Latest Innovations In Surgically Treating Brain Tumors

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>> Welcome, everyone and thank you for joining the American Brain Tumor Association Webinar Series and thank you for participating in today's free educational webinar. Our webinar today will address the latest innovations and surgical treating rain tuber -- presented by Dr. Julian Bailes. Please note that all lines during our webinar today are muted. If you have a question, you may ask please type in submitted using the question box in the webinar control panel on the right-hand side of your screen. Dr. Bailes will answer as many questions as possible at the end of the presentation. Later on you will receive an invitation to complete a feedback survey. Please do take a few minutes to share your comments about today's webinar. Your feedback is important to us for future webinar -- webinar development we are recording today's webinar I will post to the ABTA website shortly. You will find under any time learning. You also receive a webinar link in a follow-up e-mail message once the webinar is available. We will pause for just one moment so we can begin our webinar recording here.

>> American Brain Tumor Association is pleased to welcome you back to our webinar series. Our webinar today will discuss the latest innovations in surgically treating brain tumors. My name is Jillian Demes I am a senior program manager here at the American brain tumor associate have delighted to introduce our speaker today, Julian Bailes. Dr. Bailes a surgical director of the door sure neurological Institute and chairman NorthShore Department of Neurosurgery. Dr. Bailes is known for conducting leading-edge clinical trials including exploring the effectiveness of using fluorescent dye and the resection of tumors. Thank you so much for joining us, Dr. Bailes. You may now begin your presentation.

>> Thank you, it is great to be here with everyone and to tell you a few of the advances that I am aware of and we are involved with. I am a clinical professor of neurosurgery at the University of Chicago School of Medicine and the surgical director of the NorthShore Neurological Institute. We are based in Evanston, Illinois and and part of the NorthShore University healthcare system. So there have been many changes and many advances however brain tumors in particular remain a very challenging problem for the doctors and nurses and hospitals particularly patients and their families dealing with them. So I thought I would give sort of an overview of some of what I believe are the innovative changes techniques that have evolved and not certainly by us but by many investigators, many developers around the country and the world. I will talk about this really on four major advances which come to play on many, not all brain tumors but have a role to play and are really, I think, cutting edge for the most part. And I will try to demonstrate that today. These are the four Visualase, NICO, Stereotactic Radiosurgery and a fluorescent dye clinical trial we are involved in. We look at really for here is a candidate for new treatments. And I guess that's many if not most patients are potentially candidates for new treatments. And that really involves location, it involves the age of the patient, the

type of tumor, what part of the brain is affected by it and to what extent.

>> I will talk about a few case studies and a little bit more about the future innovation and then at the end, after I talk for 25 minutes or so, we will have a chance for some Q&A. Every year, there are nearly a half a million brain tumors newly diagnosed in the United States of that is not a small number of course. They are almost always problematic and not good things to have an need to be dealt with. Most of the time need to be treated and/or removed so that you are done with them. The category really are considered as primary brain tumors meaning the ones that originate in the brain and they are composed of brain tissue, brain cells. The most common is called gioblastoma multiforme and that is a very malignant tumor that is very problematic and has to be almost always operated on and treated aggressively if so there are new advances in the treatment and you will see some of that today in my talk but they are the number one primary brain tumor we deal with there are others and depends on the age group what type and there are some that are not malignant. But that is the one that we will really center on today for most of these advances. There are also metastatic tumors meaning it is cancer somewhere else in the body which is metastasized or traveled to the brain. Probably 20, 25% of new brain tumors we see our metastatic and they also can be dealt with effectively. Most of the time our best removed and not left in. But, they also have taken advantage of some of the new techniques. The other thing, which is not technically a tumor but sometimes retreat like a tumor is a hemorrhage, and hematoma within the deep part of the brain, the brain white matter. Sometimes now with new, innovative techniques, particularly the ability to put a narrow port in there, we are able to remove a clot using a NICO type device which I will demonstrate. Brain tumors are complex, they are not always operable but they should be each and individually considered. We really feel very compelled to continue to make innovation in the last 30 years as saying a progressive increase in the oncology side, chemotherapy, radiation oncology but also the surgical site. We probably still operate on a fraction and not the vast majority of tumors.

>> Many or some are not considered to be operable. So in some cases, open surgery has its limitations. Innovative treatment really is revolutionizing through new technology how we can treat them and we like to think of innovation as having several characteristics and certainly first and foremost is that they are usually minimally invasive meaning minimally disruptive to normal brain tissue and safe and effective.That could offer promising outcomes for once that in the past were considered inoperable or difficult, hard-to-reach tumors. These four innovative treatments, I am going to detail in the subsequent slides and I will talk more about their particular role and what I see them in the entire spectrum of treatment. The first is the fact that lasers, ever since the 1980s, have been in great allure to us in brain surgery because of their precision, their precise delivery of destructive energy to a point that if safely applied and safely navigated in, this energy can really be harnessed to help the patient. There are a couple of ways to do this. The one that we have had the experience with this one called Visualase and that is a fiber which is directed stereotactic link or by navigation into a certain part of the brain. It is a very small fiber through the laser energy is delivered it is put into just a very small opening the size of perhaps a cop Dale strong through the scalp it is placed, a tiny whole place into the school and the catheter delivered into the lesion or tumor. And we do this under MRI guidance so we are watching the placement of the catheter the incision is

made a 3-millimeter drill hole is placed and a 980-millimeter diode laser is placed under MRI guidance especially important for difficult and high risk tumors. You see on the slide here this case study is 54 -year-old with a long tumor which has metastasized or traveled to the cerebellum part of the branch -- part of the brain it is not a big tumor but in a critical location deep in the brain as can be appreciated here. And you see the laser fiber there with the yellow arrow delineating it right to the target to the tumor. You can see how this is a very precise and very much minimized in order to deliver the destructive energy to that target and you see here on this slide, this is a thermal map during the treatment and that is how we monitor it in real-time while the patient has treatment inside the MRI this is something just a few years ago would have been considered future -- futuristic and has great alert to us the potential for without formally opening the had placing a destructive laser beam right into the target and watching it occur during an MRI is extremely valuable we think. You see here the treatment time is extremely short this patient had 4.2 watts of energy for 20 seconds and 10 watts for 207 seconds so total treatment time of less than five minutes for this particular tumor. You can see in the thermal map the heat of the energy from the laser spread. We can watch it coincide and overlap the area of the tumor.

>> Prior to placing it we do a pre-ablation or pretreatment MRI. We do models of the type of energy we want to put in and we can predict damage done by the wattage in the time of laser application. This shows following ablation you save the tumor, the lesion here, but you can see with time the tumor changing and undergoing its death cycle as it reacts and sort of dries up from the effects of the laser treatment. The advantage is that the procedure can be performed with the patient awake.It is minimally invasive instead of having a craniotomy or formal brain surgery, this is a very small opening created in -- and requires only one states to close the surgical site. There is minimal pain, minimal discomfort, most patients do not have to go to intensive care, they have a rapid recovery they normally stay in the hospital overnight. @they don't even have to have their head shaved or any significant alteration in their appearance or status.

>> The next big advancement that I am personally very excited about is the NICO BrainPath procedure. This is a way to utilize modern technology and bring that to bear on treating tumors that are below the surface of the brain. As most of them are. The NICO BrainPath really utilizes the six pillars of the principles of their treatments. I will take you through the individual pillars. This is the most exciting thing to come across in brain surgery in my career for lesions located deeper in the brain or anywhere under the service. The first pillar is really based on navigation, based on the anatomy of the brain. You see here this is fiber tracking, which are images obtained prior to surgery. And the first pillar, you see that the area of approach perhaps would be right here where there are fewer fibers. These are all the fibers of the side of the brain. This hemisphere all being funneled down to enter the midbrain and brainstem and also may go to the spinal cord. If there is a lesion here, this would be the obvious place to approach because through this corridor here there appears to be very few fibers.This is an example of having more intelligence, more upfront knowledge of the anatomy of that patient and being able to base but we do not on standard textbook pictures, but on that particular patient on fiber tracking so we know where the major bundles that connect the different parts of the brain or the brain with the body are located.

>> The second pillar of the BrainPath procedure is navigation. What that means is, this is sort of like a GPS system that you have in your car. This shows us exactly where we are. We navigate the insertion of the instruments or of the ports that provides us with precision and absolute accuracy of where we are located. Again, allowing us to minimize their opening. The third pillar is special optics, optics which continue to evolve and get better. This is not a surgical microscope but it is an endoscope placed on the outside with this special arm and the new robotic applications that we think are going to make this even more attractive and -- these are our optics which give us a superior view inside the brain of the location where we are working. The fourth pillar really sort of the cornerstone of the NICO BrainPath is this 13-millimeter port, about the size of a dime which is placed and through which we can operate and through that port is where we gain access deep in the brain. Replace that port, navigate it based on preoperative white matter tracking to know where all the critical fiber bundles are and then we begin the fifth pillar which is resection with this special device called a Marriott it which allows us to respect, remove the tumor and then it saves the tumor in a special trap, tissue trap like a test tube, that allows us to then apply, in the future, the sixth pillar which is therapy, based on specific cell types, specific characteristics of those tumor cells. For the first time really instead of discarding tumor tissue we are saving it. We are collecting it, we are banking it to apply this sixth pillar in the future.

>> This is a very advanced procedure and technology which really, I think better than ever, gives us hope to treat sub particle and deep brain lesions. There is an example of the surgeon operating. You see me sitting there, you see the act of scope here, that is optics. We are looking at it on the television screen here. The patient is in this position here, here is the opening. We are about to approach, open and gain access to this deep tumor. We also use so-called real-time imaging which is in this case an ultrasound which allows us to instantaneously see through soundwaves, as you see right here, the tumor. And to know where we are, where the lesion is and again to minimize and increase the effectiveness of our procedure. So in summary, the NICO BrainPath provides us with six pillars of treatment which is white matter mapping, navigation or GPS so we know where we are, superior optics for a better view of our subject and of the lesion in question. Here, you see an example of thatthat. Here is a large tumor.The green or motor fibers, motor control fibers, the yellow circle fair represents speech fibers and you can see here when we are navigating across -- crosshairs tell us where we are pointed, where we are going.You see in this and you hear motor fibers all behind the lesion, behind the tumor. The last three pillars involve access through the small port, superior resection devices to allow us to go in and actually remove the tissue safely and effectively and precisely and then finally, to say the tissue for specific therapy.

>> Here is an example of a case where here is the MRI, preoperative MRI and the background and here is the ultrasound real-time while we are operating. You see here the lesion, you fit nicely matching up from the preoperative MRI to the enter operative real-time view here. Showing the surgeon exactly where we were and how much progress we're making as we are going down to the tumor. Here is an enter operative view we do a very minimal approach we don't shave the patient it there is a small amount here 1 inch shave and you see the incision is about two and a half inches. Once we open the scalp you can see the planning here being done here is the circle outlining the area

of bone or school which is temporarily removed. Here you see the port being navigated through the five spares communicating with the camera system and the feeling of the operating room, are GPS that tells the search check jury, distance to arts target and the real-time ultrasound you see areas of tumor resection you see how we can monitor that as we go this slide shows the monitor the surgeon's view inside the operating room and the opening of the durra and the brain where we are going to insert the smallsmall, dime sized port.

>> When there are lesions that we can't take out, can't respect, there are advances in radiation therapy that sometimes are extremely effective. We look at radiosurgery as being an Apple occasion of destructive radiation ion to an area that needs to be destroyed and once targeted and once calculated and applied there are potent doses of radiation that will melt away tumors or stop tumors from further growth that are applied and again in the minimally invasive way. There are various forms of radiosurgery application. This is showing the Gamma knife which is a popular to take using 201 sources of cobalt focused down through various apertures. Individually these beings of cobalt are nondestructive but the point at which they all come together is an area that the lesion is created or something is destroyed. There are various ways to do radiosurgery to be Gamma knife, cyber knife,, they all accomplish the same basic principal to focus radiation to destroy a lesion.That is where the word radiosurgery comes from. It is not really open surgery, but it is done with the school close, often as an outpatient. But for many patients a very attractive, very successful treatment to either destroy or stop the tumor from further growth.

>> Many patients who for various reasons are too six to undergo surgery, the tumors are deemed to be inoperable, are not really capable of being cut out or resected with open surgery or, if there is a risk of harming critical structures near the tumor. These are all indications for any one of the several types of radiosurgery which I mentioned. Radiosurgery is not able to be applied to large tumors. Generally about two and a half to 3 centimeters are the sizes of the tumors retreat. About an inch or little bit bigger. Sometimes the tumor is too big causing too much mass effect, too much swelling, too much pressure inside the head and in that case, radiosurgery is not appropriate and is not done. But for certain patients depending on size, location, type of tumor, overall health, radiosurgery is a very viable option, one that you should know about and in considering your possibilities for tumor treatment. The radiation high energy beams match the confines and configuration of the tumor even if they are irregularly shaped, usually the treatment plan can be constructed such that the tumor is destroyed and to minimize damage to the surrounding normal tissues.

>> Other advantages are that it is virtually painless, it is done as an outpatient, it occurs as a single day treatment and is minimally invasive. The cranium is not opened up surgically there is no incision, no scars. So radiosurgery is a very important option to know about, to consider, but not suitable for many tumors. We're very excited about it clinical trial we have here NorthShore using a yellow 560 dye and what it does is the dye is injected intravenously while the patient is asleep, while we are taking out the tumor. What the dye does, we believe it accumulates in the cancerous cells, so it turns any cancerous cells to a fluorescent yellow. It is like the same phenomenon of a firefly or --

firefly fluorescing.And we have to operate as we live in our world of white light, if we can get an advantage, if we can get benefit for the patient by the fact that cancer cells are going to reveal themselves by taking up this yellow dye and fluorescing, that is a tremendous potential advantage for the surgeon and the patient for him to be able to visualize which sells are bad which are cancer so they use of a yellow fluorescent dye is very exciting back a few centers around the country are using it. We are proud to be one of them and I think the jury is still out in general. Experts have felt that it does increase the ability to see, visualize and remove remaining cancer cells so this is a perfect example of new technology, high technology that we did not have in the recent past, one we have to figure out its ultimate role in resection or removal of tumors. It is used in conjunction with a specialized microscope that has a specialized filter that allows the surgeon then to see this fluorescence and right now, it is used for removal of glioblastoma the highly malignant primary brain tumor.

>> The purpose of our study here is to assess whether this, used in combination with the special microscope, will allow us to respect more and do a better job of removing and to really work on that important issue called a stent of resection in other words how much of the tumor the surgeon was able to remove. Not all patients with brain tumors of course are candidates for these new treatments or others you may hear about. The treatment depends on many, many factors. The age of the patient, symptoms of the patient, diagnosis, size of the tumor, what we think it is, what kind of tumor, its location, its configuration, and then of course the treatment preference by the patient. Also plays in and does the patient not want their head open but do they want at any cost the procedure to be minimally invasive and that is one done taken in consultation with radiation oncologist and narrow oncologist and their surgeons, all putting their heads together to come up with the best are committed treatment. We can just imagine the operating room of the future will entail many, many of these technologies I have shown today. There are others and we are very excited and privileged to be part of the wave of new technology that is hopefully going to make progress in treatment of brain tumors a further reality. Patients are already living longer and doing better. We need to do our part as surgeons to minimize the invasiveness, increase the effectiveness and precision of removal of these tumors and we do that by applying all of these technologies to the point of care. To where the patient needs it. No doubt there will be many great men and women you are going to continue to make advances in our treatment abilities for these patients but right now we can see how the operating room of the future is going to really become a more and more high-tech. And it will have tools to enable the surgeon to see what he right now can't see to gain access to where he can't go. And once he gets there, to be able to more effectively and precisely remove the unwanted and the bad tumors. Thank you for your attention, it was a pleasure to present to you some of the things which I think are important and breaking in this area. And I think we have time for Q&A if there are any questions. Thank you.

>> Thank you so much, Dr. Bailes. We definitely do have several questions. Just a reminder, if you have a question you would like to ask these type it using the question box in the webinar control panel on the right-hand side of your screen. We will start with some of the ones that have been coming in.Is it possible to successfully use radiosurgery on a low-grade spinal lesion? If so, are there any risks to the spine?

>> Yes, in certain cases I think the radiosurgery has been effectively used for spinal tumors, particularly the ones that are not malignant. There have been not too many, but some centers around the country that have had experienceexperience. Of the patient is interested in that, I would urge them to seek out one in their area, in their locale, who about experience with answers. Yes, it can be very effective, I think.

>> Perfect. You mentioned during the NICO path, reading the question, sorry, what method do you -- does the NICO path use to save the tissue during the fifth portion of the NICO path?

>> In the NICO procedure the resection device has a very innovative aspect and that is instead of the tumor just going down the drain are being discarded it is collected in a special trap it looks kind of like a test tube with the screen in it and that collects all the tissue that is then sent to the pathology department where it can be tested and analyzed and saved so it's very innovative in the concept of not removing and discarding tissue but saving it. There can be some application five, 10 years from now that we haven't even thought of presently that tissue could be extremely valuable to have.

>> So it is preserved in wax or ?

>> It is preserved -- caught in a trap and sent to the pathology department they will preserve it any number of ways for using it or placing it in formal land or cutting it on slides and mounting it. Have a variety of ways they would processes.

>> Okay and then the same person has a follow-up question. What would the tissue then be used in five or 10 years? Would that be for recurrence I'm assuming?

>> Yes, probably. Probably.

>> Okay. So I guess and the patient needed to be really informed going into this and talk to their surgeon about their options? Before hand? Knowing what questions to ask and knowing what is available to them, right?

>> Absolutely. This should be on the list of questions to ask your surgeon. What happens to the tissue that is removed and is it saved and could it one day be of good use for me or any other patient?

>> Here is another question. Wanted to know if this treatment can be used on brainstem tumors?

>> Yes, in some cases depending on the tumor a location and so forth they can be so I can every case has to really be individualized that some of them can be, yes.

>> Okay. Wilma combined two questions here one person is asking about if it is ever possible to remove 100% of GBM and someone is talking about a doctor [Bukovar] do said they fully respected 100% of the GBM patient using direct infusion. Do think it is possible and have you heard of this doc are using this type of method to remove 100%?

>> No I am not familiar with his work or remove a 100% of glioma in general we think it is probably technically impossible to remove 100% of a glioblastoma because of what we call the microscopic disease. So it is certainly possible to get everything out that can be seen either with the eye or even on MRI scan that we worry that there are leftover residual tissue that just can't be seen with any current technology and that is the

microscopic disease and that is probably why these tumors for the most part are not -- at the end of the day not curable.We talk about living with the disease and prolonging survival and progression free survival and quality of outcome, all of these are the measures we talk about that determine -- the terms that we as the glioblastoma is not 100% removable I think by anyone.

>> I would love for that language to change some day as I'm sure we all will. Doing the best we can and tell them. Someone is asking again kind of two-pronged talking about seizure free type of procedures and also a procedure that goes in through the cheek that would cause someone to then be seizure free so would any of the methods you talk about help someone be seizure free end of the heard another method of surgery that would go in through the cheek to help someone be seizure free?

>> I've heard of the latter I've never performed it myself but in general I think the way you think about it is to remove an offending mass, a mass creating pressure or pushing on something in the brain to remove the is the best way to try to prevent procedures and normally it does but there is no guarantee you can even remove a tumor completely and the patient can still have seizures because that part of the brain has already been irritated so that's about the best you can do normally it helps normally helps and on the other hand there is no guarantee that the person would not have another seizure.

>> Right it is always a good conversation for individuals to talk with their doctors or nurses I know we experience a lot with people calling here talking to our nurse seizures are about medical management too finding the right dose we encourage people not to give up his there always seems to be another drug out there for seizures you don't always have to suffer through living with one drug if it's not working for you. Here is a really good question you may not experience it working where you work and we are blessed living in Chicago but the phone calls we get here at ABTA, this question says it all. They are writing from semi rural region of Canada what about those people that are calling from the community hospitals and they don't have the option of all the choices that you would have at a NorthShore even on the choices we have in Chicago what would you tell the patient that only has the community hospital to go to and had a brain tumor diagnosis how would you guide them into making choices?

>> That is a good question Jillann I guess the answer is I don't know for sure other than I think if someone is at a rural setting and for whatever reason they can't be transferred to a bigger center they may have some of these new technologies I think they need to talk to their surgeon about what he knows about emerging technologies and I think in general they need to insist on having something removed if it's deemed at all possible and safe to do it. I think in general they shouldn't allow just because they are in a certain setting to take less than an aggressive approach or realize that is easier said than done but I think in general no matter where you are you want to push two things -- have things removed surgically from the brains of the treatment can begin if anything is left behind.

>> I think way could also encourage them to send their medical records to a place that has a tumor board and see with their recommendation is and we can always walk them through that process if they don't have that luxury of that multidisciplinary team that the hospitals in a major metropolitan area does and we are always happy to do that and walk them through the process.

>> Absolutely and if they want to send the records or inquiry to me I would be glad to review for them.

>> Wonderful, thank you. Someone is asking what the difference is between Visualase and neural plate and is one better than the other further deeper tumor.

>> I've only had experience do Visualase there have been different posts of laser, energy sources different ways to skin a cat those are two different types of laser technologies so I can't comment on anyone except the one I have used I think it's safe and effective I think there are may be 700 patients have been treated with Visualase thus far I think the principles are pretty much the same as how you did the tool user think the principle is the same and that is using laser energy to a plate or a reversibly damage abnormal tissue. I think they are pretty much the same in that regard.

>> With some of these do you see a lesser amount of cognitive changes then you do with other types of surgery or is there still the need to follow-up with neuropsychology I think that most of surgery is safe is safe from a neurocognitive point of view depending on where the tumor is located and what it is may dictate a big part of that but in general all of the these procedures I have described are effective and safe and preserve the neurocognitive function.

>> Great someone is asking about super selective intrusion therapy of [indiscernible] directly into the tumor site wanting to know your feelings or concerns about that.

>> I've had no personal experience with that we have to the years tried super selection for various aspects of trying to deliver treatment just to a certain area so the whole brain is not exposed to it so breaking therapy, inserting radioactive radiation sources right into the area of a tumor there is chemotherapy wafers called [indiscernible] which have been used which is sort of another form of local infusion by placing these wafers directly on an area of tumor or tumor bad these are all examples I have not had any experience with selective injection of [indiscernible] but again I think none of these have been proven to be vastly superior or two made any significant differences in the outcome but they all should be encouraged to continue to be explored a great so many choices out there that making sure the patient and the family are educated is really important so they are making the best choices I realize a lot of times they're diagnosed so quickly and taken to surgery there is not a lot of time but when there is time being able to call a resource to do our own heart of course to call someone like ABTA talk over what your choices are talk with your surgeon talk with your nurse learn as much as possible see are making an educated choice not a choice out of fear that is the best way to make a choice that is best for you as a patient and the family. So I completely agree that you have to learn to make those best choices. Another question about ablation I know it's not something that is right up your alley but if you could answer if not that's fine what are the cons of laser ablation and they're asking about how do you determine the pathology? I'm assuming they do a pathology beforehand and then to the ablation this person is wondering?

>> There are different to do it a lot of times these lesions are met at -- are metastatic lesions and the primary source is known so it's a known long, best or other source. Sometimes a biopsy is performed first and the laser is applied so kind of the two steps to one procedure. Different ways to do it sometimes it is a recurrent tumor, a tumor that has

been biopsy been taken out and recursrecurs.Sometimes it is radiation damaged, radiation necrosis so sort of presumptive diagnosis if we kind of know what is going on. Is that the different categories in different ways these are approached. There are two main lasers. We mention in use now maybe in on the horizon in the future we will have different and even better laser technologies.

>> Again I like the way you think that we will have a webinar like this in the future and it will be more things and better options and that is always there hope for our patients that we will continue to create new things and new tools and new techniques which brings may probably to our last question, for the meningioma patients or other benign patients, the ones that seem to sometimes get forgotten they live with watching and waiting and sometimes these surgeries -- need surgery are any of these options available for them the meningioma patient? But is specifically for those patients dealing with malignant type tumors?

>> Good point we were sort of picking on the malignant tumors that benign tumors like enantiomers can be just as problematic in some ways depending on their location, size etc. so a lot of these techniques really -- I guess everything I showed could be applied as well to benign tumors such as manager must be not yellow dye that certainly the NICO narrow path, BrainPath, working through a port, a small opening minimally invasive style and philosophy, Visualase all of these are things which can be applied to meningioma as well as in many cases.

>> Wonderful. Sometimes they can -- we leave them out of the picture I think it's important to mention metastatic and I think it's important to remember we cover everyone not just EBM. Of course it's metastatic, benign tumors and especially benign tumors that live long healthy life that may need surgery some knowing that we are out there to assist meningioma patients as well so thank you for that, a perfect question to kind of and as a webinar on. I thank you for answering so many of our questions we got her all of them so that was wonderful. And I appreciate everyone's are really coming up with some really great questions for us today. Thank you for joining us and thanks again to Dr. Bailes and for more information on any of these topics, please call our 800 number which is our Caroline (800)886-2282. We have publications of 0 tactic radiosurgery. We will have this website webinar up on our website any time learning. Again you can call and talk to our nurses or social workers they would be glad to walk you through questions to ask your doctor before any of your appointments.We are here to help however we can. I'm going to pause for just a moment and conclude our webinar recording and come back and tell you about two more exciting webinars we have coming up in the future. One second.

>> We invite you all to continue back to check out our website www.ABTA .org for a brain tumor related topics in our webinar series. Our two next webinars are on Thursday, December 11 from 1 P.M. to two P.M. we will have nutritional supplements for brain tumors. Join Rekha Chaudhary, the assistant Professor of medicine at the University of Cincinnati neuroscience Institute as she presents nutritional supplements for brain tumors. Dr. Chaudhary will work -- will present the research behind nutritional supplements, which ones to avoid, which ones will help with various side effects related to brain tumors.