Funding for Yale Cancer Answers is provided by Smilow Cancer Hospital.
Welcome to Yale Cancer Answers with your host doctor Anees Chagpar.
Yale Cancer Answers features the latest information on cancer care by welcoming oncologists and specialists who are on the forefront of the battle to fight cancer. This week, it's a conversation about radiation therapy for breast cancer patients with Doctor Meena Moran.

Doctor Moran is a professor of therapeutic radiology at the Yale School of Medicine, where Doctor Chagpar is a professor of surgical oncology.
Maybe you can start off by telling us a little bit about yourself and what it is you do?
I wear many hats. But first and foremost I identify myself as a radiation oncologist who takes care of breast cancer patients. And then I hold a lot of different administrative and roles on committees and organizations that basically are organizing standards and policies. For breast care across the country, let’s start with what I think is oftentimes a confusing issue.
for many people, and that is what’s the difference between radiology like a radiologist and therapeutic radiology or radiation oncologist. I find that sometimes people get those two terms confused. Can you help to help us to understand the differences? Sure, that’s an excellent question, actually, and it is true that. Even my patients will say radiology oncologists or variations of that. So a radiologist is someone who does diagnostic imaging and that can include mammograms, MRIs, CAT scans, PET CT’s bone scans, that kind of thing. A radiation oncologist is actually someone who delivers high energy X rays which are radiation, but they’re at a much higher level of radiation than with the the diagnostic levels of X rays and what we do is we use that for therapeutic purposes and treat primarily cancer but also some benign diseases as well. So the other question that I want to kind of get off the table right at the outset is many patients also are confused about the differences between
radiation and chemotherapy often.

Thinking that these are the same, can you clarify the differences between the two and maybe a little bit about how they’re different in terms of first of all, what the objective of the modality is, and 2nd the side effects that each of them carry? Sure, so chemotherapy. Or systemic therapy, generally speaking, is when something is administered either by mouth or through the vein and actually goes throughout your whole body, your whole system. And that’s why it’s called systemic chemotherapy or systemic therapy. It also includes the broader umbrella of these targeted agents and endocrine therapy as well. All of them have the ability of circulating throughout your bloodstream. And affecting any cells that might be anywhere where blood transverses in the body, which is pretty much you know throughout the body. Radiation, on the other hand is a very focused high energy X ray beam and the purpose of the radiation is really just to, primarily eradicate or to kill off any microscopic or macroscopic.
So, for example, for breast radiation after, for example, when someone has a lumpectomy or breast conserving surgery and their primary tumor in the breast is removed, we will target the whole breast area so that the radiation can eradicate any microscopic cells that might be left behind after surgery. And that has been shown to diminish the chances of the cancer coming back within the breast. So so that leads us to this whole for a discussion that we’ll have in terms of radiation oncology as it plays a role in breast cancer. So one of the areas in which radiation plays prominently in the treatment of breast cancer patients is after lumpectomy or breast conserving surgery as you mentioned. And I find that another question that often comes up for patients, is this. Why do I need radiation? If the surgeon already removed the cancer and got a nice clean rim of tissue all the way around, isn’t the cancer gone? Why would I need radiation to presumably normal tissue?
Yeah, that’s a very good question that patients do ask a lot, and so it’s not intuitive. But despite the fact that the primary tumor has been removed with a 3-dimensional circumference of normal unaffected breast tissue as well.

What we know from looking at mastectomy specimens from patients years ago that have passed away of breast cancer. Is that the primary tumor? Has little tiny microscopic tentacles of disease that can extend as far as 3/4 centimeters away from the primary tumor. So despite the fact that the surgeon is removing the primary tumor with a margin there, there is a high chance of having microscopic disease in about 30 to 40% of all breast cancer patients, and that’s what the radiation is actually targeting.

Which then brings up the question. Well, if there are these tentacles of disease in the rest of the breast, wouldn’t I just be better off to have a mastectomy? I mean, how can it be that breast conserving, surgery and mastectomy are equivalent in terms of survival?
When there still is potential for disease, right? So, uhm, they've done. You know several large randomized studies where they've taken women with breast cancer with early stage breast cancer and randomize them to either a lumpectomy or breast, plus radiation versus mastectomy. And.

What you consistently see throughout all of these studies is that the survival outcomes are the same, but that when you do the lumpectomy alone, the risk of the cancer coming back is significantly greater, so. Whether you choose to do a mastectomy or breast conservation really is just a personal choice and it's up to the individual patient, but a lot of women think it's better to do a mastectomy, and that's just not the case. Outcomes ultimately are the same in terms of survival, and the issue for an individual patient would be do. I want to conserve my breast. Do I want to keep my breast doing a mastectomy is a much.
asymmetry and and then thinking about, you know, reconstruction and contralateral prophylactic mastectomy. So there’s a lot of additional issues that need to be thought about in the mastectomy realm, and I think that that’s something that patients struggle with, especially when they’re in given a new diagnosis of a breast cancer. So I think it’s just important that patients know that the ultimate survival rates. Are the same whether you have the entire breast removed or whether you have the tumor removed and then received the radiation to the breast. The difference being that if you just remove the tumor and don’t do radiation, then your risk of it coming back in the breast is higher, which then leads us to OK. So tell me about the radiation. How is it delivered? How much is it? How often do I have to come for the treatments? How long are the treatments? And what are the side effects? So oftentimes people will ask,
you know, will my hair fall out?
Will I get sick?
What about all of those questions?
Sure,
so. So ulm again,
radiation is a high energy X ray beam.
Not only do we use it in the
breast conservation setting,
but we also use it after
mastectomy in higher risk patients.
For example those that have involved lymph
nodes to eradicate microscopic disease.
It you know along the chest
wall and in the nodal regions.
So what it does is it affects
the rapidly dividing cells or the
DNA of rapidly dividing cells,
and that’s what cancer cells are.
They’re rapidly dividing,
and so it has the ability to affect the
cancer cells more than it does normal tissue,
and that’s how it works.
I like to tell patients that it’s
kind of like taking a jackhammer,
opening up a perfect looking car,
and just basically, you know.
Kind of trashing it and the engine
and you wouldn’t notice and
then if you close close the the the
engine up you wouldn’t necessarily
know that there’s an issue with the
car until you try to turn it on. And that’s basically what happens with the radiation. It affects the DNA of the cancer cells more than it does the normal cells, and so if the cells try to reproduce at any point down the road you realize the engine is damaged and they’re not. Able to do that, and that’s how the radiation decreases the chance of the cancer coming back. So just to clarify, are you saying that if a patient gets radiation therapy, they can never get a recurrence? Well, there’s always. There are always ways in which you know. It’s never 100% in terms of how efficacious it is, but but it it does diminish the recurrence rate significantly. And and particularly these days with the use of additional agents such as endocrine therapy and some patients that are getting hormone getting chemotherapy, we see that the that the recurrence rates are in the single digits, so it’s it’s pretty low. So tell us about what there’s. There’s always a price to pay in terms of getting any benefit,
and I think all of us know that just in terms of not just medicine, but life in general. So tell us about the side effects of radiation. How often do you need to get these treatments? How many treatments are there? Is it painful? Do I lose my hair? Do I get sick?

Sure, so as far as the way radiation is delivered, it’s fractionated, delivered on a daily basis over a period of time and the biology behind that is that it allows the normal tissue cells to recover and the cancer cells don’t have the ability to recover, so it’s given over a period of days or weeks. Now, typically in the breast conservation setting it’s given over 5 weeks to the whole breast, and then sometimes we deliver a what we call a boost a smaller area to where the lump was removed. Nowadays, with the newer studies that are being done in an effort to try to reduce treatment burden on patients,
we are actually shortening that and they’re. They’re ongoing investigations to shorten that course of radiation from 5 to 6 1/2 weeks down to, you know, anywhere from 2 to 3-4 weeks and also down to one week depending on the patient. So you have to qualify for it. But there is some promising data that we can even do it in as short as one week. So as far as side effects, generally the side effects are related to where we’re targeting. So for the breast or the chest wall, it’s primarily just that localized area and they will have. Patients will have most commonly fatigue and skin reaction, and the skin reaction is kind of like a sunburn as turn as as long term side effects. Again, it’s related to where the beam. Actually intersects with the body in the normal tissue, and so, besides having chronic changes in the skin or scar tissue there are, there is a small chance that they can have problems with their wound there. There’s a small chance of having
0:14:01.19 –> 0:14:04.214 Most commonly it’s something called pneumonitis, where the lung can get a little inflamed just in the area where that portion of Lung sees radiation, not life threatening, usually treated with a short course of steroids, often asymptomatic and then the heart. Obviously for left sided patients in particular is sometimes in the path of the beam, so we have to be very careful to make sure that we minimize the radiation dose to the heart and we have techniques to do that, Have significantly diminished over the last several decades. Alright, well we’re gonna pick up this conversation right after we take a short break for a medical minute. Please stay tuned to learn more about radiation therapy for breast cancer with my guest doctor Meena Moran. Funding for Yale Cancer Answers comes from Smilow Cancer Hospital, where a wide spectrum of advanced strategies for the diagnosis and treatment of gynecological cancers are offered.
To learn more, visit yalecancercenter.org.

The American Cancer Society estimates that nearly 150,000 people in the US will be diagnosed with colorectal cancer this year alone. When detected, early colorectal cancer is easily treated and highly curable, and men and women over the age of 45 should have regular colonoscopies to screen for the disease.

Patients with colorectal cancer have more hope than ever before, thanks to increased access to advanced therapies and specialized care. Clinical trials are currently underway at federally designated Comprehensive Cancer Centers.

Such as Yale Cancer Center and Smilow Cancer Hospital to test innovative new treatments for colorectal cancer tumor. Gene analysis has helped improve management of colorectal cancer by identifying the patients most likely to benefit from chemotherapy and newer targeted agents, resulting in more patient specific treatment.

More information is available at yalecancercenter.org you’re listening to Connecticut Public Radio. Welcome back to Yale Cancer Answers.

This is doctor Anees Chagpar
and I’m joined tonight by my guest doctor Meena Moran. We’re talking about radiation therapy for breast cancer patients and right before the break Meena, you had mentioned some of the side effects that people can get with radiation in terms of skin toxicities. A little bit of dryness, a little bit of redness, it might interfere with the wound a little bit. You had mentioned things. Like pneumonitis, and avoiding the heart, some of those sound not so bad. Some of those sound a little scary. Tell us about how you as radiation oncologists try to minimize those side effects, particularly in terms of avoiding the lung in the heart and so on. Sure, so we’ve actually come a really long way in terms of minimizing the amount of heart and lung in the field years ago when patients were treated it was just a tangential beam that kind of skimmed the chest wall encompassed the whole breast or the chest wall and whatever was underneath was inevitably in the beam.
Now we have the ability to actually plan and modulate the beam so that it is tailored for each individual patient’s body. So what we do is we get a CAT scan at the time of treatment planning and we call that a treatment planning CAT scan and the whole process is called a simulation. We have the patient come in, we kind of outline the areas that we want to cover and the patient will put their arms up on the table, which will be exactly how they’ll be in the treatment position, and then we use that scan, which is not a diagnostic scan, but is purely just for treatment planning. Well, actually outline the breast tissue or the chest wall and the lymph nodes. Every incremental 3 millimeter slice in order to then change the beam actually intersects with normal tissue so that we’re blocking as much normal tissue as possible, so that’s one thing that has been a major advancement for us. Is 3 dimensional treatment planning and the use of beam modulation.
The second thing is that we use deep inspiration breath hold technique, which is a very precise way of for us to have the patient take a deep breath. What happens is that your chest. Ball moves away from your heart and that creates a space between the heart and the chest wall and allows us to get those tangential beams to go through and minimize the dose to the heart. The machine only turns on when the patient is in that breath hold position, and there are multiple lasers on the patient’s skin dimensionally that monitor exactly when that patient is in the precise. Breath hold position which has to be within a 3 millimeters of of the position they were in at the time of the CT scan so it takes longer to deliver that treatment because the patient can only hold their breath for 20 seconds at a time and then they take a break and then they hold their breath again, but it ensures that the that radiation is delivered in such a way that the heart is away from the chest wall and then we
0:19:58.203 –> 0:19:59.959 have other techniques also.
0:19:59.96 –> 0:20:01.548 That we’ve been using,
0:20:01.548 –> 0:20:04.88 such as cardiac blocks and prone positioning.
0:20:04.88 –> 0:20:08.126 Those are other kind of technical
0:20:08.13 –> 0:20:10.932 tricks that we’ve used to also
0:20:10.932 –> 0:20:13.69 minimize the amount of heart dose
0:20:13.69 –> 0:20:16.469 and the good news from all of
0:20:16.469 –> 0:20:19.247 that is that based on our data,
0:20:19.25 –> 0:20:21.959 the the progress that we’ve made from
0:20:21.959 –> 0:20:23.824 a technical standpoint in minimizing
0:20:23.824 –> 0:20:26.036 the amount of heart and lung in
0:20:26.036 –> 0:20:28.648 the field has really benefited in
0:20:28.648 –> 0:20:30.428 decreasing the cardiac toxicity.
0:20:30.43 –> 0:20:32.992 In the long toxicity that breast cancer
0:20:32.992 –> 0:20:34.978 patients experience in the long term,
0:20:34.98 –> 0:20:37.238 so that is data that is, you know,
0:20:37.238 –> 0:20:39.856 a well known and has been established
0:20:40.7 –> 0:21:03.506 One question that people who may be
0:21:03.506 –> 0:21:05.466 listening may be asking themselves
0:21:05.466 –> 0:21:07.44 is is that widely available?
0:21:07.44 –> 0:21:09.26 I, I can’t say that it’s.
0:21:10 –> 0:21:14.158 Available at small remote centers that are,
you know, private, necessarily. I think most academic centers have it, and especially now that so many institutions are requiring smaller hospitals and smaller practices. It’s being standardized so that it is recommended, for example by the NCCN as a method to strongly consider for decreasing the cardiac dose. So I think it is becoming more and more prevalent. OK, so patients should ask their radiation oncologist wherever they’re being treated. Whether these techniques are available to them is that right? Sure, so the other question that I have for you before the break you were mentioning that the dosage of radiation, how it’s delivered, how long that treatment is has really morphed overtime, and what used to be 5 and a half six weeks can now be as little as. Even one week, so a couple of questions on that. First of all, can you tell us a little bit more about the different the different treatment plans in terms of the one week versus three weeks versus six weeks? Are these equivalent, and are there specific patients who benefit more from one or the other?
I mean, because patients might be listening to this thinking, Why on Earth wouldn’t anybody just do one week? If it was as good as six weeks so?

So as I mentioned earlier, the standard you know for the breast conservation trials and for the post mastectomy trials was five weeks to the whole breast or to the chest wall, followed by a boost plus or minus a boost to the localized area and subsequent to that there have now been. More than four randomized trials that have looked at using what we call hypofractionated radiation, which means giving a larger daily dose. So it then shortens the amount of time the total dose is actually lower, but because you’re delivering a higher daily dose, you’re able to shorten the overall treatment duration, and that those studies all looked at three weeks and have found. Now we have long term data, showing that three weeks is just as efficacious as the five weeks in terms not just of breast cancer control and. The ability to eradicate those microscopic cells,
but also more,
just as importantly in terms of the toxicity,
because the major concern is always been the toxicity of the treatment.
We don’t want to do harm to the normal tissue. 
And if we’re giving a higher daily dose, are we?
Going to damage the normal tissue to the point where we’re not there.
It’s not going to be able to recover, and so these studies have shown us that we can deliver the dose in three weeks very safely.
Now the in terms of the the slightly faster regimens, and they’re ironically called the Fast forward regimens. There are two of them, one of them is 5 fractions that is delivered once a week for five weeks, and then the other one is 5 fractions. Delivered every day for one week and those also look very, very promising. We are using them at Yale and other institutions and places are also using them as well, particularly with COVID and wanting to minimize the number of times that patient has to come in
and out of a medical facility. The one week regimen only has five year data, and so that’s one of the limitations. The other thing. As you asked about was why wouldn’t every patient want to do this? If they qualified? Well, look. The issue is that they have to qualify, and so because the daily dose is so much higher, we have to do it safely. And there are pretty stringent dose constraints that we have to follow for the normal tissue in terms of the lung, the heart, the chest wall, all those things end up, particularly in the setting of postmastectomy or when there’s nodes involved those patients. Don’t qualify because those studies didn’t really include a lot of those patients, so right now it’s primarily for whole breast, but if you qualify, there’s really no reason to not consider it as, as you know, an alternative. But again, the data,
the amount of data that we have is

you know,

course is less robust than we do for the traditional

three weeks or the five

week regimens that we have.

So let me just. To make sure that

I understand this correctly,

we have long term data that the three

weeks is equivalent to six weeks.

So is it safe to say that essentially

everybody should be treated now

with the three week regimen as

opposed to the six weeks? So

that’s that’s excellent question,

because yes, in terms of breast

conservation in terms of the mastectomy,

they can be treated with the three week.

Course, the issue being that if

they’re going to have reconstruction,

there’s very little data,

and there’s ongoing studies now

looking at how these higher daily

fractions and hypofractionated

radiation effects reconstruction,

so that’s a big question mark,

and that’s why it hasn’t become the standard

of care in the postmastectomy setting.

The other area where we

don’t have a lot of data,

but I think you know enough that

if the situation calls for it,
we would do the three weeks.
Is when we’re including regional nodes, so that’s just a discussion with
between the patient and the doctor. It’s not the standard, it can be done it is likely to be very safe,
but there’s a lot of variation in the practice for that. if that makes sense.
OK, so essentially, if you’re a patient and you had lumpectomy and you are no negative.
You should be doing three weeks of radiation instead of six weeks.
Is that fair?
Yes, absolutely. And then followed by a boost absolutely
and so the one week we don’t have sufficient long term data.
So are people being treated with the one week regimen as part of standard of care, or are there still clinical trials
ongoing that patient should be asking their doctor about if they want to participate in that one
week regimen so very quickly. The NCCN has said it can be considered as a modality for treatment.
Right now it really we’re using it selectively in patients who really
0:28:14.15 –> 0:28:16.802 need to have it done in one week more
0:28:16.802 –> 0:28:19.282 often than we’re using the once a week
0:28:19.282 –> 0:28:23.1 for five weeks with just just as easy,
0:28:23.1 –> 0:28:25.158 because that has 10 year data.
0:28:25.16 –> 0:28:27.776 So I think that they’re both going to
0:28:27.776 –> 0:28:29.797 ultimately show to be very promising,
0:28:29.8 –> 0:28:31.174 but it’s just about waiting for
0:28:33.44 –> 0:28:35.34 Doctor Meena Moran is professor
0:28:35.34 –> 0:28:36.86 of therapeutic radiology at
0:28:36.86 –> 0:28:38.779 the Yale School of Medicine.
0:28:38.78 –> 0:28:40.904 If you have questions,
0:28:40.904 –> 0:28:42.955 the address is canceranswers@yale.edu
0:28:42.955 –> 0:28:45.685 and past editions of the program
0:28:45.685 –> 0:28:48.066 are available in audio and written
0:28:49.019 –> 0:28:51.571 We hope you’ll join us next week to
0:28:51.571 –> 0:28:53.518 learn more about the fight against
0:28:55.445 –> 0:28:57.239 funding for Yale Cancer Answers is
0:28:57.239 –> 0:29:00 provided by Smilow Cancer Hospital.