**What You Need to Know About Treating Prostate Cancer with Radiation**

**Webcast**

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**Introduction**

**Andrew Schorr:**

Hello. This is Andrew Schorr. Welcome once again to our Ask the Experts series and our program today produced by Patient Power and produced in association with OHSU. Every two weeks we connect you with a leading Oregon Health and Science University expert.

Now as a man, I worry about prostate cancer, and that’s something that’s a significant worry for men. Each year in America there are about almost 220,000 men who are diagnosed with prostate cancer. Those statistics come from the American Cancer Society. Fortunately it has not happened to me yet. My dad lived to be 92, but he was living with a diagnosis of prostate cancer. He’d had his prostate removed, and he had taken hormone shots. Now some men have that, but they also have radiation, and so then the question is, is radiation as part of treatment for prostate cancer getting better so that it targets the cancer tissue but we don’t have it hitting healthy tissue and having side effects of that?

We’re going to learn a lot more about where we are as OHSU helps lead the way in targeted radiation for prostate cancer with Dr. Arthur Hung. Dr. Hung is Assistant Professor in the Department of Radiation Medicine at OHSU, and among the areas he specializes in is in radiation oncology for men being treatment for prostate cancer. Dr. Hung, welcome to our Ask the Experts program.

**Dr. Hung:**

Thank you. Welcome.

**Andrew Schorr:**

So let’s talk about this. So if 218,000 men are diagnosed with prostate cancer I know not every man needs therapy and certainly not radiation. I know even en vogue now is the idea of watchful waiting, but for men who do need treatment how often does radiation come into play?

**Dr. Hung:**

Radiation is pretty much an option for treatment for men of all stages and of all ages for prostate cancer. As you stated, the majority, there are quite a few men who are diagnosed every year, and fortunately we are successful with our therapies...
whether it’s surgery or radiation, and in this day and age there doesn’t appear to be any therapeutic differences in terms of successful outcomes between surgery or radiation.

Andrew Schorr:
Now there are men who have surgery but will also have radiation too, right?

Dr. Hung:
Right, and that’s in the case when surgery was not as successful as we would like, and we can use radiation in what we call the adjuvant or salvage setting to kind of mop up the area where the surgery took place.

Side Effects of Radiation Therapy

Andrew Schorr:
All right, now what’s been the concern about radiation? You know men have to weigh with their doctor and advisors what’s best for them whether they have radiation alone or surgery alone or it ends up as you said that you might need a combination of both. What’s been the concern traditionally about radiation? Not that there aren’t concerns about surgery too, but what have been the concerns about the side effects of radiation?

Dr. Hung:
I think there are some very significant concerns, and they are very warranted. With radiation for one just inherently it’s a little bit daunting because you can’t see it or feel it, and so everyone’s always afraid of the late effects of radiation because it’s just something that we can’t deal with and we can only deal with in an abstract manner. The other issues are that when we use radiation we’re faced with the fact that the anatomy is what it is, and the prostate lies in between the bladder and the rectum and the penis, and those organs are extremely close to the prostate; so close that we can examine almost the entire back half of the prostate with a digital rectal exam as most men know or fear.

Because of that close proximity of the organs radiation in treating prostate cancer can also treat those organs and cause some collateral damage or issues to the adjacent organs.

Andrew Schorr:
Now is this typically, as we worry about even with surgery too, are incontinence and also sexual dysfunction issues?

Dr. Hung:
One of the advantages of radiation is that it is what we term “structure sparing” in that the actual structures are not changed, so the benefit is that all the plumbing is intact during and after treatment. So you don’t usually get leakage or incontinence from radiation because the muscle sphincters and everything are still intact and still function essentially just like normal.
Your bigger issue that you worry about with radiation is the inflammation that can be caused by the radiation that can affect the rectum or the bladder nearby. That inflammation results in more frequency of urination and more urgency when you’re going through the radiation or in the immediate post-treatment period if you have the radioactive seeds, but then over time that inflammation subsides so that when you look at urinary function two years after radiation you find that 99 percent of men have continence and that their urinary functions approach to the same levels that they were before they had any therapy.

Andrew Schorr:
What about sexual function issues?

Dr. Hung:
Erectile function is really one of our most difficult areas that we struggle with. Unfortunately erectile function can be affected by any of our therapies, and with radiation one of the advantages because it is structure-sparing is that there is no effect in the immediate term, during the treatment, or immediately afterwards. The nerves and the muscles and the entire physiologic complex that drives erectile function remain perfectly intact. So in the short term, immediately after radiation, the erectile function is the same as it was before treatment. Over time, however, the radiation is another one of the potential causes of erectile dysfunction, and when you add on the radiation on top of some other preexisting conditions that men may have, such as diabetes or a smoking history or atherosclerosis and artery disease, then erectile dysfunction can set in, and because radiation is another cause of that it increases the rates of erectile dysfunction long term so that when you look at patients several years after radiation there are higher rates of erectile dysfunction than you would expect from age alone.

Benefits of Targeted Therapy

Andrew Schorr:
Let’s talk about the improving story of radiation and that is putting radiation where it needs to be and sparing healthy tissue, and I know that OHSU has done a lot of research on this. So let’s help people understand sort of the science of it. So different from bone, which isn’t moving around basically, the prostate I understand is soft tissue, and when you breathe or if you just ate or if you have gas, it’s not always exactly in the same place, or the area that you need to fire radiation at, and so that’s been a problem over the decades hasn’t it, and so if you can put it exactly where the cancer cells are at that instant that would be better. Did I get it right?

Dr. Hung:
You nailed it right on the head, Andrew. Actually that the crux of what we’ve been focused on in radiation oncology in the last ten years, really precisely delivering the radiation, and we have a new way of delivering the radiation called IMRT, or intensity modulated radiation therapy, and that enables us to precisely put the radiation where we want. Along with that precision though you have to be careful
that you are putting it where you want and not avoiding areas that need to be treated or treating areas that don’t need to be treated. So with the development of IMRT we suddenly have the ability to avoid organs, but now we need to know specifically inside the body where they were or where they are at the time of treatment.

Andrew Schorr:
Right, I was just going to say I know that when somebody is going to have radiation there’s a lot of planning and physics that is involved for treatment planning for a whole; a man may get external radiation over many weeks like women do in breast cancer, but if they just ate or depending upon where the little, even by millimeters, the organs were at that time, the planning that was done weeks before may be a little off, right?

Dr. Hung:
Exactly.

Innovations in Targeted Therapy at OHSU

Andrew Schorr:
So you need to know at the second, so you have these new radiation devices at OHSU that can fire from multiple angles and have the target, and you’ve done that planning, but you need the planning that’s almost real-time, right?

Dr. Hung:
Correct. Yes, 15 years ago we would take a CT scan to help us see the internal anatomy and target the fields, and that was really the start of our standard to have CT-based treatment planning or what we call 3-D conformal radiation external beam treatments. Then as we became more proficient and developed IMRT we realized well we need to see what the internal organs are like each day. So we have the ability to do what we call “imaged-guided radiation” now where we can do a CT scan on a daily basis before a patient has treatment so we can see all the internal anatomy, and that has further enabled us to see that the actual internal anatomy shifts from a day-to-day basis. Then what we realized is that any time a person, like you said, they’ve recently eaten or you hear their stomach growling, all that, the internal organs move around constantly, and that motion can impact our treatment delivery because our margins these days are as small as four millimeters, and that’s roughly somewhere between a 16th and ¼ of an inch, and the internal organs can actually move up to four inches or two-and-a-half centimeters in one direction, and that’s impossible to predict which direction they’re going to move.

The latest technology we have is our Calypso® beacons, which are implanted into the prostate, and by using radiofrequency waves their location can be determined, and we can actually track where the prostate is during the treatment and ensure that with our tight treatment margins at four millimeters that we’re always on the prostate and never treating anything else.
Andrew Schorr:
Let’s help people understand that, and I also should mention that right on the OHSU website you have a press release from very recently, just September 23, 2008, where I believe someone who works with you, Dr. McDonald, gave a talk and a presentation at the big meeting of all the radiation oncologists on how you’ve been researching how breathing affects the accuracy of delivery of radiation to the prostate, so it’s not just whether you ate or whether you had gas, but it’s the breath you take in trying to have that accuracy, and I know that OHSU has paved the way.

These Calypso® beacons, it’s not like you’re putting a huge radio transmitter in somebody, you’re putting in something that’s like the size of a grain of rice, right?

Dr. Hung:
Yes, it’s a little smaller even.

Andrew Schorr:
Wow, and so the idea is these little beacons talk to your external radiation equipment that you’ve gotten aimed as accurately as you can for the plan for that day, and if the beacon moves because you’ve coughed or with breathing and where the target has shifted a little, then you don’t fire the radiation until you’re lined up again, right?

Dr. Hung:
Correct.

Andrew Schorr:
Wow, so that’s the whole effort to put radiation, firing it at the cancer, and not at healthy tissue.

Dr. Hung:
Yes. It enables us to really spare the organs adjacent to the prostate. Calypso® has only been out for about a year to a year-and-a-half now, but we believe that our side effects going forward are even going to be much more dramatically reduced than they were in the past.

Andrew Schorr:
Now there’s another side of this, and that is you in radiation oncology know the effectiveness of radiation if you can put it where it needs to be, but you’ve sometimes dialed back the dose because you couldn’t always throw a strike, if you will, so is the idea if you can be confident that you’re going to pitch a no hitter, that you’re throwing strikes every time where it needs to go, that you could even dial up the dose because you’re aimed at the cancer and not somewhere else?

Dr. Hung:
Exactly. I mean that’s one of the goals of the therapy, and actually one our basic principles of radiation therapy is that we treat to the maximal tolerance of that area...
up and to the point that we have near 100 percent control rates and then we start worrying about maybe we can take some of the dose back. We’re getting pretty close with prostate cancer where we have for certain stages and risks of disease we can attain almost 90 percent control rates going into the future, but that’s still not perfect, and we’d like to get it up there higher, and one of the ways that we have is with dose escalation and getting higher doses into the prostate while at the same time minimizing our damage to the adjacent organs.

Andrew Schorr:
Okay, let’s help people understand though because a lot of times there’s a lot of noise level. I mean a man is diagnosed with prostate cancer, and he is terrified. Fortunately most men die with prostate cancer even in old age rather than from it, but it’s still scary depending upon what your situation is. So if you need radiation and all this technology is coming in to bear, you’d like to think that it’s generally available everywhere you go, but OHSU has really helped lead the way as a National Cancer Institute Research Center as well with this as an example, right? So it’s not available everywhere.

Dr. Hung:
Correct. Yes, the Calypso® was really invented in Seattle, and in Seattle they’ve installed several units because of their proximity, but in Portland, Oregon, we are the only institution with a Calypso® unit in this entire state, and you have to go down to San Francisco before you get to the next one. There are only certain sites that have them, and at this time the Calypso® technology is probably going to supplant all of our previous ways of targeting the prostate just because it enables us to really focus and minimize the amount of damage that you get from organ motion.

Andrew Schorr:
Now let’s help people understand. A lot of times a medical center will buy into a technology, but it’s also what I call the art of medicine. So Dr. Hung, you and the radiation oncology team have been working on this and becoming familiar with it for quite awhile right, although it’s becoming more available and it’s FDA approved and all that, you’ve been involved with it in research too for quite awhile haven’t you?

Dr. Hung:
Yes, we’ve been focused actually on everything, and all of our research efforts in our department are focused on trying to correctly and accurately target our tumors whether we use the Calypso® technology, whether we use a cone-beam CT that the machine can generate, or whether we use a separate in-room CT to track the treatment for a patient, and all of our focus on that has really kind of culminated with this Calypso® at this time, but we’re also looking for other ways much as you saw with our recent article on the respiratory motion effect that’s seen with Calypso®.
Andrew Schorr:
I want to ask your opinion on something. So a man starts reading up on treatments
for prostate cancer. One of the ones that has been around for a few years now is
implanting radioactive seeds right into the prostate, so brachytherapy I think you
call it. You mentioned that this Calypso® external approach is enabling you to put
radiation from an external source right where it needs to be. What do you think is
going to happen to brachytherapy, or is it still going to be an option for some men?

Dr. Hung:
Brachytherapy is still an excellent option for some men, and it’s got the advantage
in that you can place the radiation directly into the prostate and in that way you
can minimize the radiation dose to the other organs. Some of the disadvantages
are that you do get more swelling in the prostate, and you get more urinary
symptoms because of that. So there are some patients who are good candidates for
brachytherapy depending on prostate size, depending on the amount of disease
that they have in their prostate. Others are not good candidates, and those are the
patients who are better served with external beam radiation.

Treatment with the Calypso® System

Andrew Schorr:
So let’s sort of go back over this so people understand. So over the years you’ve
been trying to target radiation, and it’s an effective therapy for sure to hit the
cancer and now hit the cancer where it is at that instant, and then maybe you’ll be
adjusting the dose when you have the confidence that you can put in the highest
tolerated dose exactly where it needs to be at that moment, and so these little
beacons that you’re implanting are “talking” to your external equipment at OHSU to
enable you to do that. So it sounds very exciting.

Tell us, for a man who listens and says hmm, but you’ve got to put these beacons
in. What’s involved in that? Is that a big deal?

Dr. Hung:
It’s not a very big deal. It’s the same procedure as having had a prostate biopsy,
and rather than the ten or twelve needles that are typically used for a prostate
biopsy it’s fortunately only three. So it takes only about 10 to 15 minutes, and it’s
an outpatient quick procedure, an office procedure that the patient can drive
themselves to, and essentially it’s the same thing as the transrectal ultrasound
biopsy that each person had at the time that they were diagnosed.

Andrew Schorr:
Now I come up with an analogy. I know the Calypso® people have a different one.
They talk about it being GPS for the body. I think because I’m a pilot, I think of like
an instrument landing system, and it’s telling you whether you’re on the mark or
not, and you’ve got to get on the mark. Now either way though it’s the idea of
knowing that you’re in the right place at that time, right?
**Dr. Hung:**
Yes, and that’s the crucial concept that has to be applied.

**Andrew Schorr:**
Okay, so what will this do for men do you think? So how excited are you in your part of prostate cancer therapy or taken together what this could mean for men in not only having their prostate cancer having effective treatment to go after the cancer but also giving a high quality of life after treatment?

**Dr. Hung:**
The Calypso® really has dramatically changed how our patients are going through prostate radiation. The patients still do get some side effects, but we have a significant portion, almost half of the patients, who really feel almost no impact on their quality of life and are extremely happy about the treatment. The entire time I’ve had patients continue to work full time and really never exhibit any serious drawbacks from the therapy. The outcomes have been excellent, and we’re really just, we’re ecstatic in looking at comparing our Calypso® experience with our experience of just a year ago, and seeing the difference of side effects is dramatic right now.

**Andrew Schorr:**
Wow, so I think we should make some points for our listeners too who may not be as familiar with OHSU and the Cancer Institute there. You’re really the only National Cancer Institute designated center. I understand between Sacramento and Seattle and as you said related to this GPS for the body targeted radiation approach using these implanted beacons, you’re the only one around for quite awhile, so if somebody wants to really see what prostate cancer treatment approach might be right for them and if radiation comes into play, it’s worth at least having a consultation with you all at OHSU I would think.

**Dr. Hung:**
Yes, definitely. I recognize that there are limited resources and limited time, but one of the most important parts that I usually tell patients is that you have to make sure that the treatment center at a minimum does daily imaging to localize where the prostate is, and really we’re pushing the edge using the Calypso® system, and if that’s attractive to a patient we can tell you that the side effects are much, much less from what we’ve seen so far with the Calypso®.

**Andrew Schorr:**
Now when a man goes through radiation for prostate cancer how long is usually the course of radiation? How many days or weeks would you be doing that?

**Dr. Hung:**
The treatment usually takes eight weeks, and they’re daily treatments Monday through Friday. I usually tell the patients to look at it as an errand that you have to stop in every day, and you have the rest of the day to do whatever you normally
would do. I’ve had several patients actually take advantage of the local golf courses around and really were able to lower their handicap a little bit after playing daily for about eight weeks.

Andrew Schorr:
All right, so that’s a very exciting approach then for people who are in the Portland area close by. Is OHSU going to be able to take this to the hinterland at all, or what would you see where we are headed in the future?

Dr. Hung:
I think what we’re seeing in the future is that other people are going to have to adopt this technology because I think we’re just going to see a dramatic reduction in the side effects that people are experiencing, but if they don’t what we’re also talking about is supporting patients and providing other things to enable them to have their treatments at Centers of Excellence such as OHSU.

Using Targeted Therapy for Other Soft Tissue Cancers

Andrew Schorr:
Okay, well I think it’s certainly a good story. It’s new, although it’s not unfamiliar to OHSU because you’ve been on the ground floor of it, and I think for men not only do they want to fight their prostate cancer but they want to live a full life afterwards, then it’s really a great bit of news for people.

Just one other thing. So you know there may be spouses and others listening, and they say well will this targeted approach for radiation apply to other, let’s say, soft tissue cancers? Where are we with that?

Dr. Hung:
That’s something that we’re very excited about developing, and we’re in the process of looking at using the Calypso® device for treating patients with breast cancer as well as patients with head and neck tumors where precise delivery of the radiation is really critical and can be a life and death issue. So we’re trying to apply this similar technology to other sites and also trying to develop some of our other ways of focusing the radiation as well with our imaged-guided radiation therapy.

Andrew Schorr:
So I think it’s important when, I always tell people to really discuss their specific situation. So when a man’s diagnosed with prostate cancer then whether it’s with the urologist or with the medical oncologist or the radiation oncologist or all together, I guess it really is important then to see what’s the latest that’s available and to what extent does it apply to me, but at least when we talk about this targeted radiation and the beacons sending instantaneous messages to the radiation equipment, all of that is available at the OHSU Cancer Institute.

Dr. Hung:
Yes.
Andrew Schorr:
That’s a great story, and I want to commend you for your leadership in that. Dr. Hung, you sound excited.

Dr. Hung:
I am. Actually I think when the Calypso® technology came out, when it was before it was FDA approved, it was announced in our national meeting in what we call a plenary session or the session where everybody’s expected to attend. I mean this was the first time that we had the ability to track the human body during an actual radiation delivery. Never before had this been possible, and when we first saw the capability of this technology everybody was just astounded, and so to have this technology that we can use daily where we’ve had it for a couple of years now at OHSU has just been a really fun time to be treating patients and taking care of them.

Andrew Schorr:
Well, I’m glad you’re excited, and I think that means a lot to people listening who have this diagnosis and want to get state-of-the-art care, beat the cancer, and lead a full life. So Dr. Arthur Hung, Assistant Professor in the Department of Radiation Medicine and a specialist in helping men with treatment for prostate cancer using radiation as many men require, this advance is a big deal, and I’m excited that it’s available at OHSU.

This is what we do on our Ask the Experts program every two weeks produced by Patient Power and brought to you by OHSU. Thank you for listening. I’m Andrew Schorr. Remember, knowledge can be the best medicine of all.

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