Advancements in Radiation Oncology

Halifax Health
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Welcome to this OR-Live program presented by Halifax Health.

Good evening, and thank you for joining us for another OR- Live here at Halifax Health. My name is Day Young from marketing communications and I'm excited to be here in the Herbert D. Kerman Center for Oncology.

This evening we're going to be talking about some of the advancements in radiation oncology, and joining me is a group of physicians, therapists, as well as a patient. The first group is in the Novalis Tx treatment room, and we have Sheila Garthwaite [PH]. She is the chief radiation therapist, as well as Debby Baker, radiation therapist. We will visit with them in a few minutes as they are preparing a brain cancer patient for treatment.

On the panel here with me tonight is Dr. Chick Hechtman. He's the radiation oncologist here.

Thanks for having us today, Day.

And Dr. Roheath Cana [PH], he is a neurosurgeon with Halifax Health.

Glad to be here.

Throughout the webcast, if you have questions, simply click the "Ask a question" button on the screen and we'll try to and get to your question during this live broadcast. Dr. Heckman, to get us started, can you give us an idea of sort of the evolution of radiation oncology?

Sure. I think probably the way to describe this is there's really two different directions that radiation therapy has taken. I think the one that we're going to concentrate on tonight is the direction of very, very tight fields, very high-dense, high-dose fields with high precision and sparing the normal tissue around the cancer. Just briefly, when we talk about traditional radio therapy, we're giving small doses over a long period of time so that the normal tissue that is hit is able to recover. That's probably not what we're going to concentrate on this evening. We're talking about high precision, high dose, and relatively small volumes. That's really how we are able to take advantage of some very sophisticated equipment.

Can you talk a little bit about, specific to brain and spine, how far have we come, can you give us an idea how we were treating patients and how we are now?

Sure. Roughly 1967 there was a neurosurgeon, Leksell, who thought of this idea of taking a bunch of radioactive sources, cobalt, actually 201 of them, and placing them in basically a position of hemisphere, all pointed at a particular point, which took a bunch of very weak fields, and when they all coalesced into that one point it was very, very strong. And, of course, you had to have a person held in a very, very -- with very, very tight tolerance and they managed to do that by bolting a frame to the patient's head, and I think Dr. Konnick [PH] can tell you more about that. Patients didn't really care for that too much, but that was the way to do it. And gamma knife was tremendous. But we've come quite a way since then.

Dr. Konnick, can you talk to that, what a patient -- kind of the reaction you got when you told them you were going to have to drill into their head to perform surgery?

Well everybody is very apprehensive about having anything drilled into your head, so in order to put the frame onto perform these radio surgery procedures, we had to basically drill four holes to attach the frame to the outer portion of the skull, and even though we use sedation and local anesthesia, it can be a little painful, and just the thought of having the frame attached to your skull is a little apprehensive to most patients.

I would bet.

So we're actually so fortunate that we can actually offer the community this radiosurgery without bolting frames to people's heads. And you might ask, "Well is it going to have the same accuracy, the same precision," and the answer is, "Yes." So because of having some very sophisticating equipment, we don't need to put patients through that anymore. We also don't need the limit the treatment to a single dose. We can actually offer multiple doses. You can imagine trying to bolt a frame to somebody's head five times per treatment as opposed to one time. But we have no problem with that at this point.

And with the Novalis Tx and these types of newer technologies, is it different and can you talk about that maybe specifically to head, neck, and spine. Can you maybe talk to that?

Yeah. Sure. We are able to deliver stereotactic radiosurgery, which is using multiple beams from a bunch of different directions, all of them weak, and the confluent joining of these beams into a very, very ablative dose , a very, very high dose with precision of less than a millimeter. And I think, you know, that's what's so magical about this, and you'll find later, as we talk about this, that it's not just limited to the brain, but we can also do this for the spine, and you'll find that it's true for lung, it's true for the liver, it's true for many, many regions in the human body. So it is a dramatic difference.

Okay. I think now is a good time to transfer into our Novalis Tx treatment room with our therapists and our patient that they are preparing. Sheila, would you please talk to us a little bit about the machine, how it moves, how it works.

Sure. Thank you, Day. This is our NTX Novalis, our Novalis Tx linear accelerator, and along with the brain lab Exact Tracks System, it offers a powerful treatment in the treatment of cancer. It also offers state-of-the-art treatment with non-invasive modality that we can treat more accuracy and we can treat around very critical structures.

Tonight we are going to concentrate on stereotactic radiosurgery, but I do want to tell you a little bit about what the machine can do other than stereotactic radiosurgery. It is a very versatile machine, and it can allow us to not only treat brain treatments but we can also treat prostate, liver, lung, breast, just to name a few different areas.

One of the things that is so great about this machine is why we can treat with such accuracy. One of the things is the imaging components that it has attached to it. Debby is going to bring out the arms of the machine and show us how there are two arms on the machine. And the one arm on the machine is actually an X-ray tube, and the other arm on the machine is actually an image intensifier. And we can take any kind of KV imaging that we want to take, with this we can take it in any direction that we want to take.

It takes a few minute for the arms to come out.

Can you hear me, Sheila?

Yes, I can hear you.

I was just going to ask, so you actually can image the patient at this time as well?

Yes. We can image the patient right now in position, which is great. We can also not only do static KV film but we can also do an actual CT scan of the patient if we wanted to. So we can do all of this while the patient is in the room on the table in treatment position. Okay. All this accuracy, like we said, is accomplished by the imaging. But one of the other imaging systems that we have the Brain Lag Exact Track System, and we have the patient all set up. The patient is in their mask. This mask was made earlier in the week in the simulation room, and then we've also placed the positioning array on top the patient.

This positioning array has reflected spheres on top of it that, along with the system, we can manipulate the patient and table so that the patient will start to go into treatment position, and then we can get the patient in treatment position. Debbie's just going to retract those arms. Once we have the patient in treatment position where we want them to be, we will then take some images using the Exact Track Imaging System.

The Exact Track Imaging System consists of two X-ray tubes this are actually in the floor, and there's two reflectors up on the ceiling. We take two images that crisscross each other. We then, with the software from the system, the software evaluates those images, matches them with the images taken originally from the planning simulation that we did, tells us what adjustments need to be made, and we can make the adjustments. And the doctors and the physicists look at all of those and approve say "That's what we want and that's how we want to do it."

Once that is done, then we can come in and manipulate the table in such a way using our robotic system. The robotic system allows us -- as Debbie can show us, it allows us to raise the table up and down, raise the table up and down, it will slide the table in and out. We can also move the table left to right. We can also move the floor around if we want to. But the one nice thing with this robotic system that makes it so completely unique is that we can do two other motions called a "pitch" and a "roll."

If you notice on this table there is an accordion section. This accordion section is what allows us to do these two other motions. The two motions, like I said, are a pitch, which basically you could lower the head or raise the head of the table to adjust for a position or you could actually roll the table top left to right to position the patient if you need to.

And as we were saying, another thing with the Exact Track System is once everything is set up and the patient is ready to be treated, the Exact Track System also has a tracking system. These spheres on this positioning array is all attached to this base. While we're treating the patient, if the patient should happen to move, we would notice that outside because of these spheres, and we would be able to shut the machine off, come back in the room, adjust the patient, take more images if we need to verify they are in the right position, and then continue with their treatment, and we can do all of this while they are getting their treatment.

And all of this technology is really important when you're treating in the brain or any other critical areas like the spinal cord, because with all of this technology and the Exact Track System and the Novalis Tx, we can ensure that our treatments are as accurate as one millimeter.

Thank you very much, Sheila, and be Debbie for that. I think now is a good time to transition into the Novalis TX video that shows some of its capabilities.

Halifax Health Center for Oncology's commitment to technological excellence is best symbolized by the recent acquisition of the Novalis Tx, a miraculous advancement in radiation therapy that is revolutionizing tumor treatments and bringing new hope to the most difficult cases. The Novalis

Tx Radiosurgery System is a platform designed to deliver contoured multidirectional beams of radiation that converge on a specific tumor area while sparing adjacent healthy tissue.

Using computer-enhanced imagery based on MRI and CAT scans, the tumor area can be viewed in three dimensions. This enables physicians and dosimetrists, using a proprietary computer system, to plan or contour radiation dose delivery with a precision never before possible. While initial findings indicate success rates comparable to surgery, this precision also eliminates the side effects of traditional radiation. There is virtually no recovery time.

Recovering from surgery is quite different than having a day of treatment with the Novalis Tx where you can go about your business, go dancing, do whatever you want.

The Novalis Tx, the latest and one of the most powerful tools in our partnership with you in the battle against cancer, surgical precision without the surgery.

So now that we understand sort of how a patient is treated using the Novalis Tx, I was hoping that that you both could talk to the process. I would imagine they would have to go through a lot of things before they actually get to this point. Can you talk about that process?

Sure. Let me just tell you – let me just preface all of this by saying that I'm not the only radiation oncologist here. We have Dr. Battle and Dr. Factor. So we all work as a team. And we also have Dr. Konnick here as part of a team. It's very, very important that we have indications for doing this. We don't just have a machine here and we turn it on here for giving people sunburns. We have to be very, very careful about how we judiciously use this equipment. So if it would be all right with you, we could have Dr. Koenig explain some of the indications for using it for brain lesions.

Absolutely. Yeah. As the technology has evolved and we have gotten more studies, we have found more patients that are very suitable candidates for radiosurgery. The most common use has been for brain cancer or what we call metastases, which are tumors that spread from other parts of the body to the brain. We've also found patients with benign tumors, like meningiomas or pituitary adenomas, and acoustic neuromas or schwannomas have been very good candidates for radiosurgery also.

Other indications include arteriovenous malformations, which are an abnormal tangle of blood vessels that some people are born with, and they have a tendency to bleed and cause neurologic deficits, even death if they do so. So we can treat those with radiosurgery as well. And more commonly now we are treating patients with trigeminal neuralgia, which is intractable facial pain that people experience, difficulty talking or even chewing, and if they failed medical treatment for that then we've found that stereotactic surgeries to be very useful procedure for those cases.

We've also now expanded the use with this new Novalis machine to spine cancer, which we have not been able to treat with the previous machines. So that's a tremendous asset and leap in the technology.

Sure. If you think about the Gamma Knife, which I talked about before, the whole coordinate system is based upon bolting a frame to a person's head. That's much, much more difficult when you're talking about a spine. I mean so to get the kind of precision that you'd need to treat very close to the spinal cord without hurting someone, you have to have some mechanism for doing that other than a head frame. And with this new equipment we're able to do that and hold tolerances on the order of a millimeter.

Right. I noticed that in the treatment room there was a mask and it looked sort of like a plastic white mask, can you talk a little bit about what the process is of making that?

Sure. After Dr. Connor and one of the radiation oncologists agree that the patient should be treated with stereotactic radiosurgery, we then have to mobilize the patient's head, and we actually use a thermoplastic mask that's put in a warm water bath. It softens, and it's pulled over the patient's head, and when it cools, it becomes hard. And every time we put the patient back into that mask they're in relatively the same position. A mask will hold a person's head to roughly a two, three millimeter kind of tolerance. And then we have to do things special on top of that, infrared monitoring, infrared guidance to get the person within a millimeter. So that's part of the process. We need to be able to plan this and deliver the treatment exactly where we want and so that mask is part of that process.

Right. So each individual patient gets his or her own mask. Okay. I think it's a good time to transition into that mask video so we can see how that's done.

Because a brain cancer patient's head must be kept absolutely still during Novalis Tx radiation treatments, the patient must wear a custom-made mask. This mask is designed to fit comfortably on the face while the patient lies on the treatment table. Depending on preference, the patient can either sleep or rest comfortably during the 15-to-20 minute treatment.

Prior to the treatments, the patient comes to the hospital for an out-patient appointment so technicians can make and image of that mask. The patient's head is secured and the mask material is molded to the face. While the patient rests for approximately a half hour, the mask hardens, and a CT scan is performed to image the brain. This imagery becomes vital data for the contouring process, and the mask is used for all the ensuing treatments.

Although some patients express concern about remaining still for this length of time, our compassionate doctors and technicians will provide whatever is necessary to make this experience as easy as taking a nap. Novalis Tx at Halifax Health Center for Oncology, surgical precision without the surgery.

We're going to talk a little bit about what happens after that mask is created. First we're going to take an audience question. And I'd like to introduce a new panelist that we have, Dr. Vadim Kuperman. He's a radiation physicist here at Halifax Health.

Thank you to be here. Thank you for inviting me.

Thank you. Audience question is, "Could this type of radiotherapy be used on a recurrence in a patient that had traditional radiation treatment?"

Great question and the answer is yes.

There are organs in the body that are very radiosensitive. They can be hurt by radiation. Traditional radiation brings the level of the dose to these regions to roughly close to their maximum. However if we're able to hone and define the beams to a very small spot that misses the normal tissue and just gets the tumor then, yes, we're able to retreat people, which is something that we really couldn't do before.

Right.

So that's a great question.

Great. So we saw that mask being created. What happens after that? What happens with all that data?

So after that mask is created, the patient is then CT scanned in position, and all that information is sent back to our planning computers. Now Dr. Kuperman is sitting here. He's the guy that keeps us safe. He's the guy that makes sure that these treatments are delivered properly and

that the doses are calculated properly, the machines are calibrated, and that there's no problems. And so maybe he'd be able to describe some more of the detail to us.

Sure.

Well what's important in this field is to make sure that we know where the tumor is. As Dr. Hechtman mentioned, we have to be very precise, so we're essentially talking about accuracy of one millimeter or even better. To achieve this accuracy we really to know a lot about the tumor and in this field we use many different imaging modalities to determine where the tumor is. Specifically, we use CAT scans or CT scans, we use MRI, and we use PET.

So when we get all this information, what physics and the symmetry does, we actually try to fuse these images together to make sure that we know, not only anatomical, but also function information. Functional is a very important word now too, because Dr. Hechtman and I just discussed a case where we did not see a lot of enhancement on one kind of images, but we did see some enhancement in another images, and Dr. Hechtman decided, this is the tumor and this is what we need to treat. So determining how the tumor functions is very, very important, and this is accomplished by using different imaging modalities.

Just in the way of background, when we talk about PET scans, it's a sugar molecule that's connected to an isotope that's radioactive, and cancer cells that are growing quickly need a lot of sugar, and the radioactive isotope gets taken up and shown. So it's the cells – the cancer cells that are alive and growing like crazy, the ones that take up the sugar, and that's what Dr. Kuperman means by functional.

The other CT scan is just looking at differences in density, water versus tissue versus bone. So one of them is just looking at anatomy and another one is looking at the functional quality of the tumor.

Right. I think that looking at these images, viewing these tumors, I think we have a good video that shows how you all do that.

In order to irradiate a tumor with a Novalis Tx the radiation oncologist must visualize the tumor first. This involves a process called "contouring." Using advances MRI and CAT scans, the tumor is located and its shape is rendered into computer animation imagery. Because the MRI and CAT scans provide different kinds of vital information, these images are fused into a contoured, three-dimensional image of the cancerous area. This virtual tumor image can be manipulated in all directions to determine the shape, strength, and margins of the radiation dose.

Margins are the buffer area of healthy tissue surrounding the tumor. These are the same margins surgeons use to make sure they have removed all cancerous tissue during surgery. Expert physicists ensure the target is receiving the proper dose. The defining principle is to deliver pinpoint radiation from multiple directions so only the target area receives the necessary dose.

If someone could get a fly to fly around in a circle, with the Novalis Tx, it could take its wings off. Contouring with the Novalis Tx, by the expert technicians at Halifax Health Center for Oncology, surgical precision without the surgery.

Dr. Hechtman, would you like to explain what you meant by those flies wings?

Sure. It's a little tongue in cheek. But the thing is that there are tumors, for instance in the brain, that are relatively motionless. They are static. So when you target them, you don't need to do anything that allows for motion. We're not limited to those types of lesions. We can actually go after – treat lesions in a lung for instance. You must realize that as you breathe, this lesion moves, so what do you target, how do you target that? That's also another great Dr. Kuperman question.

It's not just – it's not lungs either. There's more to it. You can treat liver lesions. They're right underneath the diaphragm, so as you're breathing, that liver is moving back and forth. So it turns out that we can treat lung lesions that are relatively small, that normally it would be surgery as the treatment of choice with somewhere between a 70% and 90% cure rate, and we rival that. There's data that shows that we're pretty close to that, if not as good. The gold standard is still surgery, but there's many patients that just can't tolerate surgery. And the same thing is true with liver lesions. So we have a capability that's very, very advanced and different at this point. So maybe Dr. Kuperman can tell us a little bit more about how we would target things that are – target lesions that are actually moving.

Right.

Well targeting movement tumors is a very, very complicated and challenging problem. So what we do in our case, we try to image the tumor as it moves.

So why would a tumor be moving? Can you explain where a tumor might move more in the body?

Normally, tumors move a lot in the chest and the lungs. So lung tumors are very well known for their motion. Now tumors in the brain, as Dr. Heckman mentioned, they try to, you know, remain at rest because there's nothing there which can make them move. But in the lung, as patients breathe, the tumor tends to move, and the range of motion can be several centimeters. So the whole idea of our approach is to treat the tumor and spare normal tissue as much as possible. So we need to know exactly where the tumor is, right? So what do we do?

We use a special kind of CT imaging where we image many different phases of the respiratory cycle, and then we sort our images into different phases. So the physician knows exactly which phase responds to maximum and minimum motion. So what we create is a location of the tumor as it moves during the whole breathing cycle. And then physicians can determine exactly how they would like to design their beams. So they can target the tumor and spare the surrounding tissue. It's called "4D imaging" or "4D CT." And this is what we are now doing with radiation patients.

So you can actually follow the tumor as it moves through the patient.

That's correct. We follow the tumor as it moves during the whole cycle, and then we know we can design our treatment beams so we can target the tumor and spare the surrounding tissue.

I think we have a good video to show how they actually track those tumors.

Because the Novalis Tx is so precise in its radiation delivery, the technology has to account for the normal biological movements of the body, especially breathing; for instance, as part of the contouring process for a lung tumor, a patient's breathing motion is documented by a specially-designed marker on the chest during a CAT scan. This data is programmed into the Novalis Tx contouring solution computer. The recorded movement information is integrated into the dose delivery direction. As the patient breathes during treatment, radiation beam direction corresponds to those pre-programmed movements.

When we put in our radiation we will take into account where the tumor is going to be during the treatment based on these 4D CT images. This is a very unique and new approach for us to track tumor motion.

Tumor tracking is another example of how the Novalis Tx delivers surgical precision without the surgery. Dr. Kuperman, before we move on to some audience questions, I was just listening.

You said that this is a new technology, how you can track these tumors. How did you treat those tumors that moved a lot before?

Well before we didn't know how tumors moved, so we had to treat a lot normal tissue because we did not have the ability to determine exactly where the tumor would be during the breathing cycle. Unfortunately this wasn't the option before. That's why we had to, I would say, treat a lot of normal tissue. So now, of course, we can take less normal tissue and still deliver the required dose to the tumor.

I'd also add this to what Dr. Kuperman said; the approach before was to make sure that the target was always in sight of the beam, and because we ended up treating so much normal tissue, we had to lower the dose. We had to lower the dose and fractionate it, give the small doses over a long period of time.

So it was a longer treatment period?

Longer treatment and lower doses, and the effectiveness of the treatment was greatly diminished.

And there was more radiation to the patient.

There was much more radiation to the patients. So that's – in contrast, when we're able to know where that target is with great precision we can make the margins on our beams very, very small, and then go to very high doses and use very few fractions, and we can, as I said, get similar results from surgery for lung cancers. It's true for liver lesions as well. You know, in the 80-90 percentile for a local control is in the literature. I mean it's there. So that's really the advantage of this.

Is the recovery time different for the patient now?

There's virtually no recovery time. I've said it before that after we treat the patient for one of these lung cancers or liver lesions, even some of the brain lesions, they leave our department and go out dancing or do whatever they want. I mean it's not – it's uneventful for the most part, and we like it that way.

Yes.

I also want to tell you. There's something else I need to mention, is this stuff – these kinds of treatments are very dangerous. There's no second chances. You have to do it right the first time. And so one of the things that I'm actually quite proud of in this department is every Friday morning all of the radiation oncologists, as well as the physics people, as well as those dosimetrists, as well as the nurses, all get together and we review every patient that we are treating.

We review every plan. It's all projected, we all look at it, and we have not just one set of eyes looking at it but three and four and five sets of eyes. So the likelihood of us causing damage is dramatically reduced because one person, something happening bad could be rare, but if you have two people, rare times rare is even rarer, and if you take five people, rare times rare times is very rare. So this is sort of our approach and we're very proud of it.

Yeah. Okay. I think we'll take that audience question. We have a couple. We'll take the first one. Is this a first resort or a last resort type of treatment?

Another good question, it sort of plays off the question before, as to whether we could retreat something. So in some ways, if something's been treated and it grows and there's a cancer that recurs, it grows, we can actually retreat that in certain cases. So that would be a last resort. But,

for instance, in the case of the brain lesions, sometimes that's the first treatment we'll use. So it just depends upon the case. Good question though.

This seems like – this Novalis Tx seems like the end all, be all. Are there any cancers or types of situations that wouldn't be appropriate for the Novalis Tx?

Sure. You know, the great – the reason that we're able to make so much progress is because we're talking about essentially small lesions, and if the lesion is large, if the cancer is large, then we get no benefit from going to these very highly precise sophisticated techniques. It's only that we get the lesion early that we actually have made huge amounts of progress. That's what it's predicated on is being able to treat a lesion that's small and early.

Right. Do you have anything to add to that, Dr. Kuperman?

I just want to focus on what Dr. Hechtman mentioned previously. He said that we're all involved in quality assurance. Quality assurance in our field is extremely important. You know, we can really damage normal tissue. We can, in some cases, kill the patient. So what we need to understand is that safety and accuracy of our treatments should come first. And in our case, in our team, we just – we don't have one physicist, we have three physicists, we have excellent team of physics, excellent team of the dosimetrists, and very, very experienced therapists who focus on making sure that patients are treated safely and accurately every day.

Right. Team work.

Team work, yes. Team work is extremely important.

Absolutely. We don't have the room for egos here.

Well this has been extremely educational and we really appreciate your time this evening. Thank you, Dr. Cana, who left; Dr. Hechtman; Dr. Kuperman.

Thank you.

I want to thank Sheila and Debbie in the treatment room, of course. And thank you all for tuning in this evening. We hope you learned something. And we hope you're interested in learning something else. You can find us online at CANCERHATESUS.ORG. There you can learn more about our cancer care team and the cancer care services that we offer here. This webcast will also be available for viewing at that site. And now we'll leave you with the spotlight feature of our Center for Oncology here at Halifax Health. Thank you and good night.

Cancer hates us at Halifax Health Center for Oncology, and for good reason.

Cancer, it's a battle. It's a personal battle. If you have friends, you have knowledgeable doctors, you have good people around you, you can get through it.

They're fabulous here. They really are. I mean they really make you feel good. I mean, you know, they take the pressure off of you.

There's always hope. You never give up.

We treated this gentleman. The plan was five fractions, and by the third fraction his son was already taking him out fishing. So they come here, they're so nervous, they're so anxious, our goal is to get them to smile before they walk out the door.

The team at Halifax Health Center for Oncology is made up of uniquely passionate, collaborative, and academically-driven oncology experts. For 50 years, Halifax Health has been at the forefront

of the fight against cancer. Patients find comfort in an individualized approach, from diagnosis through treatment, and relief in the staff's unmatched expertise with the latest technology. Our philosophy is to target and attack cancer with skill and precision while providing an atmosphere of support and healing.

The role of surgery in cancer treatment at Halifax Health is well established and often the chosen method. With the availability of new and minimally-invasive treatment options, including robotic surgery, the patient experience and recovery can be even more effective and less traumatic.

The robotic technology allows us to have, I think, to have a more precise dissection. The ability to move the instruments in the same directions as we would normally move our hands during an open surgery allows for more specific dissection. Because it's a laparoscopic procedure, the vast majority of our patients are able to go home on the first day after surgery.

Non-surgical options are always part of the treatment plan.

My approach to recommending a treatment is to find the most effective and least invasive treatment that's available for the patient, and if I feel like radiosurgery is one of those treatment options then we get the radiation oncologists involved.

In addition to minimally-invasive surgical techniques, our Medical Oncology Department with a dedicated on-site pharmacist offers the latest drugs available along with a healthy dose of compassion.

I think a lot of the preventative meds that we give that allows a patient to be successful at receiving the chemotherapy.

New treatments come out almost weekly. Almost weekly we have to be in-serviced on a new treatment because it progresses that quickly.

However even the most effective chemotherapy must account for the patient experience.

We have a lot of things to do, but being able to sit down and really connect with that patient is the reason you're here.

We get to know them personally. We get to know their families. We get to know their dogs' names. We get to know their kids, their grandparents. If they don't hug you the first time they come, they always hug you the second time. We give out a lot of hugs.

For many years we've had the motto, "It's the patient first at Halifax." It truly is the patient first here at the Oncology Center.

Miraculous advancements in radiation therapy are revolutionizing tumor treatments and bringing new hope to the most difficult cases. Our Center for Oncology now offers the latest in radiation therapy with the Novalis Tx Radiosurgery System, a platform designed to deliver contoured, multidirectional beams of radiation that converge on specific tumor areas, while sparing adjacent healthy tissue.

You need to deliver very high doses to the tumor, but you need to spare as much as possible the lung, and so we are able to see those doses in three dimensions and design beams of different particles.

Where it really is showing its full potential is when we're treating very tiny lesions. Now these lesions can be in the brain, they can be in the lung, they can be in the liver. Recovering from surgery is quite different than having a day of treatment with the Novalis Tx.

In fact, the delivery system is so precise it can account for the motion of a patient's breathing.

We image a patient with a marker on the skin, and while the patient is being imaged, the marker is moving and there is a camera in the CT room, which is filming the motion of the marker.

With the Novalis Tx we're actually able to track motion of that lesion.

All of these state-of-the-art services are under one roof, on the campus of the Halifax Medical Center. This enables physicians and support personnel to impose the rigors of an academic hospital on every medical decision, through tumor boards and multidisciplinary consultation.

Whether it be surgery or radiosurgery or external beam or whole brain radiation therapy combined with chemotherapy, in that sense is very, very – fundamentally, I think, a very important thing.

So essentially that patient is receiving a second, third, fourth, fifth opinion without ever having to meet with that specialist.

But for all the technologically advanced expertise and academic discipline, we are, first and foremost, a family of professionals.

We think of ourselves as a family and, I think, we hope that by doing that we can provide comprehensive care that would be difficult in some other settings.

I love it here. The people here care. I can't say enough about our doctors and my co-workers. We've been together. They're like my family.

They make you feel family in here.

You can't ask for any better treatment.

My mother was diagnoses with lung cancer right here at the rock. She's still alive today because of the quality of care that was given to her by the nurses and the physicians.

It's great. I was born here, been here every since.

One of my patients eventually became my mother-in-law.

I grew up at this hospital.

I've worked here for almost 30 years now.

I've been a nurse for over 30 years and this is the best job I've ever had.

I must love it, I've been here 17 years.

23-and-a-half years.

If we combined all of our nurses together, probably 200 years of combined experience.

The gift in cancer for nurses is that it gives us a perspective we would never have. It puts your priorities in perfect order. Your people are number one. They are your number one treasure in the world, and cancer gives us, we know that.

We're pretty sure that cancer is no fan of Halifax Health Center for Oncology. With the rare talent and dedication of our staff we have what it takes to work tirelessly at the side of every patient, using the most advanced tools just as we have for more than 50 years.

There's always hope. You never give up.

Thank you for watching this OR-Live program presented by Halifax Health.