YALE CANCER ANSWERS

Breast Cancer

Radiation Therapy and Breast Cancer

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Welcome to Yale Cancer Answers with doctors Anees Chagpar, Susan Higgins and Steven Gore. I am Bruce Barber. Yale Cancer Answers is our way of providing you with the most up-to-date information on cancer care by welcoming oncologists and specialists, who are on the forefront of the battle to fight cancer. This week Dr. Higgins welcomes Dr. Susan Evans for a conversation about radiation therapy and the management of breast cancer. Dr. Evans is an Associate Professor of Therapeutic Radiology at Yale School of Medicine and Dr. Higgins is a Professor of Therapeutic Radiology and Obstetrics, Gynecologic, and Reproductive Sciences.

Higgins I think that what I would like to do is start with some of the big picture topics, because a lot of people know about surgery and they know about chemotherapy, but many people and many patients do not know a lot about radiation therapy and what role it plays in the management of breast cancer before they see us, so maybe we could just start with that and discuss sort of one of the more straight forward things that we play a very important role and which is breast conversation therapy?

Evans Absolutely, I think to take a small step back like you said a lot of people do not understand what radiation therapy truly is. Whereas chemotherapy is sort of a whole body treatment or a systemic treatment really aimed at finding any microscopic cancer cells that may have been left at the site where the cancer started, radiation therapy is a very local treatment. When we talk about breast cancer and we talk about breast cancer management we find that not only local therapies such as surgery and radiation therapy have a very important role, but also the systemic therapy like chemotherapy or endocrine therapy, anti-hormone pills that women take play a very profound role in management. So when we talk about radiation therapy, we are really talking about treatment that is delivered to the breast, following breast cancer surgery, and so as you said, a lumpectomy or removal of the cancerous lump in the breasts is followed by treatment typically to the entire breast with daily radiation treatments. Now those radiation treatments are x-ray treatments unlike chemotherapy with breast radiation, we do not see nausea, we do not see lowering of blood counts typically and this is a treatment that takes just a few moments to deliver.

Higgins Yeah and I think that is a really important point because people who come in for radiation therapy one of their main concerns is that they have been through systemic therapy, they have had various side effects that had a profound effect on their sort of quality of life and their day-to-day activities, but it is important to differentiate a local treatment like and radiation and systemic therapy like chemotherapy that is distributed

throughout the body. May be, you can talk a little bit more about the technology that allows us to treat people "locally" because the beams are directed at very specific places.

Evans Absolutely. The first step when we are talking about delivering radiation treatment is to have a good discussion and review of the individual person's situation that brings them to our clinic, so we talk to them about how the cancer started, review any imaging studies that were done to figure out where treatment needs to be delivered, review the pathology report, review any prior treatments that they have had with respect to surgery or chemotherapy or hormonal therapy and then also to have a good discussion about what the role of radiation therapy is in their care. Once that is complete and we make the decision together with the patient that radiation is indeed the best next step for them, then we start to get into that discussion and utilization of technology. So when we decide to do a radiation treatment, everything is very much custom-designed for the patient. One of the abilities that we have now that we did not have years ago was to really individualize and customize everything for their individual size and shape. We have patients come to our clinic and do a planning CAT scan where we get 3-dimensional imaging of their body to understand their exact size and shape, customize the radiation to them. I often will have patients say to me, I have dense breast tissue, is the radiation going to be able to account for that and I am able to answer them that yes and did it well, in fact part of the benefit of doing that CAT scan is we are able to measure the density and account for the density of all of their tissue, so whether it is the skin, or the muscle, or the very front of the rib cage that sometimes we will see some radiation during breast radiation, we were able to account for their individual differences and really make the treatment very well designed. The other benefit that we have with that is our computer software lets us really map out treatment in a virtual reality fashion, so that before a patient ever gets radiation therapy in our clinical we are able to know exactly where the treatment is going to be delivered, whether or not there will be any nearby organs that see any radiation, oftentimes the lung will see a slight bit of radiation during breast radiation and we are able to look at what that would be at the end of treatment and determine before treatment starts whether that is acceptable or needs some modification. We are able to make all of these judgments before treatment begins, so that we can make sure the treatment is accurate, safe, and optimized for their individual scenario.

Higgins I wanted to go back to that because I think that lot of patients do not realize how customized it is in terms of how the treatment is geared towards their specific body size and shape and how much work from a team standpoint goes into the planning process, you know the physician is part of it, but there is an entire team of people and a lot of sort of quality checks and balances that happen before they could ever get to treatment. Maybe we can discuss that a little bit.

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Evans That is actually one of my favorite parts about the field, is that we really do just like as you said, have a very nice team, so behind the scenes, we have the radiation therapist who actually delivers the treatment each and every day and they are an integral part of the treatment team. We also have the dosimetrists which is a group of people in our team who help us with optimizing the treatment plan for the individual patient doing a lot of calculations. We also have our physics team which does have a lot of quality assurance and safety double checks behind our treatment plans as well as helping maintain the machines to extremely high stringent standards of performance that are checked daily, monthly, yearly, all sorts of different checks that go on throughout the physics team. So we really have a great team when it comes to that and so it is not just, like you said the physician who is designing the treatment plan, but also a whole host of individuals behind the scenes that are really working to make safe effective treatments.

Higgins And the other thing that I think people do not realize is that we have many many decades of data on hundreds of thousands of women and we have guidelines about how to treat patients, how much lung can be in the field, how much heart can be in the field and that is a treasure trope of information for radiation oncologists and there is a lot of data that we have attesting to the safety and efficacy of radiation, moreso than a lot of other things in medicine, so I think hopefully people are reassured by that I know that is usually a part of the discussion because people are very fearful.

Evans There is no question, I think the other thing that is sort of unique about radiation therapy is that it is very different from drug therapies, you know when someone takes a new medication, you may have a side effect from the medication and absolutely that is related to the dose of medication, but sometimes you start a medication and even at a very low dose, you can have a significant side effect. With radiation therapy, that sort of reaction is very uncommon and the reactions that we see related to radiation are oftentimes quite predictable with respect to dose and where we are and how well we are able to respect the organs at risk as we call them in terms of keeping those safe. Now, as with anything in medicine, strange things can happen, but that is really the minority of cases and it is quite predictable in terms of what the safety of a treatment is based on the stringent criteria that we use to evaluate treatment plans and in the design of the treatment plans.

Higgins So this is a good place to talk about those specific side effects. When a patient comes to see you in the clinic, part of the consultation is educating them about radiation, but then talking about sort of what they are going to encounter over the course of treatment. Maybe you could go through what discussion entails?

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Evans First and foremost one of the things that we always talk about is the basics. Patients should know that they are not going to be radioactive with external beam radiation treatments. They are not going to be putting their family members or pregnant family members or colleagues or young children at risk. There is no need for precaution. Their bodily fluids are not radioactive in any way. They are able to continue their normal day-to-day interactions with their family members without fear of any associated radiation being delivered to their loved ones. So that is an important thing for people to realize. The most common thing we see with breast radiation is that women get fatigued and as you know better than me, Dr. Higgins, that is something that we see a lot of variability with, and some people get quite tired right away and other people do not get tired hardly at all. I would say the typical pattern and what I tell my patients is that the fatigue is worse at the end of treatment than the beginning of treatment, worse at the end of day than the beginning of the day and it really does not seem to be associated with the time that the radiation is delivered. I also have noticed that the patients who listen to their bodies and rest when they need to do seem to do better. The women or men who continue with their daily activities and sort of continue working until 11 o'clock at night and waking up at 5 in the morning, jumping out of bed to get back to work tend to have a tougher time of treatment. You really do need to sleep, sleep is the time the body heals. So it is important to be able to get that. Besides that, the other thing that we see is some redness to the breasts, there can be irritation to the breasts, swelling in the breast. It is not uncommon during treatment for women or men to experience aches and pains in the breast. After surgery, a lot of people experience little shooting pain in the breasts, where they will get these little jabs or zingers with certain movements and we see that phenomenon in radiation therapy as well that women will get a little aches and pain here and there. For the vast majority of women that goes away. There is a small percentage of women who will have some breast pain after radiation therapy is complete and by that, I mean you know lasting more than a few months after treatment, so it is rare, but once in a while a year of treatment we will have someone who is still experiencing those sorts of shooting pains on a regular basis. The other things that we can see during treatment, the skin reaction can go beyond just being red like a sunburn and sometimes it can have some peeling and that peeling can either be dry peeling of sort of superficial layers of the skin or uncommonly they can have a deeper peeling where the skin will peel the top layers off and even have a little bit of wetness to it. The good thing about that is although it is uncomfortable when it happens it does heal quite quickly and so many radiation oncologists will follow their patients quite closely when that sort of thing happens to offer supportive care and after treatment is over, still continue to see them once a week or whatever their clinical scenario dictates to keep a close eye on

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that area and making sure that it is healing well.

Higgins I think that is a good point to come back to, skin care is a really important part of what we do in order to manage people during treatment and we also have a team approach to that also. Patients are being seen every day by the therapist. The doctor sees them once a week, but our nurses are very involved in that and are our skin care experts and we have special creams and things that we talk to them about, but again it is a nice team approach to the side effects and I think with everyone's input in the regimens that we have now people are finding that the skin reactions are quite tolerable.

Evans I would agree certainly and I certainly echo your statement about the importance of the nursing care and the role of the nurses in the care of the patients as well as the therapists who are seeing them daily and assessing that area daily and alerting us to any changes. And the fatigue again that is another side effect that is very manageable for people, they can go about their usual life activities, but again pacing themselves is important and I think that is another part of just counseling the patient which again we as radiation oncologist have the good fortune to spend a lot of time with their patients talking to them about these things. We are going to take a short break right now for medical minute. Please stay tuned to learn more information about radiation therapy and breast cancer with me, Dr. Susan Higgins and Dr. Susan Evans.

Medical Minute

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Genetic testing can be useful for people with certain types of cancer that seem to run in their families. Patients that are considered at risk for a familial or hereditary cancer receive genetic counseling and testing so informed medical decisions can be based on their own personal risk assessment. Resources for genetic counseling and testing are available at generally designated comprehensive cancer centers such as Yale Cancer Center and at Smilow Cancer Hospital at Hale, New Haven. The Smilow Cancer Genetics and Prevention Program is comprised of an interdisciplinary team that includes geneticists, genetic counselors, physicians, and nurses who work together with a goal of providing cancer risk assessment and taking steps to prevent the development of cancer. This has been a medical minute brought to you as a public service by Yale Cancer Center and Smilow Cancer Hospital. More information is available at YaleCancerCenter.org.

Higgins Welcome back to Yale Cancer Answers. This is Dr. Susan Higgins and I am joined tonight by my guest, Dr. Susan Evans and we are discussing the role of radiation therapy and the management of the breast cancer. We spent the first half discussing

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the basic strategy of radiation, how we use it, why we use it, what the patients experience, and I thought that we would use the second half of the program here to discuss what we are doing to make radiation safer and how we are improving upon all

the great things that we have accomplished in the last 30 or 49 years with treating patients with breast cancer. I thought we might start with the safety aspect. I know that it is one of your research interests, one of your clinical interests, and there is some really new and exciting things coming out that allow us to again make the radiation very specific to the areas that we want to treat and treat the area of breast tissue that we are concerned about while sparing things like the heart and lung. Maybe we can discuss some of that now.

Evans Absolutely, there are a lot of things that are going on that, so I would have gladly brought this up Dr. Higgins. I think that one of the things we think about a lot as radiation oncologists is to really focus in on delivering excellent treatment and trying not to leave footprints behind on our patients. We are very blessed in that breast cancer typically is a disease in which we have a big need for survivorship, women tend to do well with breast cancer in general and we have a lot of breast cancer survivors. There are about a quarter of a million women diagnosed with breast cancer every year and when you think about this number, it is pretty staggering. Now, how many women are affected and how many women are going to live beyond this diagnosis and so when we talk about treatment, we really had to pay close attention to any potential long-term side effects and I think probably the most important one that we think about is the potential for side effects to the heart. Now, when we look at the early data with breast cancer, there was a really troubling trend that has been identified over the decades that this has been used and that is there was an elevated risk of heart disease, small, but still noticeable and definitely measurable in women who received breast radiation and over the years, we have been able to show that risk is very much associated with the dose of radiation that the heart receives and that to me is good news, because we can think about that and we can modify it. It is not that if you get radiation you are at risk and that is something we are not going to be able to change, but as your radiation oncologist, your team, is able to identify that and really know that we can monitor the heart dose and use strategies to lower that dose, so that we can reduce your risk in the future because our expectation is that you are going to be around 20 years from now and that we need to think about these sorts of things, so that 20 years from now, we are not dealing with side effects of treatments delivered decades ago. Now, there are a couple of different strategies and again, this is where the team approach really comes in. One of things that has been a tremendous benefit to us is the collaboration with the surgeons and when the surgeons remove breast cancers these days, they have the capability to leave some markers in the breast to help us identify where exactly the surgical bed was, so that of all the areas in the

breast, treating the entire breast is important, but sometimes we are able to shape the treatment field in such a way that we are having a small portion of breast receive a lower dose of radiation in order to spare the heart and when the surgeons in collaboration understand that relationship and are able to identify for us by putting some simple surgical clips at the time of surgery for instance among other ways then we are really able to shape the beam quite well and do not have to worry about not having adequate space and radiation dose to that surgical bed area. So that is one of the things that the team can help accomplish. The other thing that has been quite exciting in the national experience has been methods to decrease cardiac exposure and there are several different methods out there. So one method is the use of what is called the prone breast radiation technique and that is the technique where women will lie on their stomach and the breast that is going to be treated falls forward and that oftentimes leads less heart be exposed to radiation just by positioning. The other technique that we have available is a technique called breathhold and that deep breath-hold technique is really quite simple on the surface of things. What happens is women while being monitored by a whole bunch of fancy equipment, will take a deep breath and their lungs will fill up with air and that will push the heart away from the breast tissue and down in the chest and both of those anatomic maneuvers caused by the deep breathing will help remove the heart away from the radiation treatment field.

Higgins And I was just going to interject there that one of the things I find exciting about that kind of technology is that it really represents a sort of a paradigm shift because in the past, a lot of our gains were made by modifying the beam and we could modify the shape, the size, and the direction of the beam in our planning but now we can actually modify the anatomy which is so exciting because this is now way to reproducibility, for example what the heart, move the heart away from the radiation field.

Evans That is very exciting, it is sort of a new concept that really is coming into practice and really showing a lot of benefit. And you are right that that is tremendously exciting because of one of the things that the literature has shown over the years as you know is that there is a great variability even among similar techniques and to what dose the heart receives radiation and just as you said, it is related to individual anatomy, just the relationship of the shape of the breast, then the shape of the chest and the location of the heart and how close it is to the rib cage. All of these things are things that until now we really have not been able to change.

Higgins Right. Again this is more and more technology and the basic concept is the same, treat the areas where the tumor cells may be hiding, avoid the underlying tissues like the heart and lung, but it is just exciting to get things that are more and more adept at doing that and allowing us to achieve our longterm goals because you mentioned the

side effects and survivorship issues. We know that radiation therapy and a lot of cancer therapies are relatively, especially radiation, relatively well tolerated short-term, but now I think that we have made of a lot of strides in trying to pay attention to patients throughout the course of their lifetime and what we can do for our survivors and things like survivorship clinics. Maybe we can discuss some of the longterm outcome issues for radiation therapy patients?

Evans Absolutely. One of the things that a lot of cancer centers offer these days and something that I would certainly encourage people to seek out is having a program for survivorship and patients tend to find this useful because in a survivorship-type setting oftentimes it is multidisciplinary where you will meet with the physical therapist, you will meet with the nutritionist, you will meet with the social worker, you will meet with an oncologist and the oncologist will address how you are going to be followed for your cancer in the future, what sort of studies might need to be ordered, how often will you be seen, what sort of laboratory studies might be needed, will you be followed by mammograms or mammograms and ultrasounds or will there be MRI integrated into your follow up. All of that is very individual and having that game plan is oftentimes very reassuring to patients so they can understand where to go from here to sort of transition from active treatment to living beyond this diagnosis which can be so traumatic and so devastating for so many women even with a good prognosis. They will meet with a physical therapist who can talk with them about how they are doing after all of their treatments, are there any issues with arm range of motion or limitation of the shoulder motion, how can that be improved on, what is the risk for lymphedema if they have a risk for lymphedema how can that be modified, do they have need to have any concern about doing certain activities with respect to their lymphedema. We have a lot of patients who will be concerned about carrying their child on one side or taking a flight and the physical therapy team can help to answer that and help people move beyond. The nutritionists can talk about dietary factors which have been shows to decrease the risk of recurrence so maintaining an active lifestyle and maintaining a healthy weight and staying away from too much alcohol, those are all things that can modify future breast cancer risks and social worker as well are a very important part of that team because they can also talk about managing the diagnosis internally, how is your family dealing with that, how are you dealing with it, is there any need for counseling or additional support? So when we talk about survivorship, we are talking about a comprehensive integrative approach to this and radiation also is highlighted there as well because the oncologist who will do these sorts of meetings will talk about all right, well you received left breast radiation and maybe this is a woman who has also received something that could affect the heart like Adriamycin chemotherapy or Herceptin immunotherapy and that may be someone who we involve the cardiac oncologist, right. These are cardiologists who specialize in the effect of oncologic

therapy on survivors of diseases like breast cancer, so that they can be more tuned and say "hey we know that these things may be putting you at a little bit higher risks, so for you we are going to take extra good care of your blood pressure and your diabetes and hold you to a higher standard because you have also received these oncologic therapies which could impact your risks and we want to be very proactive about making sure that you're at the lowest risk possible.

Higgins I wanted to go back to the issue of lifestyle factors because what I think is, what I have seen in my practice and what I find really encouraging is people ask us, 'what can I do to improve my situation' and a lot of that is lifestyle, for instance with breast cancer now we know that many people by controlling their BMI or their weight can enhance even their overall survival because we know that estrogen feeds tumor, and I think that one of the big benefits is that patients have hope that they can do something for themselves, but also some of these lifestyle modifications that they begin with the survivorship program carry over into their life and actually prevent other cancers because we know things like colorectal cancer are also related to obesity, so actually sometimes women and men with breast cancer come to us and have the breast cancer as their focus, but then we can put them into touch with the survivorship program which allows them to actually move forward with their life in a healthier way that can actually prevent other cancers from developing and help them with their overall health in the longterm.

Evans Absolutely. I think one of the other things with respect to how radiation has changed as well is that not only that we are more conscious about toxicities and heart related possible side effects but we have also been able to modify the delivery of the radiation for many women. So for women who have early stage breast cancer where only the breast is being treated and at present, who typically have not received chemotherapy, we are able to offer a shorter course of radiation of about 4 weeks of treatment which has been a really nice thing rather than 6-7weeks of treatment. The shorter course are hypo fractionated radiation therapy which is sort of a medical term for it, has been shown to be quite effective, really comparable to the longer course of radiation and interestingly in some work done across the country has shown some improved quality of life parameters, so women had less fatigue and also less skin irritation and one of the fascinating things I find about the study that was done in Texas was that they looked at women's, because it was predominantly women in the study, ability to care for their family members 6 months after treatment and the fascinating thing about that was that the duration of radiation therapy was actually predictive of ability to take care their families well than the administration of chemotherapy.

Dr. Susan Evans is an Assistant Professor of Therapeutic Radiology at Yale School of Medicine. If you have questions, the address is canceranswers@yale.edu and past editions of the program are available in audio and written form at YaleCancerCenter.org. I am Bruce Barber reminding you to tune in each week to learn more about the fight against the cancer. You are on WNPR, Connecticut's public media source for news and ideas.