

Melanie Cole (Host): Welcome to the podcast series from the specialists at Penn Medicine. I'm Melanie Cole and today, I invite you to listen as we discuss prostate cancer brachytherapy. Joining me is Dr. Neil Taunk. He's an Assistant Professor of Radiation Oncology at Penn Medicine. Dr. Taunk, it's a pleasure to have you with us. Can you start by explaining brachytherapy and its place in therapy for prostate cancer?

Neil Taunk, MD, MSCTS (Guest): Absolutely. Thank you. Thank you for having me. It's a joy to be able to share some of the treatments that we have in place and additional offerings that we have for men with prostate cancer. So first, brachytherapy is a type of implanted radiation therapy.

Brachy is a Greek root word that means short and therapy means treatment. So, it's the ability to give radiation therapy at a very short distance inside the patient by using either permanent or temporary radioactive implantations. And its place in cancer therapy and prostate cancer therapy, brachy is important for the treatment of men with clinically localized, intact prostate cancer, meaning that these patients still have their prostate gland intact.

And brachytherapy can be used really for all patients with intact prostate cancer who don't have contra-indications to anesthesia or they don't have other factors that they would not be able to receive the treatment or they don't have significant, lower urinary tract symptoms.

Host: And there are a few different types, correct? Can you speak a little bit about the different types that you might look to?

Dr. Taunk: There are two major types of prostate brachytherapy. The first is permanent seed implantation, or LDR or low-dose rate brachytherapy. And the other is high-dose rate brachytherapy, or temporary implantation. Permanent seed implantation has been around for a long time. It's been very well-studied and this involves the implantation in a single outpatient session of anywhere from 45 minutes to two hours under general anesthesia, placing anywhere from about 50 to 100 seeds directly into the prostate gland. In this fashion it's convenient because it's a single outpatient session. Some of the challenges, though, are patients are radioactive for potentially up to three months while those seeds decay and deliver treatment dose to the patients.

And some men would prefer not to be that way.

The service that we'll be offering at Penn Medicine—high-dose rate brachytherapy—is delivered, in a slightly different way. We place hollow needles inside the prostate, again while the patient's under general anesthesia and then using ultrasound based planning, we deliver the treatment while the patient is asleep. Then we remove the needles. The patient wakes up with no radioactivity inside of them and no radioactivity that goes home. So, it offers some slight differences. We use real-time ultrasound planning and there is no radioactivity when the patient goes home.

Host: So then, is brachytherapy more convenient than external beam radiation? Can you compare and contrast a little for us?

Dr. Taunk: Sure. So, external beam radiation therapy is typically delivered with IMRT, or intensity modulated radiation therapy, or it can be delivered with proton therapy. The number of treatments for each of those types of therapies is generally the same, potentially on the order of up to 44 treatments and for what we call moderately hypofractionated regimens, about 28 treatments, or maybe four to five weeks. Brachytherapy can be considered more convenient in that it reduces the total number of treatment visits, or total episodes of treatment, compared to external beam radiation.

When brachytherapy is used alone, it can be delivered in a single treatment, say with permanent seeds. When it's used in high dose just as a treatment, as a monotherapy, it can be delivered in two outpatient sessions. So, that affords the patients a significant amount of convenience because it's fewer treatments, there's also no downtime. Men can return to work next day.

When used in combination, it can reduce the total number of treatments, as well. So men who receive brachytherapy as part of their radiation package, they might receive one brachytherapy session. And that might be followed by anywhere from 16 to 25 outpatient sessions. So, brachytherapy can significantly reduce the overall amount of treatment and downtime and, kind of lifestyle interference, in the treatment of prostate cancer.

Host: Dr. Taunk, can you speak about when brachytherapy might be used alone as primary first line versus as a second line or adjuvant therapy?

Dr. Taunk: Okay. Great. So, I'll focus mostly on high-dose rate brachytherapy. Another advantage of high -dose rate brachytherapy is that involves what we call superior conformality compared to seed implantation, meaning that we have the ability to control the dose and stay off of organs like the rectum, bladder, and urethra, a little bit better than we've ever been able to.

In terms of where this comes into their treatment, men with clinically localized prostate cancer, who do not have significant lower urinary tract symptoms, such as getting up in the middle of the night many times or rushing to the bathroom, or other irritative urinary symptoms, are eligible to receive monotherapy, or brachytherapy alone, as curative treatment in the first line.

And this is generally done in two outpatient sessions. For men with more advanced disease, for example, unfavorable intermediate risk prostate cancer or high risk prostate cancer that is Gleason eight or T3 with, say, extracapsular extension or seminal vesicle invasion, really the preferred approach is to do higher dose rate brachytherapy combined with external beam radiation in the first line setting.

This is also often combined with androgen deprivation therapy or hormone therapy. The reason that the combination approach is favored is that men would need treatment to the pelvis, to the pelvic lymph nodes, which the external beam radiation would do. And then the brachytherapy offers us the ability to deliver ultra high doses to the intact prostate cancer. But in addition, we can target lesions that have extracapsular extension or seminal vesicle invasion that we previously were really never able to target effectively. So those are the types of patients that are eligible in the first line setting.

We don't use this in the adjuvant setting after the prostate comes out. So there's no role for brachytherapy after the prostate is removed, but there is a role for brachytherapy for patients who have what we call radiorecurrent prostate cancer. And these are men who've had external beam radiation in the past, and their prostate cancer has recurred again, inside the prostate. We can treat those patients with brachytherapy effectively and offer them curative intent treatment, while also being able to spare organs like the bladder, urethra and rectum from significant side effects.

Host: Can you speak a little bit about radiation safety or exposure issues and when might the use of brachytherapy be limited by other factors or comorbid conditions?

Dr. Taunk: So, let's do the second half of your question first. When would you not want to do this? Or who would not be the ideal candidate? Patients who may not be the optimal candidate for brachytherapy are patients with significant lower urinary tract symptoms, meaning irritative urinary symptoms. They might not be ideal. Patients who do not have a rectum, say, from prior surgery around the rectum. We can't perform this because we can't see the prostate gland. Patients who are unable to receive general anesthesia, because our practice does this under general anesthesia, would not be able to receive this either.

And then there's some soft contraindications for patients who have large gland sizes. Those would be patients that may not be ideal for it. But those patients in general are few. So, if patients have no significant lower urinary tract symptoms and are able to receive general anesthesia; they're generally a candidate for brachytherapy in some form. You also asked about patients and radiation safety. Radiation safety is a potential concern of patients. In permanent seed implantation, patients receive that treatment from inside the body over the course of about three months. In general, the radiation safety issues are limited. But we do give patients, who do receive permanent seed implantation, a card just in case they set off radiation detectors at say an airport or other facility. Some men though are hesitant, in that they have grandkids and they want to be able to freely interact with them.

In HDR brachytherapy, there is no permanent seed implantation, so there is no radioactivity, when the patients go home and there are no radiation safety concerns after discharge.

Host: Dr. Taunk, this is such an interesting episode. Tell us about your multidisciplinary approach at Penn Medicine. Who's performing brachytherapy there?

Dr. Taunk: We are very lucky at Penn Medicine to have experts in prostate cancer therapy, and experts in surgery, medical oncology, and radiation therapy. It really is one of the few places in the country, I think that, we really can offer all of it. Brachytherapy at Penn Medicine is performed by the radiation oncologist entirely.

So we'll be responsible for working with the patient to explain the procedure, perform the procedure and then manage all the peri procedural care before and after their procedure.

We do run an interdisciplinary initiative. Meaning that we discuss patients, particularly with high risk prostate cancer amongst our entire group, including our surgeons and our medical oncologists to better understand who might be the best candidate to receive definitive radiation or radiation alone or who might be better suited to have say surgery, and maybe the occasional patient that we would recommend surgery followed by radiation.

But in general, we discuss these with our colleagues first. So, while the procedure is performed by radiation oncologists at Penn Medicine, we do our best to discuss every patient and make sure that patients are very well informed of their options before they choose a pathway forward.

Host: Thank you so much for this great information. As we wrap up, tell us a little bit about other prostate treatments that your team offers and how your outcomes are, and when you feel it's important to refer to the specialists at Penn Medicine.

Dr. Taunk: So another facet about our practice at Penn Medicine Radiation Oncology is that we're truly one of the full service practices, probably in the world. We offer every type of prostate cancer radiotherapy, now that we have prostate brachytherapy. So, men who are seeking opinions at Penn Medicine Radiation Oncology, we offer IMRT, we offer SBRT.

We offer prostate brachytherapy. We offer proton therapy and we offer space OAR, which is implanted hydrogel between the prostate and rectum to further spare the rectum from radiation. So, again, we're one of the few practices that can really offer every treatment modality to patients, and then can kind of help them pick and choose what options might be best for them.

Host: Thank you so much, Dr. Taunk for joining us today and sharing your expertise and what an exciting time in your field. Thank you again. To refer your patient to Dr. Taunk at Penn Medicine, please visit our website at pennmedicine.org/refer, or you can call 877-937-PENN. That concludes this episode from the specialists at Penn Medicine.

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