

>> Welcome, everyone, and thank you for joining the American Brain Tumor Association Webinar Series and thank you for participating in today free educational webinar. Our webinar today will address: Meningiomas: Risk Factors, Treatment Options and Future Advances Presented by Ronald Warnick, MD Please note that all lines during our webinar today are muted. If you have a question you would like to ask, please type and submit it using the "Question" box in the webinar control panel on the right-hand side of your screen. Dr. Warnick will answer as many questions as possible at the end of the presentation. Tomorrow, you will receive an invitation to complete a brief feedback survey. Please do take a few minutes to share your comments about today webinar our feedback is important to us for future webinar development. We are recording today webinar that will post to the ABTA website shortly. You will also receive the webinar link in a follow-up email message once the webinar is available.

>> The American Brain Tumor Association is pleased to welcome you back to our Webinar Series. Our webinar today will discuss: Meningiomas: Risk Factors, Treatment Options and Future Advances My name is Jillann Demes, Senior Program Manager here at the American Brain Tumor Association and I am delighted to introduce our speaker today, Ronald Warnick, MD. Ronald Warnick, MD is the John M. Tew, Jr., Chair in Neurosurgical Oncology, Professor of Neurosurgery and Radiation Oncology, University of Cincinnati; Neurosurgeon, Mayfield Clinic; and Medical Director, University of Cincinnati Brain Tumor Center. Thank you so much for joining us, Dr. Warnick. You may now begin your presentation.

>> Thank you Jill and welcome everyone, it is a great pleasure to be with you today and talk about meningioma. We will talk about several subtopics, first the instance of meningiomas and something very important, risk factors. We will talk about several classification schemes for meningiomas, presenting symptoms that is common for patients, and how we image or take x-rays of the different types, but I will spend the majority of my time talking about treatment options including surgery, radiation, medical therapy, and I will touch on the end of some future advances that are very exciting. First about the origin of meningiomas , they grow from the outer was protective layer of the brain called the Dura, this is a cartoon of a person looking straight ahead, purely the bone and skull, the Dura is the outermost protective layer of the brain, and here's the meningiomas arising from the Dura, although called a brain tumor it is really outside the brain. I was able to find an MRI scan similar, as is a real patient, I will show a lot of MRI scans, always the right side will be here in the left side here. The great is the brain, the black are fluid spaces of the brain, and this is the meningiomas growing in the Dura, and going into the brain, and interestingly, this also has a mere image of meningiomas on the other side . Meningiomas are, -- common, they represent 34% of all primary brain tumors costumers that start in the brain, and a personally 20,000 patients will be diagnosed each year, they're more common in women to men from a ratio of three to one, we think that is because of or mobile incidents.



-- Hormonal incidents. The average age is 63 years but you can see in the graph, it looks at the incidents, of meningiomas in each age group, these are the ages. Meningiomas are very uncommon in children increased in the 20s, 30s and 40s and exponentially all the way up to 70 years old and more common in women than men. Various risk factors have been either proven or associated with meningiomas, this is a hot topic in neurosurgery and oncology, definite risk factors our -- are higher level radiation, such as an Israel when children were immigrating in the 60s and 70s, they were treated with radiation to the scalp or infection, and 1023 years later they develop meningiomas. Radiation, high-level, therapeutic radiation is a cause of meningiomas, which is unusual and almost ironic because you will find out later that they already know radiation is a treatment for meningiomas. There are genetic disorders that cause meningiomas, most common is narrow to assist two, this is a mutation that runs in families it is on chromosomal 22 and leads to multiple meningiomas and also multiple acoustic meningiomas. The biggest topics in discussions relate to possible risk factors, there are some association between lower level radiation and x-rays, and people always ask me about cell phones, this association is very weak and has not been proven, low level radiation is a concern and limited but has not been proven. Head trauma such as concussion or have fracture has been linked in one or two studies, not at work.

There is an association between meningiomas and breast cancer, breast cancer have a higher risk of developing meningiomas later, this may be because both have estrogen hormone receptors. One of the most intriguing associations is a negative association, allergies, seasonal allergies such as hay fever and medication such as Allegra has a protective effect, if you look at a large population of patients, patient with allergies have lower brain tumors and meningiomas in general. There are many classification schemes for meningiomas, distribution or location, I have here a cartoon also of the Dura, and it turns out that 30% of the meningiomas arise from the Dura on the convexity, the Dura that is hourly facing. 27% arise from this midline, called the falx, the largest percentage, 33% arise from the Dura along the skull base, skull base meningiomas. Interestingly about 8% of patients will have multiple meningiomas so as we follow patients for their primary meningiomas we must look throughout the scan to see if there is a second meningiomas. We also classified meningiomas by pathology and there are three grades, grade one is considered benign, the most common, or it is atypical, and grade three is malignant. Here is microscopic view, what the pathologist looks like after I removed the tumor of a benign meningiomas, each purple dot represent a tumor cell, the pink is the background, as you can see there are large areas of pink which means there are not a lot of cells here, they are not tightly packed in and the cells look relatively normal, benign, but look down here at a malignant meningiomas, there is less pink, many more cells, and many of the cells are large and angry looking, and that is what makes up a malignant meningiomas, so the pathologist can tell us the grade and that dictates the kind of treatment necessary.



One of the classifications is by genetics, I mentioned Neuro five I mentioned Neuro 5 miles this is a family of disorder but it turns out if you take a group of patients that don't have an F2 that have spontaneously occurring meningiomas and you look to see and analyze those tumors for loss of mutation of this NF2 gene, 30 -- 50% of patients also have this genetic defect. Interestingly, a new study from last year has shown that you can project the genetic defects that meningiomas has based on location, so this is a skull looking from the top, and this orange area represents meningiomas in this area, have mutations in these genes, and therefore location can determine gene defects and ultimately determine biologic therapies that might be given for those tumors, this is cutting edge and soon will be used for treatment options. Presenting symptoms, most patients or many patients present without symptoms, there meningiomas is picked up or accidentally, they bump their head or have a CAT scan and it shows, and they don't have any symptoms, but if the patient with meningiomas symptoms, was common is headache, seizure is common, memory disturbance, cognitive, personality, weakness on one side of the body or other, speech problems, and also sensation and vision less commonly.

Sometimes patients will have an external sign of an -- meningiomas, this is one woman who is a nurse who noticed a gradually increasing bump on her head and over the past three months the bump became area large write quickly, this is the patient at the side -- at the time of surgery when I operated, you can see this is the normal level of the skull and this is the bump, here is her CAT scan, the CAT scan is a little different them -- that MRI, the skull is white, this is normal, here's the brain, and this entire area is accessed bone that formed because of the meningiomas and this is an important finding of meningiomas , it causes the skull to overgrow and sometimes it appears as above. Let's talk a bit about the kinds of x-rays we use for patients with meningiomas . One of the older types of x-rays that is still useful is CAT scan or CT scan, it is useful because many meningiomas have calcium within it, you thought the first page and -- patient, but here is the meningiomas that is rockhard , literally, and that is because of calcium, like the skull, and the CAT scan is ideal for showing that, that is important and the doctor may ask for CAT scan because you want to know ahead of time how easy or difficult it will be because calcium sometimes makes the tumor or difficult to remove. The most common type of imaging done is an MRI scan, and that is because it shows the brain in better detail but also we can get three dimensions, here is one dimension, one view of the patient from the side, this is the eye, the forehead, top of the head -- for head, top of the head, and this is a large meningiomas , we're looking at the patient from the side, this is the temporal region. This is the view, we take a slice of MRI across the patient, and we have a different view, and this is the view I arty shown you, the patient -- I already shown you, the patient in the front, and inside the skull in his -- has eroded outside the scope.



-- The skull. The features we look at to determine if it is meningiomas is its location, the Dura, right here, the tumor is a rising and that and paginating, pushing into the brain, you can see this line of fluid, protecting the brain from the tumor, these tumors are inside the skull but outside the brain. They also light up with intravenous dye, it is important because here is the meningiomas before the die -- the die -- before the dye, and it also shows this HR, Dura tale, extended beyond the term in two directions, that is important for the surgeon to know about because it should be removed at the time of surgery to prevent regrowth. We also sometimes particularly with malignant meningiomas see brain edema, it is not round like the others, it is a little lumpy and Bobby, and all of this -- bumpy, and all of this is swelling, and here is a different view of the tumor, and very dramatically swelling, combination of the tumor plus the swelling that leads to increased pressure of the brain and headaches and other symptoms the patient experience. Here is an important one, meningiomas have a rich let's applied, they have the ability to tell the brain to produce more blood vessels and bring more nutrients and, this is the tumor here, and it MRI, and everyone of these black dots represent a blood vessel within the tumor, this is a different test called a CAT scan angiogram, where we insert die into the blood vessels, these are the blood vessels, nest -- next to the normal blood vessels and feeding the tumor is a birds nest of blood vessels here, it is a very bloody tumor, the surgeon has to know that to prepare for blood loss.

Luckily we have a procedure that can block those abnormal blood vessels to the tumor and make surgery easier, this is what is called in angiogram, where one of our specialist puts the catheter up into the artery and injects black-tie, the lack represents the die, and each one is an abnormal blood vessel, very large, feeding this birds nest of blood vessels that represent the tumor. The specialist can then inject a special dye blue into it and block it off, and here's the result, all the normal blood vessels remain in here was the meningiomas that used to have love vessels and now these little lines -- that used to have vessels and now these little lines show the vessels blocked off, we do that within a few days of the procedure. We talked about imaging, and we now have a patient such as yourself who has a meningiomas , we need to talk about treatment options and they are broken down into observation, surgery, or aviation, and medical are be -- radiation and medical therapy. Observation is appropriate for patients with no symptoms or picked up incidentally or migraine headaches, and are found to have meningiomas, smaller tumors. We usually get regular MRI is dance every 6 to 12 months in the beginning and then longer intervals, two years and three years, and then 10 or 20 years. Here is the natural history of meningiomas if you follow all these small meningiomas there'll be no change and growth of the tumor and 70% of the patients but there will be tumor growth in about arty percent. You are -- here are examples of patients that I have recommended observation and they are still being followed, convexity, and Yuma, and here is the skull base in geo-mod. Skull base is important but sometimes it is hard to persuade a parent -- the patient, and their migraine headaches are related to meningiomas and that is understandable.



Will be the goals for surgery, the rationale? The most important is pet policy, it confirms the diagnosis and meningiomas and tells us the great of tumor, imagine there are three grades, we would then know the great, and we would use hormone receptors, look at other special markers, biologic markers that may present -- predict recurrence of the tumor, it is always better to have a pathology do not. Neurologic, some patients coming with large tumors swelling like the patient I showed you, pressure affects, surgery is the fastest and best way to improve someone's neurologic condition, we might remove the tumor that we think will grow soon and cause a neurologic problem because we want to do it preventative. But also permit outcome point of view if we have a great one meningiomas and we removed, that is curative and 90% of patients so that is the reason in and of itself to do surgery. There are many factors we consider, that I discussed with the patient, and they are split into three categories, factors related to his -- to the tumor, patient and surgeon. Many think I mentioned like the location of the tumor, size and brain swelling, does it invade the brain or what grade, these are things I tell the patient about. The patient has the final decision, and there are things for them to consider, the older you are the less likely you can undergo surgery, if you're neurologic status is affected were more likely to have surgery that ultimately it is the patient choice after hearing all this information. Let's not forget about the surgeon, important factors that you see, their ability and experience, early in their career the surgeon may be a little tentative to take on a big complex meningiomas where is another center or more experienced surgeon may wish to undertake that surgery, and also the resources of that particular cost little in terms of the complex surgery, so we take this all together and I make a recommendation but normally I give options and the patient makes the decision.

One thing we do prior to surgery that is important and new in the past five years, we do a functional roadmap for the surgeon, ours bestial radiologist performs a functional MRI where they map out the important or sensitive areas of the brain, here is one, a picture of the brain from the top, left and the right, and look at the time of this meningiomas , what they do at the time of surgery is a ask the patient to tap their fingers together and they map out the area of the brain that is activated and they have them tap their foot and they map out exactly where that place was, so now I have an exact location and idea where they were but I counsel the patient that they would likely have some temporary and weakness after surgery but their leg would be fine and that is what happened and ultimately the patient recovered that you need to know where those important areas are. All of the surgery is done them. Guided, the surgeon is involved, the computer is used as a tool, what we do isn't MRI scan with these markers, think of them as Lessig Lifesavers, on the four head and behind each year and we do a CAT scan or MRI scan with the markers, and here is one of the markers, and here is meningiomas , and we feed it into the computer workstation in the operating room and then we can see everything in three dimensions.



There is a camera that sends out infrared light that tracks this instrument, the pointer, so after we calibrate, touch each of these areas, let the computer know where the patient is in space, take the pointer and put it where the tumor is, look on the screen and see yes, we are directly over it or know, we need to -- know we need to move one half centimeter or 1 inch, so we can plan the operation and make a relatively small incision compared to before when we had to make large openings, this has revolutionized brain tumor surgery in general and specifically meningiomas surgery. Some of you have already had a craniotomy, for those that have -- that are interesting I wanted to show you schematics for what a meningiomas operation would entail, here's the patient under general anesthesia held in place with the head holder, that is important so they don't move, we make the incision, here is the edge of the skin with little clips on it to prevent bleeding, the skull is here and this is muscle, make an opening in this particular tumor. And now we have opened the skull and taken the bone flap out and placed it in antibiotic solution in here is that Dura where it rises, the shiny structure. This is what it would look like, this is the brain and blood vessels in red, and the veins and blue, and this is the Dura from which the meningiomas would arise. Then we close everything back up with titanium plate. Here's an actual patient I operated on, I will show the operation, not a video but a few pictures. A 59-year-old woman with a history of headaches, her headaches change in frequency and severity which prompted an MRI scan, on my examination she was completely normal. Here is her meningiomas, it seems pretty large, convexity rising from the surface, pushing into the brain, here is another feature you may not notes, involving the bone, going through the bone so I knew that prior to surgery.

Here is a picture of the time of surgery, here are the clips, we have opened the skin, this is the skull, we have removed the skull in this region in -- and you're looking at the Dura, the shiny structure, the first thing you see if the tumor is eroding through the Dura it is unusual, we knew this to be the case, here's the skull from inside looking at it, this is the tumor growing into the bone, so we need to remove that and remove the bone in the region and open the Dura and take out the tumor. Now we opened the Dura, it is been opened here, and here is the brain, there is the vein, here is the meningiomas, it often has this color, this orange-ish color, stuck deep into the brain, 2 inches deep. We dissect around it carefully using the microscope, sometimes we core out the center to make it easier, and here it is after the removal, a little hard to tell, this is about 2 1/2 inches deep, this is what the brain that was pushed away, looks pretty good, maybe a little blanched, so a sects what -- a successful operation, it was the nine, and she is doing well and here's what it looked like meningioma, this is the part that was in the brain, this, and here is the remaining dura around it. Surgery has some limitations, sometimes blood vessels, arteries or veins are in the way and we cannot remove the tumor completely or puts the patient at risk your also eloquent areas, we think of the brain being all eloquent insensitive but there are areas that are more important and we call those eloquent such as the optic nerve, cranial nerves for moving your eyes and tongue, motor sensory language invasion, so sometimes if the -- and vision, so sometimes we won't route the tumor completely. Also problematic for us are highly invasive multiple meningiomas which may not -- which may not work for surgery.



These are some examples of our limitations, here's a massive meningioma, with blood vessels here and here, we can't and Willie remove the tumor because of those blood vessels, trying to preserve them. Okay at this MRI, there is a major vein here, we must protect it so we may remove most of the tumor -- tumor and leave some along the vein. This is a patient who was fortunate that the -- there were meningiomas on both sides and invading the motor area on both sides, we Janet obtain a complete removal, she did have some weakness for. Of time but ultimately improved. This is the patient we did not operate on, look at the diffuse nature of the meningioma, down the center of the brain, not suitable for surgery. It is important to mention the risk of surgery, split up into three -- three categories, neurologic, regional and general, neurological relate to the function of the brain, leading and brain swelling or seizures can be a complication of the surgery, stroke even at the blood vessel is injured, regional convocation such as the wound and infection or wound breakdown of 1%, and of course anyone undergoing surgery could have a complication from an Estes yet, heart or lungs, -- Anastasia, or lungs, and the high incidence of blood clots of people in the Nate -- in the lakes of people that perform -- that have meningiomas, we also have -- we always have to be cautioned him program -- prevent them.

I would like to switch gears and talk about radiation, sometimes they can't be removed or can become clearly removed and we have to consider radiation. First the energy levels of radiation, they go from low such as radio or microwave, intermediate such as ultraviolet from the sun, but the meningioma, on the side high dose radiation, x-rays or gamma rays, it is important to note that we are on the side of the spectrum. The reason is, the target for radiation is tumor DNA. Let's look at the tumor cell. Here it is in within it are chromosomes, the little axis -- the little x's, and when you unravel it you get DNA, and here is the helix, and within that is a gene, and within the gene are these little bonds, and the target are these little bonds, and you will see that in a minute. Radiation is delivering energy to the tumor cell DNA causing damage, so here's how it works, radiation beam comes in and hits a drop of water within the region of the tumor cell, and that causes the water to agitate and send off what is called a free radical, a tiny firecracker, which is the DNA and causes a break in the DNA, and that is the basis of radiation. You were just that you can imagine it might do that to the tumor, or the normal brain and that could be a problem year in -- and --, In fact sometimes the brain cell will receive radiation and there will be a break, but there is a big difference between a normal brain and the tumor and the difference relates to prepare the normal being -- brain can repair itself, and a 24-hour period where the tumor cell cannot, so as we get additional doses of radiation, the normal brain constantly repairs itself while the tumor cell is unable to and accumulate significant damage which leads to the death of the cell, imagine that magnified million times over. There are many common radiation machines, you may have heard of these are been treated on them, the true beam, a linear accelerator, x-rays, then the ball is -- the novalis, Cyberknife, this is a robot like you might have in an auto assembly land that targets the tumor -- plant that targets the tumor, and gamma knife works -- works differently, gamma radiation, there are similarities and differences, they let you meningioma radiation. I would like to mention two terms, your doctor may speak of these, one is radiosurgery and the other is radiotherapy.



Radiosurgery is a misnomer, it doesn't involve surgery at all, it is high dose radiation, one to five sessions, typically one and a tight treatment area, so here is a schematic showing the tumor and green and showing the areas of radiation tightly wrapped around here, I like to think of it as shrink wrapping the tumor with radiation, a tight beam usually when does. Radiotherapy is multiple low doses, each day getting a low dose anywhere between six and 33 sessions although for meningiomas it is typically 28 to 33, and there is a larger margin of brain. And this is a kind of treatment, radiation you see here, this is the kind of treatment, radiotherapy we would give to a patient with malignant meningioma, and this is the kind we would give for a benign, small meningioma. And there are many indications for radiation, interoperable, we cannot age -- we cannot operate, after surgery where the surgeon has incompletely removed meningiomas, after surgery for high-grade, grade 3 or higher meningiomas, they actually need radiation no matter how good the surgery is. For recurrent meningiomas after previous surgery, if you had surgery 10 years ago and it grew back. Radiation is used when there are other medical problems that preclude surgery and the most common is patient choice, patient choose radiation over surgery for small to medium-size meningiomas because of the noninvasive nature of the surgery. Here are couple examples of meningiomas, the cavern on this -- not operable but good for radiation, this is the diffuse tumor, one image, imagine the left side of the brain coded with this meningiomas, not suitable for surgery but good both for radiation, and both of these would be radiotherapy, the 28 to 33 fractions a day.

-- This is a patient that underwent partial removal, this is meningiomas on the left side, the surgeon was able to remain part of it, but this part remained, so we needed to do radiation to treat this portion of the tumor also. I showed you this patient already with the main late-night meningiomas, -- malignant meningiomas, we still need to give radiation therapy. Here is an example of the patient, and 2003, a little before this underwent removal of a very large meningioma and there is a small remnant left, it was treated with radiosurgery, small dose over one day, it started to grow back two years later, she moved, didn't have a neurosurgeon, came back to CS and 2014, the tumor was large again, she is now elderly and cannot undergo surgery so she is being treated with the fractionated radiotherapy. To patients who I give them the choice between the surgery and radiation and they chose radiation, both of these were radio surgery, one to five doses. What are the results, they are great, 90% probability that the meningioma will not grow because of radiation, and that is a 10 year result, follow the patient for 10 years, 90% chance, good results. I like to think of this as the role of trees -- trees, if you follow patient over time, 30% of patients will have no change in the tumor, it hasn't trunk, 30% will have minor shrinkage, the doctor will have to take measurements to define the shrinkage, and 30% chance of major shrinkage, the patient looking at the scan to see the difference. One thing it may not do is reverse neurological symptoms, if the patient comes in with lines in this -- blindness were severe disturbance, radiation a not reverse that only surgery.



There are some side effects of radiation. The first is fatigue, which would normally occur with the fractionated radiation, the many weeks of radiation that could occur with one to five actions. And also hair loss at the site of treatment which is usually temporary. And scar tissue, something called radiation necrosis, here's a patient -- necrosis, this patient had meningiomas treated with radiation, look at this white area, it is swelling and scar tissue that resulted as a result of the radiosurgery, about Dick Stewart 18 months later is the peak time for that radiation necrosis. It can be treated with steroids and other therapy and usually responds. Another thing that can happen with radiation is a new meningiomas can form, this is one young woman who had treatment several decades ago and now she has in the field of radiation on new meningioma previous from the other side, so the risk factor, is used to treat, and very rarely, it is probably one and 100,000 chance.

The last therapy we work with and offer is medical therapies, these are medications or injections we use, and the indications for them are if and meningioma -- if a gross, we are left without -- with one option, medical therapy, patients with model call -- multiple meningiomas, and very diffuse or over an entire service of the brain. Here is an example of the patient who is a very current patient because I'm discussing treatment with her, she had the very large bump on her head, this is all bone and this was the meningiomas, we took it out and gave radiation, because it was a great tumor and we weren't -- agreed to tumor and we want sure we removed all, she did well for two years, but this white area) -- area right here shows regroup -- regrowth, so we did surgery again and removed it, unfortunately this past week she has regrowth and a different area, and this area has already received maximum radiation, surgery is not possible because it is over a very broad area, the images show that so we are talking to her about medical therapy. Here is a patient with multiple meningiomas, a patient with Neuro fibrocystic type II, you can see how many meningiomas there are. Not radiation or medical therapy would be needed. I mentioned before the diffuse meningiomas overlarge service of the brain, you see it there, and this patient, the entire Dura, all the way around, is involved with meningiomas. We are hesitant to give radiation to the entire brain so medical therapy may be plant. There are three Hydroxyurea approved medical therapies, the first is, also called high durian, this is the So, what it does is it tricks them -- the meningiomas into dying, they go down a certain pathway, it is a -- it is a normal pathway but it it excels the tumor death, it has some help in some patients, also we have A interferon, it inhibits the tumor was vessels, that lead to a of birds nest, invite starving the tumor of blood it can reduce tumor size, and the third Sandostatin treatment is, the brand name is Octreotide, there is a medical scan that can be done with it to show if your meningiomas lights up with this, so you might be a candidate for it, this is and injection and it works for hormone receptors.

We have a few approved medical therapies, but help is on its way, there are many scientists and physicians working on new advances and future advances, in preparation for this presentation I looked up on clinical trials.gov and found they were 18 active clinical trials, most involving the standard agents, combined with another drug, hoping that two is better than one.



Many of them are biologic agents, if you look at this cartoon USC that this is supposed to be the outer part of the meningiomas cell, and there is the receptor, which I like to think of as an on off switch, so factors come in, they lock and in turn this on, which leads to revving up of the mechanism here which leads to growth and even blood vessel formation, so many agents can block different points, and this cascade such as Avastin, ever line this -- Everolimus, and many others in clinical trials. There is one treatment that is called NovoTTF, these are electrodes that are basically pasted to the patient had, here they are, with the Tate -- with a piece of tape, takes it in the area of the tumor, the patient carries this battery pack and small backpack, and what this does is send alternating electrical currents, which disrupt or inhibit soon -- tumor cell division, it is been used and proven and tumors called gliomas, and now are being tested in strand three, and is best for tumors that are rapidly growing, so it will probably be of benefit for people with high-grade meningiomas, so more on this later but it is exciting because it doesn't involve injections just wearing this device and the patient can obviously wear a hat or scarf.

>> What you can see from this example and the clinical trials is there are some really exciting new therapies on the horizon and we think these will offer new hope for meningiomas patients. At this point, I will turn, that concludes my presentation, I will turn it over, and because I know there are a lot of questions I want to answer as many as possible I want to thank each of you for being here today, your attention and time to listen to this presentation. Thank you very much.

>> Thank you so much. And you are right there are a lot of questions, and we did have a wonderful turnout online, so we will get right to the questions. One that we hear a lot of, is that personality changes. I will start out with that one, I don't know how much you can answer about that, how much you see in your practice, of after surgery, DC a lot of meningiomas patients -- do you see a lot of meningiomas patient that have personality changes, paranoia, and memory changes in how do you help the families cope with that?

>>We see it even in diagnosis because meningiomas is in the frontal lobe, and can cause personality change in trouble with executive function and even depression, so we have patients that come to us from the psychiatric ward and they have a giant meningiomas , many of my patients do complain of those symptoms, typically based on where the tumor is located. One of the most important things is there are memory problems or cognitive problems, the patient should see a psychiatrist. You hear the term and you think, that doesn't sound like it is for me, what a neuropsychiatrist for neural psychologist, more common, they do the in-depth memory testing, cognitive testing, they may help you find some strategies to improve memory, and I found them very useful, you could ask your doctor or nurse urging to refer you to her neural psychologist. They also specialize, they work with patients who have unusual or abnormal feelings such as paranoia, and they've been very helpful for those patients, not with drugs that would discussion and counseling, so I encourage the referral.



>> Couple questions about hereditary, meningiomas, and hereditary diagnosis.

>> Typically not outside of syndromes such as neurofibromatosis type II, however having said that there are some families, I have a father-son combination right now, luckily they are doing area well, you will not see -- believe the story, they are both admitted to the hospital at the same time for meningiomas surgery , one was elective and I planned to remove the meningiomas, and his son was having symptoms and we admitted him with meningiomas and a different location of the brain, so there must be something going on -- going on there but we haven't defined it. Some scientists are analyzing meningiomas after they are removed and looking for a genetic defect that may link family members who both have meningiomas , but if the patient is asking, will my brother or sister or daughter have an increase risk, typically we would answer no.

>> Follow-up question, a mother was asking if their child should get MRIs at an early age.

>> Very good question that is what is being asked of every tumor and lesion of the brain, should my family member be tested and if so how often, that is one of the biggest concerns and questions. I would say in general no, I wouldn't do a screening MRI but if I saw a cluster of patients within a family with meningiomas then I would, in the next question is, if you have one and it is normal when do you do the next one, or do you do an excellent, how long do you wait, a lot of questions involves but I was limited it to families with a cluster, two or more patients with meningiomas.

>> Any suggestions, a couple of questions on alternative and complementary therapies for meningiomas .

>> I would say I am a firm believer in combining complementary there please with traditional there please as well as both sets of doctors, maybe sometimes different doctors involved, no what the other is doing. I'm not an expert on complementary medicine although I will say it is very important in general if we look at diet and activity and how it affects tumor formation in group -- and growth in general in tumors and cancer that a diet high in antioxidants, fruits and vegetables, is favorable for patients to reduce their risk and we want to reduce things like cured meats, bacon and salami and pepperoni, and if you are smoking you want to stop smoking, and you want to increase your activity because almost all cancers relate to activity, not meningiomas per se, these are things you can do to stay healthy and potentially reduce risk of growth or recurrence.



>> Perfect. Can anyone be on, watchful waiting for their whole life?

>> Any patients are, I am following many hundreds of patients, now I've been practicing 24 years, I've been following them since the beginning in their stable, yes it is very common and is often the case when someone comes in with an incidental meningiomas, I have also had situations where there tumor was growing and they scheduled surgery, for some reason the patient decided not to and 10 years later they're okay, so they knew better than me that surgery was not needed and there tumor was stable forever. It happens, very commonly.

>> Can you tell us anything about MRIs, focus altar sounds for meningiomas -- focused altar is -- altar sounds for meningiomas This is been examined in many areas , think of focused altar sound therapy similar to radio surgery that I mentioned, 1 to 5 doses of radiation to a tight area, shrinkwrapping the tumor with radiation, ultrasound focused use something similar, it looks like the Gamma knife to focus these beams of all -- ultrasound to the tumor and intersecting fashion so all of these beams are hitting the tumor and when they collide with the tumor they lead to death of the tumor cell, they disrupt the DNA in a similar fashion to radiation but without the risk of radiation induced secondary tumors. This is very cutting edge, and I am sure are be more on this, then the next time I give this presentation in a few years I am sure I will include that Kirk

>> I'm sure that will be exciting. Risk -- is their risk -- discuss the risk of radiation a little bit further, someone wasn't quite understanding, I note the slide showed it was pretty impressive on the slide, but what can I do to a person, what are the implications.

>> I will be happy to expand upon that, let me talk about that particular patient because it is boring to form a concept around the patient. That patient was doing well until about next month after radiosurgery and she started developing unsteady gait, headache, nausea and vomiting, math swelling, it was very scary looking MRI, it looked like it would require surgery, we placed her on steroids education and she promptly improved, then we gradually followed her over time, I tried to take her off steroids but it didn't work, so she went back on, I started Temple medications called Trent all, which is a medication for another purpose but treats the radiation affect plus vitamin E which is an antioxidant and this improved her addition in the brain is coming down. The first thing to note is it is a delayed phenomenon, 6 to 18 months leader, why, there are all kinds of possibilities, it is surprising it doesn't happen right after but in a delayed fashion, it can devastate the patient because of the swelling if it is not under control, but the good news is usually time is just what it takes to resolve it, now we have a new drug called MSN as I mentioned which is a -- called EVASTA which is the tumor fighter, and it occurs 3% of the time after radio surgery, almost never after radiotherapy in about 1% of the time would be where we have to give a drug like Evasta.



>> You mentioned the connection with breast cancer and hormones. What are the role of hormones that are naturally occurring, and the role of hormones that are commercially, that you would take for instance as a contraceptive pill or HRT, do they affect meningiomas differently.

>> Used to be thought that meningiomas frequently had estrogen receptors, and really estrogen receptors are rare on meningiomas, but they are not rare in breast cancer. They occur and 15% of meningiomas, if you look at their hormone receptors could they have estrogen receptors but if you look at are just around, dirty 5% of meningiomas -- 35% of meningiomas will have progesterone. There is something that is used to block the receptors, and the study did not work and the drug was not effective because so few meningiomas has the progesterone receptors. Estrogen is not as important whether external or pills you take or as you know the BPA from the chemical from old water bottles, estrogen side effects, that is probably not going to make meningiomas broke but is more on the progesterone side, if you will go on progesterone, and your skin -- your scan is scheduled for two years from now we need to do it sooner, like three months later were six months later to make sure you're not having tumor growth from progesterone, that is the important hormone.

>> Do they know what causes certain growths in meningiomas, from scan to scan, it's normal and suddenly there's a large growth spurt, is there a known cause for those?

>> During the early -- generally no, one situation at occurs where we understand it, if we see a patient with a typical benign grade 1 appearing meningiomas, we don't know for sure because we haven't operated, but it looks classic for that and we follow the patient on their next scan it grows dramatically, then we know that it probably wasn't a great one, and when you do surgery you find out it was agreed to, so sometimes great to the masquerade itself and show growth rapidly. If we take a different scenario where I am following the patient or 10 years and everything is going well and suddenly it starts growing. Our criteria for resect, is a gross 2 mm per year times two years, 4 mm, that is when we wake up and say okay, we need to do treatment, what causes that to put step -- to plateau in Grogan, we don't know how we wish we did, because the follow-up question is what can you do to prevent that, and I don't know of any -- what can you do to prevent that and I don't know what the patient can do to keep the risk low.

>> I am going to sneak in one more question, I closing comments made run us over 3 PM but I would rather have one more question, and people can sign off. Someone is asking what can cause a brain bleed after meningiomas surgery.



>> That is a very tragic thing that can occur, and there are many possibilities, it could be as simple as a small bit of a zine from the brain -- losing from the brain service that the surgeon felt was under control, and you see on the postop CAT scan some blood in the cavity are not causing a problem, that is fairly common, probably the biggest cause of the big bleed would be a vein injury, those veins are important because they take brain -- blood from the brain to the heart suffered being is damage - - so of the vein is damaged it leads to the buildup of blood in the brain which shows up as a bleed and that can be a devastating thing but the good news is it is almost always reversible, unlike the normal stroke you think of this vein stroke, this -- the patient can recover with rehab.

>> That is good news. That is definitely all the questions we have time for. It is the top of the hour and I appreciate you going straight to 3:00, I am sorry we couldn't get to everyone's questions, if you only knew how many were here, it was such a popular webinar, much needed, and we are already having people pop up saying thank you, so I can't thank you enough, I am passing along from all the members, so I am going to pause for just a moment, and we are going to conclude our webinar recording and I will be back for just a moment to make some announcements.

>> We invite you all to continue to check back at our website, www.abta.org for other brain tumor related topics in our webinar series. Our next 2 webinars are Tuesday, 9/30/2014 - 1 p.m. to 2 p.m. Central time- Living With Seizures. Join Kathy Lupica, MSN, CNP of Cleveland Clinic Burkhardt Brain Tumor & Neuro-Oncology Center as she presents, Living with Seizures. Ms. Lupica will discuss seizure triggers, first aid, medication choices, side effects and prevention. Wednesday, 10/8/2014 1 p.m. to 2 p.m. Central time - Ketogenic Diet for Brain Tumor Patients. Join Leonora Renda, RDN, of University of Arizona Cancer as she discusses what the Ketogenic diet is, how to achieve ketosis, the challenges associated with this specialty diet and the results that have been seen thus far in the research studies. This concludes our webinar. Thank you for joining us and please be sure to complete the feedback survey you will receive shortly following this session. You may now disconnect. Thank you and have a great day.

>> [Event Concluded]

