Scott Redding: Welcome to the 3Ps of Cancer podcast, where we'll discuss prevention, preparedness, and progress in cancer treatments and research. Brought to you by the University of Michigan Rogel Cancer Center. I'm Scott Redding.

Scott Redding: We're here with Michigan radiation oncologist, Dr. Robert Dess to talk about radiation therapy for prostate cancer patients, in particular, brachytherapy. Dr. Dess is an assistant professor of radiation oncology. He received his medical degree at the University of Chicago and completed his residency at University of Michigan where he has continued on as a faculty member. Bob's area focus and research are on prostate cancer, lung and breast cancer. He also serves as a co-lead for prostate cancer within the Michigan Radiation Oncology Quality Consortium, where he works to improve statewide care. Welcome Bob.

Dr. Robert Dess: Thanks, Scott.

Scott Redding: Before we get into brachytherapy, can you tell us about the various radiation options for prostate cancer patients?

Dr. Robert Dess: Sure. At Michigan Medicine, we've taken an approach of a multidisciplinary care. So most patients will see myself or a radiation oncologist in addition to a surgeon to discuss their best options for localized prostate cancer. With respect to radiation itself, there's two big categories. There's external beam radiation therapy and that's radiation therapy that's coming from the outside in the form of high energy x-rays. And then there's internal brain radiation and that's known as brachytherapy and that's delivering radiation from the inside out.

Scott Redding: And the brachytherapy is, when you say the inside out, how does that delivered?

Dr. Robert Dess: So those procedures are done under general anesthesia, under ultrasound guidance. And they are placement of needles or catheters and it can either be low dose rate brachytherapy or high dose rate brachytherapy. And the difference between the two is low dose breaking rate brachytherapy is the delivering of small radioactive seeds about the size of a grain of rice, and they're dropped off within the prostate and deliver radiation dose over the weeks and months that they're placed in the prostate.

Dr. Robert Dess: High dose brachytherapy, and that's what I do here at the University of Michigan, is placement of catheters, again under general anesthesia but actually as a temporary radiation source. And so those catheters go into the patient and the temporary radiation source goes through those tunnels, stays in the prostate for a matter of minutes, and then goes to the next catheter and delivers the radiation that way. So then when the patient's done with our treatment, they're no longer radioactive.

Scott Redding: Could you explain a little bit more about the difference between a high dose and low dose brachytherapy?

Dr. Robert Dess: The differences are with low dose rate brachytherapy that is a permanent implantation of the radioactive sources, and over the course of weeks and months those radioactive seeds will then decrease over time, their activity, and it treats the prostate cancer over that period of time.

Dr. Robert Dess: High dose rate brachytherapy, what I do, it's a placement of catheters and that temporary source then goes through the catheter to treat the prostate cancer and it can be delivered in several different settings. One, sometimes with more favorable risk cancers, all you need is the internal radiation, the high dose rate brachytherapy. So that tends to be one procedure or two, most often two procedures separated by a couple of weeks. For certain tumors that are still localized to the prostate but are higher risk often they can be treated with a combination of internal radiation in addition to external beam radiation therapy. So that's usually a procedure first with internal radiation or the brachytherapy followed by possibly external beam radiation therapy if it's needed, and often that's given along with hormone therapy or anti-testosterone therapy.

Dr. Robert Dess: The third setting, and a setting that has been growing, is that with the advances of molecular imaging or the advances to detect where a prostate cancer is after it's been treated, sometimes we realize that the prostate cancer has come back in the prostate and so that's a setting in which it's called salvage brachytherapy or salvage high dose rate brachytherapy. And that's the ability to treat prostate cancer that's come back, but it's only localized, is localized into the prostate. And so that's taken advantage of new technology that allows us to see where the prostate cancer is and give a chance to treat it a second time.

Scott Redding: It sounds with the internal or brachytherapy options that patients have, one, maybe two treatments, how is that compared to a patient that maybe goes down the path of having external beam radiation?

Dr. Robert Dess: So one of the overriding principles in prostate radiation oncology is that we've tried to develop more convenient, more cost-effective forms of treatment, and that takes a form of both external radiation and the internal radiation brachytherapy. And to touch briefly on the external portion of it, we used to treat patients for upwards of eight weeks of treatment of daily treatments, and that was logistically challenging for some people, particularly people that were coming from a bit of a distance away.

Dr. Robert Dess: And thankfully we've run several trials that have allow us to shorten most courses of treatment at the longest about a month or four weeks and some of them we can even deliver an as short as five treatments, and that's from the external beam side. Brachytherapy is similarly convenient. In fact, it could be an

extreme version of that. Some patients only need, like you said, two treatments with high dose rate brachytherapy and that completes their treatment course. And so each patient is a little bit different and the decision of external versus internal is complicated, but thankfully both forms have become much more convenient over time.

Scott Redding: At the beginning, you talked about a multidisciplinary team and during that conversation as this multidisciplinary team, I'm sure you discussed the various options, whether it's external beam, whether it's internal, whether it's a combo or salvage depending on the situation. What are some of the criteria to help determine whether a patient goes down the path of radiation compared to surgery?

Dr. Robert Dess: So thankfully for localized prostate cancer from the perspective of treating the cancer itself, both surgery and radiation, radiation of multiple forms, internal or external, have very good outcomes. So a lot of times it comes down to one personal preference. There are certain patients that are very surgically-inclined that naturally hear the word cancer and would like to have surgery, and there's other patients that very much would like to avoid surgery.

Dr. Robert Dess: And so part of it comes into the personal preference of what the patient would like, what seems to make most sense for them. But a lot of times, people are okay with either one of the treatment options and really are looking for both the surgeon and myself to help walk them through the various likelihood of of side effect profile. And thankfully both options often have very good outcomes. But the things that we focus on are side effects in terms of bothering the urinary system, the bowel system and sexual function. Those are the three big domains that people worry about in side effects of their prostate cancer treatment.

Scott Redding: Whether it's external beam or internal, low dose, high dose brachytherapy, how has technology changed for radiation in treating patients with prostate cancer? I know at least with diagnosing prostate cancer there's a lot of new technology to be able to really pinpoint where the tumor is. How has technology changed from a radiation standpoint in order to really protecting other areas and just getting to that one spot in the prostate?

Dr. Robert Dess: So I'll start a little bit on the external beam side and talk about brachytherapy as well. We've made a lot of progress over the past several decades frankly, but the backbone has been, one, we have transitioned from historical 2-day based treatment planning where we really couldn't see even the soft tissue inside the body to now truly understanding where the prostate is relative to the bladder relative to the rectum. And the whole idea is you want to give radiation where it should go and avoid the surrounding structures. So truly just being able to see inside the prostate hit was a big step forward.

Dr. Robert Dess: The things recently that have allowed us even more progress on the radiation front is, number one, the abilities to use fiducials, things like what we call gold seeds, is one way to do it, to actually place into the prostate. To be able to see where the prostate is, not only on the original treatment plan, but actually every day when we deliver radiation. And so that gives us confidence that not only are we designing a good plan, but we're delivering that plan every day.

Dr. Robert Dess: Another advance recently is actually the use of spacers, of temporary materials that degrade over the months after they're placed. They're placed in an in-office procedure, but it gives us a little bit more space between the prostate and the rectum, and that allows for lower dose to go to the rectum and higher dose to go to the prostate.

Dr. Robert Dess: And so those are principles just with external beam that as we talked about, we've gotten shorter and shorter treatments. It's been really been those ability to design a good plan, execute that plan every day and then do it with the best space that we have that has allowed us to shorten those treatments.

Dr. Robert Dess: And then we use some of those similar principles with the internal radiation or brachytherapy. And so much of what I do is ultrasound-based and so that's what allows me to see the prostate. What I actually am able to bring in the patient's information from their MRI that they've had to know exactly where the tumor is relative to the urethra, the tube that urine goes through. And we treat the whole prostate because there are parts of the tumor that you can't see, but allows us to really make sure that we're focusing on the area that we can see and focus the radiation where it needs to go.

Scott Redding: When we look at these different procedures, external beam, internal, are those available at any radiation therapy center? Or what's the difference between going to someone in the community compared to coming to like an academic medicine location?

Dr. Robert Dess: There's good doctors across the state that I am convinced at. The one thing that I think is really important in radiation oncology is the entire team. We work with nursing. We work with dosimetry, which are radiation planners. We have a physics team, we have radiation therapists that actually deliver the radiation, and a whole host of other people that help us with our job. And so whether it's in the community or academic, I think it's really important to be a part of a great team, and I think we're lucky to have that here in Michigan.

Dr. Robert Dess: The second thing is I feel lucky in my job. I actually get a chance to work out in the community of Brighton and both in the academic center doing my procedures. And the procedures sometimes are labor intensive and also required certain shielding and rooms that are only available here, so there's some care that certainly is appropriate for academic settings. But it's exciting to deliver... We have a great brand new radiation machine and Brighton and we

have our same physics staff that we have down at the main campus. And so we're lucky to be able to deliver care throughout the state that really is good, high quality radiation. And so some of the question of community versus academic really has to do with the resources required to deliver the radiation.

Scott Redding: There's lots of different machines and equipment out there. You hear ads for CyberKnife, for example. If a patient were to come in and say, "I want to have CyberKnife." What do you say to them?

Dr. Robert Dess: So what I do is I first try to separate the brand from the treatment technique. And what a lot of times what people talking about treatments like CyberKnife, what they're really talking about is high doses per fraction or stereotactic radiation. And there's different ways in which that can be delivered, but really what that involves is having highly conformal high doses of radiation that have falloff very quickly related to the organs that are around the prostate.

Dr. Robert Dess: And we deliver the same type of radiation, high dose radiation, VR linear accelerators. And so I first just try to understand, are they really talking about a certain brand or a treatment technique? And then I also take a step back and ask myself, just in general, is this patient appropriate for more fractionated radiation therapy, a longer course of radiation therapy, or perhaps they're appropriate for brachytherapy or internal radiation? And so it's a conversation that we have with with our patients and really to get a heart of what their question is and design a good radiation plan for them.

Scott Redding: How do you come up with that plan? Is it just asking questions or is it looking at their whole medical history? How do you kind of get to that personalized plan?

Dr. Robert Dess: We touched on it a little bit with the surgical patients as well, is there's different treatments that have different side effects. For example, external radiation, you're awake, you're not asleep. And so one of the things that with brachytherapy or internal radiation, I need to make sure that they're safe for anesthesia, so that's a simple thing that we talk about as an example.

Dr. Robert Dess: The other thing, it's a procedure and so you have needles and catheters that are going into the prostate, and so one of the things we look at is, what does the prostate size and what is the anatomy of the prostate? Does that allow us to do what we need to do to deliver the radiation?

Dr. Robert Dess: Another thing is, how is their urinary function? How is the flow of the urine? Sometimes when you're doing a procedure, you need to make sure that they have good baseline function to enable to get them through the procedure. But a lot of it comes down to personal preference and logistics and how we can deliver the radiation therapy that best works with their life.

Scott Redding: As far as prostate cancer, we've talked about how you kind of put your plan together, the options that are valid for patients. What's the future for radiation therapy for prostate cancer patients, whether it be different kinds of treatment, whether it be clinical trials, what does that look like?

Dr. Robert Dess: I think that the prostate cancer space, I'm biased, I'll admit that, but it's incredibly exciting. I think we have two principles in radiation oncology and surgery and medical oncology, it's either improving quantity or quality of life or both. And so in the future, I think with respect to radiation, number one, I think we'll continue to focus on shorter, more convenient, more cost-effective treatments that limits the side effects of the internal organs. There's no question that will continue.

Dr. Robert Dess: And I think we'll learn a lot more about the genomics of prostate cancer, better understand which patients are at risk of their cancer spreading and maybe need more intensified treatments or maybe cancer patients that are less aggressive and maybe can even safely defer their treatment. But I think we'll understand not only the aggressiveness of the tumor, but also perhaps there are tumors that are better served with radiation therapy, very radiation sensitive. And perhaps there's tumors that are prostate cancers that are better served with surgery, and so we may have better information to help us provide guidance to which patients will benefit from which treatments.

Dr. Robert Dess: The other thing that I think is exciting in prostate cancer is that we're learning more and more about the benefit of even prostate cancer that has spread outside of the prostate, whether that's to the lymph nodes or to the other bony parts of the body. We're learning more and more about the benefits of treating the prostate itself in that setting and also treating areas where it spread to. And so I think radiation therapy is having a growing role, not only in in localized prostate cancer, but also other prostate cancer disease states. It's an exciting time to be in the position that I'm at.

Scott Redding: Well, Bob, I really appreciate the time. I think this is valuable information as it relates to various different treatment options for patients with prostate cancer, particularly around the radiation therapy. As you wrap up, what's the big takeaway that you would want someone to have from after this talk today?

Dr. Robert Dess: So I think that the big takeaway for men with localized prostate cancer is they have options, and that one of the things that makes me excited to be a physician in radiation oncology is we get to be a big part of their treatment team. And so radiation therapy, prostate cancer treatment in general, it can be very confusing. There seems to be very many treatment options and the degree of risk can span from, you don't even need your prostate cancer treated right now to we need to do multiple treatments. But what I want prostate cancer patients to know that they have options, and that I view very seriously our job is to help them navigate what best treatment options are for them.

Scott Redding: Well, again, thank you for the time.

Dr. Robert Dess: You're welcome. Thanks for having me.

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