Radiation Oncology Treatment for Gynecological Cancers

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Welcome to Yale Cancer Center Answers with Dr. Ed Chu and Dr. Ken Miller. I am Bruce Barber. Dr. Chu is Deputy Director and Chief of Medical Oncology at Yale Cancer Center and Dr. Miller is a medical oncologist specializing in pain and palliative care and he serves as Director of the Connecticut Challenge Survivorship Clinic. If you would like to join the discussion you can contact the doctors directly at canceranswers@yale.edu and the phone number is 1-888-234-4YCC. This evening Dr. Miller is joined by Dr. Susan Higgins, Associate Professor of Therapeutic Radiology from the Yale School of Medicine.

Miller: Let us start by talking about radiation as a form of treatment for cancer. How does it work?

Higgins: Radiation therapy is a process of using high-energy x-ray beams to treat cancer. What I tell my patients in explaining it, is that we use low energy x-ray beams to take pictures like chest x-rays, but ours is a higher energy beam with the purpose of treating cells. It has enough energy when it passes through cells to damage cells, including tumor cells.

Miller: When people hear the word radiation, myself included, there is some anxiety. What are the things that people worry about when they hear they are going to get radiation?

Higgins: People worry about the side effects and one of the things we have to remember is that radiation, although it passes through cells, and I just talked about how the tumor cells are preferentially damaged, that even though your normal cells receive some harm, they can bounce back better than tumor cells. Many people take the information that they get about other therapies like, for instance, chemotherapies, etc., and apply it to radiation therapy, but we try to explain when we see a patient exactly what area is being treated for radiation, and depending on what site you will have different forms of side effects and some of them are actually quite mild.

Miller: Why is it that the cancer cells cannot repair themselves, but the normal cells can, what are some of the differences?

Higgins: Well, internally each cell has machinery to repair its DNA and tumor cells, when they receive damage from the radiation, they are not able to repair because they do not have the machinery; they do not have the ability to repair the damage that they receive. Some of your normal cells, as we talked about, are damaged, for example the skin, but the normal skin cells are very remarkable in their ability to regenerate and replenish themselves. For example, when we treat patients with breast cancer, they do get some redness to the skin, and some of skin peels, but it is amazing because a few weeks after treatment, their skin really looks quite good.

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Miller And it does, I treat a lot of woman with breast cancer and I get to hear some of the anxiety going into it and it is amazing, the cosmetic result; often times you can never tell.

Higgins Yes, that is right.

Miller Radiation therapy, from what I assume, has a lot of physics that go into it and planning as well, can you share with us the process that you go through with the patient in terms of planning the radiation therapy.

Higgins That process is called simulation and it is now a more complex process. We call it CT simulation because we use the CAT scanner, but basically when the patient comes in they are placed in an immobilization device that could be something as simple as a slant board, or sometimes we have molds that mold to the patient's body that keeps them in the same position everyday, so we start out with that. It is important that someone is in the same position everyday so we can treat precisely the same part of the body. We then take a CAT scan and use that for the planning. That allows me to see the patient's body from the inside and outside and decide what types of beams we are going to use, where they will be pointing, how many beams, etc., and then we come up with a treatment plan. That treatment plan at that point is set in stone, and that is what is going to be used everyday. Then that information is fed into the computer on the machine they will be treated on.

Miller How is the data from the CT and the CAT scan translated into this, is it digitally put into the computer, how does that work?

Higgins One of the nice things about radiation is that we have a lot of quality control from the point at which we are preparing the plan, to the point at which the radiation is being delivered. What happens is, I devise a plan with the help of people called dosimetrist, who are experts in doing the calculations that go along with this, and when we come up with the calculations and how many beams and how strong the beams are, that information is digitally sent to a computer at the actual machine, or “accelerator,” that is going to treat the patient. Whenever that patient comes in, we identify the patient and make sure that information is correct and that is how they are treated.

Miller In terms of beams, you know there was a time when the treatment would just be in one direction, the x-ray would be headed in one direction, what is the advantage of using different beams as you were describing them?

Higgins We have come a long way in that sense. A lot of people may remember that their grandparents, etc. were treated with things like cobalt radiation where you had a very limited way of delivering beams, maybe from only one direction, or

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at the most two directions, because of the limitation of the technology that was available. One of the most difficult things at that time was that radiation did not have the "skin sparing effects" that we have if a high dose is delivered to the skin. Now, we have beams that come from multiple directions. We can also spare a lot of normal tissue because of the skin sparing that we just talked about, so the skin is not a limiting factor, but also by using multiple beams we are able to deliver, or focus, a lot of the dose on the target and less dose on the surrounding tissue. That is really our goal when we give radiation treatments.

Miller  It is fascinating, when we think about a sunburn, that is a direct effect of the sun’s rays directly on the skin, and what you are saying is that these beams essentially deliver the strongest amount internally, and it is not like everything in the middle is effected the same way.

Higgins  That is right, and that is especially true when you are using the multiple beams that we just talked about coming from different directions. We can focus the highest dose on the tumor and spread out the other dose to other places in the body appropriately. That is where the planning comes in. There are obviously techniques that are going to enhance, your accomplishing that goal, and that is what we are trained to do, and the dosimetrist are trained to do.

Miller  What types of gynecologic cancer do you treat with radiation therapy?

Higgins  Radiation has played a role in treating gynecologic cancer for decades, going back to probably the 40s and 50s. One of the most common gynecologic cancers that we treat is cervical cancer. We play a primary role in treating cervical cancer, meaning that we are one of the main therapies for locally advanced cancer, meaning not really stage, but cancers that are a little farther along. We treat our patients with both radiation, and in most cases, with chemotherapy.

Miller  Is cervical cancer a curable disease?

Higgins  Yes, it is, and now we are in an evolution with cervical cancer. We have the issue of the vaccine, which is a very, very exciting development. We also have a lot more people going for regular screenings, and that is key in developing programs because we need to find the disease early. Early disease is highly curable, but even in patients who have disease that cannot be surgically cured with one operation, we have radiation and chemotherapy to cure those patients. I think the outlook for most cervical patients is very good.

Miller  You see a lot of women with cervical cancer, and I think it is important to share the information, what constitutes good screening?

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Higgins: Women should be going for annual Pap smears and gynecologic exams. Although there is a little controversy about that regarding every year versus every 2 years, but certainly they should get regular routine follow-ups with their gynecologist. There is also this issue about the vaccine, that it covers certain types of HPV virus, and not others. We need to keep that in mind in terms of the effectiveness of the vaccine.

Miller: If a woman has not been going for screening, which obviously, we hope people are going, but what are the symptoms that a woman may present with if she has cervical cancer?

Higgins: There are multiple symptoms, but certainly if someone has bleeding when they should not be having bleeding, as for someone who is premenopausal who suddenly starts to have irregular periods with bleeding, that would be something that needs to be investigated. And whenever a postmenopausal woman has bleeding, that needs to be investigated because that could be a sign of either uterine or cervical cancer.

Miller: Let us take cervical cancer as an example for a second, how many radiation treatments would a woman have, how long would they take, and what would the course of therapy be like?

Higgins: If we are giving a patient a course of chemotherapy and radiation, which we just discussed, we would be using the radiation daily, because we know from historical experience that when you give the radiation daily, your overall outcome is better with regards to side effects. They receive one treatment a day, everyday, and they are in our department for about 20 minutes. A course of treatment last about 5 to 6 weeks with regards to the external beam, and then there are two procedures, which we are going to talk about. Internal treatments are essential for curative therapy, and that is called brachytherapy. Those treatments are usually done towards the end of the external beam course of treatment. With regards to the chemotherapy, they will get that once a week during the radiation.

Miller: Why not just do radiation?

Higgins: The chemotherapy acts as a sensitizer, and as I tell my patients, it helps get a bigger bang for your buck out of each radiation therapy treatment. That is now the standard of care because there are studies that show that is quite helpful.

Miller: Is the machine on for 20 minutes, and I have to ask you because I think people wonder what it is like. Is the woman lying down? Can you tell us about the experience a little bit?

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Higgins: Yeah, we talked about this immobilization and that is part of it. When you come into the room we usually have a treatment machine with a table, and the table is like any examination table, and you lie on the table with whatever immobilization device we have used. Again, we have something that is sort of like a body mold that you just lie in and it keeps you stable and immobilized. The treatment machine will be on for about 10 minutes at the most. There’s no pain; it is basically like an x-ray machine that rotates around your body.

Miller: My impression is that you have some of the best people in the world working for you, the technologists that actually do the treatment. You think about these big machines and all the technology, but on a day-to-day basis, what is that experience like for women and men; is it in an intense one, or is it easier than that?

Higgins: In terms of the experience of the patient coming in the department, what we like as radiation therapists, and what we think patients like, is that we built a rapport with them over the course of their 6 weeks of treatment. They are coming in everyday for about 5 or 6 weeks, and I think that the therapist that works with the patients on the machine enjoys this. What is great about it is it becomes a familiar environment to people; they have the support of the therapist working in our department. I see them at least once a week. It is a very supportive environment.

Miller: Which is the feedback I have gotten from patients, that there is a flavor of positivity to it, which is very nice. What are the side effects of radiation for a woman who has gynecologic cancer?

Higgins: What we know is that the side effects are going to be dependent on the area that you treat. When we think about the pelvis, we think about the organs that we are treating and one of the big issues with people who develop malignancy in the pelvis is that we are going to be treating the bowel and the skin, but the bowels especially. When we are giving 5 weeks of treatment, during that course of treatment people will develop diarrhea, some more than others, but we have lots of ways to manage that. We have a dietitian, we have dietary measures that we talk about with people, for example, using a bland diet, staying away from fiber etc. There are simple things that people can do. With regards to other side effects, some people do have skin problems, just like woman with breast cancer treatments, again that redness and peeling of the skin, but we talk to them about all of the supportive measure that they can do for that.

Miller: We would like to remind you that you can e-mail your questions to us at canceranswers@yale.edu. We are going to take a short break for a medical minute. Please stay tuned to learn more about radiation oncology treatment for
women with gynecologic cancers with Dr. Susan Higgins from Yale Cancer Center.

Medical Minute

Breast cancer is the second most common cancer in women. About 3000 women in Connecticut will be diagnosed with breast cancer this year, but earlier detection, noninvasive treatments, and new therapies are providing more options for breast cancer patients and more women are able to live with breast cancer than ever before. Beginning at age 40, every woman should schedule an annual mammogram, and you should start even sooner if you have a risk factor associated with breast cancer. Screening, early detection, and a healthy lifestyle are the most important factors in defeating breast cancer. Clinical trials are currently underway at Federally Designated Comprehensive Cancer Centers such as Yale Cancer Center to make new treatments not yet approved by the Food and Drug Administration available to the patients. This has been a medical minute and you will find more information at www.yalecancercenter.org. You are listening to the WNPR health forum from Connecticut Public Radio.

Miller Welcome back to Yale Cancer Center Answers. This is Dr. Ken Miller and I am here with Dr. Susan Higgins discussing the role of radiation oncology and the treatment of women with gynecologic cancers. Susan, let me ask you, you have a busy clinic, any stories that you might share from the last couple of weeks, women you have seen with cervical cancer in follow-up?

Higgins In terms of types of cancers we treat as radiation oncologists, one of the most gratifying is gynecologic malignancies, because, treating cervical cancer, for example, is somewhat of an art and a science, and each patient has to have a highly individualized treatment, that part alone is so challenging, so when it is successful, it is very gratifying. I see patients in follow-ups which is another gratifying thing because we have long-term relationships. This is why people love to be radiation oncologists, they have long-term relationships with their patients, like you do, but again, they do need close screening because they have not only long term side effects sometimes, but they usually have other areas that need to be monitored. We are very supportive of those things and try to help them with those, and that is helpful because we still care for them as a whole patient.

Miller I want to ask you about the art and science part. As you know, I specialize in medical oncology, and there is the science part of choosing dosages, but tell us a little bit about the art and science of radiation.

Higgins Especially in gynecologic malignancies, let me talk a little bit about brachytherapy. The external beam portion of what we do using the high energy
x-ray is something that is quite standard, and we have used it for years and years, but brachytherapy also has a long history. It is a very specific subspecialty within radiation oncology with the use of radiation sources that are inserted in or near tumors, and doing that particular type of treatment requires a lot of skill and a lot of experience. When you treat people with that particular therapy, and you have the knowledge and the experience to do that, it is really very gratifying because it is curative treatment.

Miller Which must be a wonderful feeling as a clinician. What is brachytherapy, and when you say sources, practically, how do you do that?

Higgins We have various forms of brachytherapy, but for gynecologic malignancies, radiation sources are often little pellets or seeds, depending on how small they are. With regards to cervical cancer, we have a way of inserting these into both the vaginal canal and in the uterus, and we use that again as part of this treatment which is comprised of the external beam and the chemotherapy, and at the end, the brachytherapy procedures, which we have two. With that procedure, what you do is go to the operating room and the patient is put to sleep. We then place implements that look almost like straws, one goes in the uterus and the other two go in the vagina, and then later on, when the patient is awake, we place these radiation sources, or seeds, inside of those and the patient stays in bed for about a day or two and then those sources come out. During that time they are giving off small amounts of radiation and the cumulative effect of that is to accomplish the killing of tumor cells.

Miller What is the advantage of that as opposed to what you mentioned, which was external radiation?

Higgins Again, with regards to cervical cancer, in the center of the cervix you can achieve a very high dose of radiation when you surround it with sources in that way; much higher than you could achieve with external beam radiation therapy and their selective sparing of the bladder and the rectum. You get a high dose right in the center of that implant where your target is, and very little dose to the rectum and bladder, which are the two important organs near the cervix.

Miller Let us talk about uterine cancer. If a woman develops cancer of the uterus, how do you decide who goes to surgery and who would have radiation, or who might have both for that matter?

Higgins Most patients with uterine cancer luckily present with bleeding, and that usually happens early on in the course of their disease. They undergo a surgery, and following the surgery many of those patients will need treatment again with brachytherapy, because most people do quite well, but a certain percentage, maybe 10%, can develop recurrence at the top of the vagina, or what we refer to

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as the vaginal cuff. We have a very simple and straightforward brachytherapy procedure where we can place a cylinder in the vagina, and there is a little radiation seed that goes in the cylinder and gives treatment right where you need it, right at the top of the vagina with very little dose to the other organs around it. It is simple, it is straightforward, and it takes 10 minutes. We do that 3 times and that actually reduces the incidence of recurrence from 10% down to about 1% or 2%, so it is highly effective and very easy to do.

Miller  I have to say, it sounds terrific, to be able to do limited treatment and have that big impact. Let me ask you more about uterine cancer, who commonly develops it, and again, what are the symptoms? What things should a woman look for to go to their doctor?

Higgins  One of the main risk factors is excess of estrogen, which drives the uterus to produce, or turnover, more and more cells. When one is obese or overweight you have a lot more estrogen being produced in your body, so it is very common to see an obese person with uterine cancer. The things to watch for are bleeding in some patients, there could be pain if it is a more advanced tumor in the pelvis, but many patients present with bleeding because what happens is inside the uterus the tumor grows and you see spotting at first, and certainly when any patient is postmenopausal and then have spotting, that should not be ignored because that is abnormal until proven otherwise.

Miller  Is it more common in postmenopausal women than premenopausal?

Higgins  It is usually more common in postmenopausal women.

Miller  We have an e-mail question from Barbara who lives in West Hartford. She says, “I am 54 years old and I have had breast cancer and I took tamoxifen in the past, do I have to worry about developing uterine cancer?”

Higgins  We do feel that it is really important for patients who are on tamoxifen who are at risk for uterine cancer to go to their gynecologist and get, at least, yearly exams. Patients should have a high level of vigilance if they notice spotting, etc., they should go and see their gynecologist right away.

Miller  At Yale Cancer Center there is an emphasis on multidisciplinary teams, how does that apply to your work?

Higgins  It is very important in gynecologic cancers and that is what we have been discussing, you often have a combination of surgery, radiation therapy and chemotherapy, and all of those treatment modalities need to be coordinated. What we do is as you would do in a breast conference, we get together and we have a group, or team, of people including the pathologist, the GYN...
oncologist in this case, and the radiation oncologist, and we discuss each patient's case. We discuss a management plan and that is extremely important to do upfront so that we start out with a plan and are all on board from day 1. You must experience this with breast cancer patients because the current treatment of many cancer patients in this day and age is really from a multidisciplinary perspective.

Miller A lot of the therapy is directed to cure, and a lot of women with gynecologic cancers are cured. What is the role of radiation therapy for palliation, and also what does palliation mean, broadly?

Higgins In general, we are taking care of symptoms such as pain, which can improve a patient's life. It may not be curative, but it is still extremely valuable, and that is a very gratifying part of what we do as radiation oncologists. For instance, if someone has a tumor that went to their bone, that bone pain can impair their life, and they may need to take narcotic medications, but we can use radiation to treat that. It usually takes 10 treatments or so, and we are very, very effective in reducing that pain. In many cases, the patient can discontinue their narcotic medications and their quality of life is really enhanced.

Miller We are wrapping up, but I want to ask, what are some of the things you are excited about in your field, what can we look forward to?

Higgins We have spoken about the techniques that we use right now, but we are all interested in making our treatment easier to bear, and decreasing side effects. We now have techniques like intensity modulated radiation therapy, which is also called IMRT, as many of our listeners get on the internet, they will see that acronym. It is one of the things we are excited about. We are using that to basically decrease side effects and enhance the patient’s quality of life.

Miller What is IMRT?

Higgins It is a special form of radiation. It usually takes a little longer to deliver, but it is multiple beams, many more than what we use normally, and we are delivering an even higher dose to the target, and less of a dose to the surrounding tissue. It has certain constraints though because it needs to be used in a situation where the tumor, or the area of the tumor, is static, because it is so constrained that you cannot have the target moving in and out of the field.

Miller If a patient or a family wants to access clinical trials here at Yale, how would they do that?

Higgins The gynecologic oncology team has several trials and they work with the

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gynecologic oncology group, which is national group. We have radiation therapy oncology trials, so when they see the radiation oncologist, or the gynecologic oncologist, and they are interested, they can enquire and we will be happy to enroll them.

Miller    Terrific. Susan, I want thank you for joining us on Yale Cancer Center Answers.

Higgins   Thank you Ken.

Miller    Until next week, this is Dr. Ken Miller from Yale Cancer Center wishing you a safe and healthy week.

*If you have questions for the doctors or would like to share your comments, go to [www.yalecancercenter.org](http://www.yalecancercenter.org) where you can subscribe to our podcast or find written transcripts to past programs. Next week, Ed Chu and Ken Miller will speak with Dr. Kevin Kelly about the detection and treatments of advanced prostate cancer. I am Bruce Barber, and you are listening to the WNPR Health Forum from Connecticut Public Radio.*