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Minimizing Cardiac Toxicity in Non-Metastatic Early Breast Cancer

Announcer:
Welcome to Breaking Boundaries in Breast Cancer on ReachMD, sponsored by Lilly. Here's your host, Dr. Charles Turck.

Dr. Turck:
A critical component in the treatment of patients with non-metastatic early breast cancer is managing the cardiovascular risks associated with its treatment, such as radiation-induced cardiac toxicity, and since this particular threat can put early breast cancer patients at risk of heart failure, what steps could we take to prevent that from happening?

This is *Breaking Boundaries in Breast Cancer* on ReachMD. I'm Dr. Charles Turck, and joining me to discuss minimizing cardiac toxicity in patients with non-metastatic early breast cancer is Dr. Rachel Jimenez, Associate Director for Translational Medicine at the Department of Radiation Oncology at Mass General. She also recently hosted a session on this exact topic at the 2020 San Antonio Breast Cancer Symposium. Dr. Jimenez, welcome to the program.

Dr. Jimenez:
Thanks so much for having me.

Dr. Turck:
So, Dr. Jimenez, when a patient is diagnosed with early breast cancer, what role does radiotherapy play in the treatment plan for that patient?

Dr. Jimenez:
So, among patients who undergo breast-conserving surgery or lumpectomy, the standard of care following surgery is to administer radiation to the breast and sometimes to the regional lymph nodes around the breast to reduce the risk of a recurrence of the cancer. In patients who undergo mastectomy or who have other high-risk features of their cancer at the time of mastectomy like a large tumor, lymph node involvement, or positive surgical margins, radiation's also used in that setting to further decrease the risk of local recurrence.

Dr. Turck:
Now, in patients with non-metastatic early breast cancer, there's a risk of cardiac toxicity that's associated with breast radiotherapy, so could you tell us more about that?

Dr. Jimenez:
Sure. So the risk of cardiotoxicity in patients who undergo breast radiotherapy is actually somewhat difficult to quantify because it depends on the patient's baseline risk factors, including their age or other medical comorbidities as well as the amount of radiation exposure that they receive at the time of their radiotherapy treatment. Now, modern radiotherapy techniques have led to increasingly lower doses of radiation being delivered to the heart, and so I believe that, in the modern era, radiotherapy is extremely safe and a very effective treatment for most of our patients. However, for a small proportion of patients, it can still result in cardiac injury, and so one example is that a recent study that looked at a cohort of about a thousand women who were receiving radiation for breast cancer found that the incidence of an acute coronary event within about ten years of treatment was less than five percent, but that incidence would increase based on the exposure to the heart and specifically with exposure to the left ventricle, and so as a result, radiation oncologists are very cognizant about radiation exposure.

Dr. Turck:
Are there particular risk factors that put some patients at higher risk for that type of heart damage than others?

Dr. Jimenez:
Yeah. So, we think that the risks are higher in patients who already have a history of ischemic heart disease or other types of heart disease as well as patients who have other cardiac risk factors, so what I mean by that is hypertension, hyperlipidemia, diabetes, obesity, a prior history or current history of smoking, as well as older age, and so those are the kinds of risk factors that we take into account when we're seeing patients and trying to estimate their risk.

Dr. Turck:
For those of you just tuning in, you're listening to *Breaking Boundaries in Breast Cancer* on ReachMD. I'm Dr. Charles Turck, and I'm speaking with Dr. Rachel Jimenez about the risk of radiation-induced cardiac toxicity in patients with non-metastatic early breast cancer. Now, Dr. Jimenez, if we switch gears a bit and focus on how we can minimize the risk that we've been speaking about, what are some of the preventive strategies we might utilize?

Dr. Jimenez:
Sure. So, when we're thinking about trying to mitigate cardiac risks in patients, the first thing that we ask is whether patients can safely forego radiation, and so if their cancer risk is low enough, then we do offer patients omission of radiation. For patients who can't forego radiation, the radiation oncologist can use several different approaches to try to limit cardiac exposure. So, one is to limit the dose to the heart by decreasing the amount of tissue that we're treating, and so instead of treating the entire breast, we might just give the radiation to the area where the cancer was within the breast, and that's a technique that's called accelerated partial breast radiation, and using a technique like that can limit cardiac exposure. We also can change the patient's positioning to limit the likelihood that the heart is in the treatment field or nearby, and so one technique that we use frequently is called a deep inspiration breath hold. So, a technique like that allows the patient to take a deep breath, and when they do, the heart is pulled out of the field of radiation by the diaphragm, and that allows us to treat the breast tissue without having the heart get as much radiation exposure. So, the last thing that radiation oncologists can employ are advanced radiation techniques, and one technique that we use frequently at Mass General Hospital is proton therapy, and so the idea behind proton therapy is that the physical property of a proton beam compared to conventional radiation allows us to better spare some normal tissue, and that means that we can lower the cardiac exposure compared to regular radiation therapy, and then on top of all of those things, a radiation oncologist is still an oncologist, and so we do think about the wellbeing of the patient overall, and so for our patients, we do try to optimize their cardiac health, encourage them to exercise, to have a healthy diet, to optimize their blood pressure and cholesterol whenever possible because the optimization of those risk factors really can prove very beneficial in limiting cardiac risk.

Dr. Turck:
And what sorts of diagnostic tools are available to help us better detect and predict the risk that we've been discussing?

Dr. Jimenez:
So medical oncologists often will use an echocardiogram prior to starting chemotherapy to evaluate a patient's cardiac function because chemotherapy can result in changes to the heart that can happen during or very shortly after administration of certain chemotherapies or other targeted agents. With radiation, it's a little bit different because the nature of the changes that we observe to the heart after radiation tend to happen later, so we are talking about this latency of onset of toxicity, which can happen, you know, 10-15-20 years after radiation exposure, so there's no diagnostic tools that we currently use as part of routine practice. That being said, there's a lot of research that has utilized an array of cardiac imaging tools, like nuclear medicine scans, CT angiography, strain echocardiography, MRI. All of these things have been used to evaluate early changes to the heart after radiation, and so while none of those are really ready for prime time in terms of diagnostic tools that we would use regularly, the guidelines would say that if patients have had prior chest radiotherapy, they should consider having a stress test and an echocardiogram five to ten years after their exposure to look for any changes that could result in symptomatic heart disease.

Dr. Turck:
And finally, Dr. Jimenez, are there any alternatives to radiation-based care for patients with non-metastatic early breast cancer?

Dr. Jimenez:
Yeah. So, you know, the field of breast cancer has seen a lot of advances in systemic therapy, particularly for patients who have had more aggressive biologic subtypes, and so as those treatments are improving and we detect more cancers at an early stage, there's really been an increasing focus on deescalating therapies. So, whenever possible, we're offering patients omission of radiation for those patients who fit our criteria for omission, so those patients who have low-risk cancers based on a genomic signature, and there are ongoing clinical trials that are exploring omission of radiation in women who have lymph node positive cancers but who demonstrate a really robust response to systemic therapy. However, those are still ongoing clinical trials, and so adjuvant radiation really does remain the mainstay of modern breast cancer therapy, and I think with the current technical advances in the field, radiation is extremely safe.

Dr. Turck:
That's all really great to know. Thank you, Dr. Jimenez, and that actually brings us to the end of today's program, so I want to thank my guest, Dr. Rachel Jimenez, for joining me to discuss how we can minimize the risk of radiation-induced cardiac toxicity in patients with non-metastatic early breast cancer. Dr. Jimenez, it was great having you on the program.

Dr. Jimenez:
It was great to be here. Thanks so much for having me.

Announcer:
You've been listening to Breaking Boundaries in Breast Cancer, sponsored by Lilly. To revisit any part of this discussion and to access other episodes in this series, visit ReachMD.com, where you can Be Part of the Knowledge. Thanks for listening.