knew what a great facility we have in the Medical Center, and just to know that M. D. Anderson is one of the premier cancer places in the world and having it just down the road literally, it was like you said earlier, a no-brainer for a decision. I would drive 3,000 miles to get there.

Andrew:

Well, that's what I was going to ask you, because there are people listening all over the world. So, Dr. Weinberg, so where we are. It sounds like you're very proud of the team that you have there. This is an example of new technology, and the whole goal is from the surgery point of view get out this abnormal tissue and do it as safely as we can. Have people, you know--and I know it doesn't always work out this way, but in Dean's case, to get back to a normal life.

Dr. Weinberg:

I think the one thing that's unique about M. D. Anderson as a whole is the way that everybody recognizes that they're dedicated to take care of the patient. And not goes not just from the team of doctors who are involved in taking care of Dean but everybody from the nursing staff to the--the entire staff, the volunteer network that we have at the hospital. It's really an amazing place

And you mentioned before in terms of the technology and the skull base center and minimally invasive surgery and proton therapies. If you look at all them they're investments by the administration with the recognition that this money is going to be spent to do better things for our patients.

Andrew:

Right. And I think the important point I want to make too is, you know, if people, whatever hospital or medical center, had unlimited money, they could start to amass some really cool sounding technology, but in the end it's layered on top of the skill of the medical staff.

Dr. Weinberg:

Not a question.

Andrew:

And so I think that's what's come together here, Dr. Weinberg. As you said, you're doing 850 craniotomies, the whole group is there, in a year, more than anywhere in the nation, and so you know best when these tools, like the BrainSUITE, the intraoperative MRI and the other technologists you have can come in to play. That's the team I'd want, and I know Dean is delighted it's worked out for him.

Dean, I want to wish you all the best with your work as an IT project manager, and as those little kids grow up I hope you're well on your way. I know you're still on sort of a low dose of an antiseizure medicine and trying to see can that be even curtailed. But no more zoning out, right? Hopefully that growth is all gone and you can just go on with your life.

Dean:

Well, the growth is still in there, but the zoning has stopped pretty much so.

Dr. Weinberg:

Hey, you need to reword that. Most of it's out.

Andrew:

Most of it's out. Right. Right. There you go, buddy. Well, all the best--well, Yes, because there was a lot of work going on there.

Dr. Weinberg:

There was a lot. And in fact he has a very complicated tumor, so it's got to come out through two approaches. But the bulk is out and the part that was causing his symptoms is gone.

Dean:

That's right.

Andrew:

Good for you. Good for you. All right. Well, we wish you well, Dean.

And Dr. Jeffrey Weinberg, neurosurgeon at M. D. Anderson, thank you for being with us. And we wish you well with your latest technology, the BrainSUITE, and how it all comes together for your whole team there with working and helping people who developed these growths in their brain so they can get the most extensive surgery to help them get better but do it as safely as possible. Good luck to you, sir. Thank you so much for being with us.

Dr. Weinberg:

Thanks for having us.

Andrew:

Thank you, sir.

So let's talk about what's coming up on our next edition of Patient Power. We're going to have with us Dr. Pedro Ramirez and Dr. Robert Coleman. And we're going to discuss advances in gynecologic cancer, and certainly they're working on advances there. That's what's so exciting about M. D. Anderson in so many areas.

Sometimes you see breakthroughs, sometimes you see incremental progress, but it is progress. And so I know we'll want to hear about that related to cancers that affect women in the gynecologic areas, ovarian cancers and others.

Thank you for being with us once again. As always, we realize that knowledge can be the best medicine of all to help you make informed healthcare choices. And I know Dean and I think we made a good one with M. D. Anderson, but hopefully this is good information for all of you.

This has been another edition of Patient Power brought to you by M. D. Anderson Cancer Center. I'm Andrew Schorr. Thanks for being with us.

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