



Breast Imaging

Hosted by: Steven Gore, MD

Guest: Laura Horvath, MD, Assistant Professor of Radiology and Biomedical Imaging

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Welcome to a series net casts brought to you by Yale University.

Thank you for joining us for this edition of Yale Cancer Center Answers, where we provide you with up-to-date information on cancer care and research. Our host, Dr. Steven Gore, is Director of Hematological Malignancies at Smilow and an expert on myelodysplastic syndromes. He interviews some of the nation's leading oncologists and cancer specialists who are on the forefront of the battle to fight cancer. If you are interested in listening to past editions of Yale Cancer Center Answers, all of the shows are posted on the Yale Cancer Center website at YaleCancerCenter.org. If you would like to join the conversation, you can contact the doctors directly, the address is canceranswers@yale.edu. Here is Dr. Gore.

Gore Welcome to another episode of Yale Cancer Answers. This is Dr. Steven Gore, and I am joined today by my guest Dr. Laura Horvath. Dr. Horvath is an Assistant Professor of Radiology and Biomedical Imaging at Yale School of Medicine. She is here with us today to discuss breast imaging. Dr. Horvath, thank you so much for joining us today.

Horvath You are welcome. Glad to be here.

Gore Tell us a little bit about what you do, you are a radiologist and imagist, what is biomedical imaging?

Horvath I am a diagnostic radiologist, which means that I have specialty training and experience in all aspects of medical imaging, but I subspecialized within radiology to use various imaging techniques to concentrate on the diagnosis and management of breast diseases, specifically breast cancer. So, I am a radiologist, but I am also referred to as a breast imager.

Gore Is it common to be that subspecialized in radiology, I know that there were CT people and MRI people, so are there people who are just breast imaging people?

Horvath Yes, there are. But that is mainly true at academic medical centers like ours where myself and most of my breast imaging colleagues only do breast imaging. In the community, a lot of breast imaging might be done by a general radiologist as part of their practice.

Gore So, general radiologists are trained to interpret at least with mammograms?

Horvath Absolutely.

Gore So, what made you interested in going particularly into breast imaging?

Horvath Well, it is a particularly challenging area of radiology for a variety of reasons, but it is also very interesting and has a lot of patient contact. So, first of all, when we talk about mammograms, there is a tremendous variability in the normal appearance of breast

tissue between women. So, just like any 2 women do not look alike, any 2 mammograms do not look alike. And so, the challenge in diagnosis is to tell normal breast tissue from what could be an abnormality because normal breast tissue can mimic abnormalities and likewise breast cancers sometimes mimic normal breast tissue. So, there is that challenge of diagnosis, but the other interesting aspect of breast imaging in particular is that we really have a lot of patient contact, one-on-one, face-to-face contact. Because many of the women are coming to us because of perhaps abnormal imaging that they have already had or because of a breast symptom, and so we are talking to them, examining them, we might be actually doing the imaging hands-on with say something like ultrasound, explaining the results to them and then when it comes to the detection of a suspicious abnormality, in many cases we are actually the ones who is performing the biopsy and then helping to determine the significance of the results and what the next step is in their management. So, there is the challenge of the imaging interpretation, but also the enjoyment of the direct patient contact.

- Gore There seems to be so much anxiety among women that I know even around their so-called routine mammograms, and I imagine that in a referral center where as you have mentioned, some people already have a suspicion that there may be an abnormality, there just got to be anxiety off the top for a lot of people.
- Horvath Definitely, and that is why we certainly try to do our best in explaining what is going on to each patient and trying to guide them through the process and support them with what they might be going through.
- Gore As a breast imager, you mentioned that you also do ultrasound and not just mammograms?
- Horvath Correct. So, the primary imaging tool that we use is mammography, but we also do ultrasound as well as MRI, magnetic resonance imaging.
- Gore And will you interpret the MRIs of the breast as well?
- Horvath Oh yes. We interpret all of those studies and we coordinate their use. We might use any of those 3 tools to screen women, but we also use them to solve different diagnostic problems.
- Gore So, why would you choose one modality of imaging versus another?
- Horvath The primary tool that we use for screening is mammography, and we will use that both for screening and diagnosing. But mammography uses x-rays to image the breast, and so there is a certain spectrum of information that we will be able to see on a mammogram, but in other situations, ultrasound is very important in evaluating mammographic findings and also in evaluating symptoms such as a lump.

Gore I guess ultrasound can help to find if something or not, is that right?

Horvath Yes, it can tell us if a mass is a cyst or a solid. But solid masses can also give us information about the characteristics of the findings as to whether or not it is suspicious and warrants biopsy.

Gore And how does MRI help?

Horvath MRI is also used to screen certain women and those are women who are at very high risk of breast cancer because of a strong family history. It is also used in the setting in some cases of women with newly diagnosed breast cancer to evaluate the extent of their disease, so those are a few of the reasons why we might use MRI.

Gore Does the MRI detect earlier breast cancer, is that why you might use it in somebody with a family history?

Horvath Not necessarily, but it might detect breast cancers that do not show up on a mammogram. So, there are breast cancers that can be mammographically occult and so MRI is really the most sensitive imaging modality that we have to look for breast cancer.

Gore Why shouldn't we do MRI as mass screening?

Horvath Well, because it is very expensive technology to use. The examination typically can take at least half hour to perform, it does require the injection of intravenous contrast, but that being said, there are people working on shortened protocols that would allow us to do faster exams at a lower cost.

Gore And is the MRI for breasts similar to other MRIs where you have to sit in a tube that many people find claustrophobic and makes the big noise and all that, so that a lot of people find that rather unpleasant I guess?

Horvath Yeah, as I said, most women understand the reason and are motivated to have the study done.

Gore And especially if they have a family history?

Horvath Correct.

Gore That is very interesting. I am also interested in, we think of invasive radiologist as being almost a whole different beast of subspecialization, but you are saying that you actually are an invasive radiologist really when it comes to doing biopsies, needle biopsies I suppose?

Horvath You could think of it that way. What we are looking for on the imaging when it comes to breast cancer is cancer that has not yet become clinically apparent. So, we see a finding and we actually did not know it was there before the imaging was done. So, then we use the imaging to guide the biopsies, and using mammography or ultrasound or even MRI, we can precisely place what is essentially a hollow needle into the abnormality and remove very small pieces of tissue that way. But we have done this for many years and it can be done very accurately and give very reliable results in terms of managing that particular woman.

Gore Got it. And what is the turnaround time between from when a woman has such a procedure done and when she may actually have some information about whether there is a malignancy to worry about?

Horvath That depends a little bit on our pathology colleagues, and often we have the results back in just a matter of a couple days.

Gore Oh wow! And do you give the information or is that sent back to the primary physician?

Horvath Really both. When we do the biopsy, we talk with the woman about how the results will be conveyed to her, and so often we are calling the patient with pathology information and those patients are expecting to hear from us. But in other situations, we of course always want to keep the referring physician in the loop so we will be letting them know as well what the pathology results are, and in most cases, they will also be talking with the patient and arranging whatever followup is necessary.

Gore Why don't we talk a little bit about who should be screened for breast cancer. I know there has been a lot of controversy over my career in terms of the benefits of mammography versus potential risks of radiation and starting at age 40, starting at age 50, every year, every other year, only with family history. What is the current recommendation?

Horvath Certainly to begin with, screening is typically done on women without any breast symptoms to look for signs of breast cancer. And there has been certainly a lot of press talking about the different recommendations between the different societies, but I think if you read through all of that different information, there is agreement that population screening with mammography does decrease the death rate or decrease mortality from breast cancer. Everybody agrees on that, alright. Where the disagreement comes in is, when should we start screening, how frequently should we do screening, is there an age at which we should stop screening. And so, that is really where the controversy arises from. Our recommendation is that generally women begin screening at age 40, but sometimes sooner if there is a particularly strong and

significant family history. And we generally recommend that they have yearly screening.

Gore I see. So, starting at age 40 and on average every year?

Horvath That is correct, and that is with mammography. You may have heard of dense breasts, and in that situation, the composition of breast tissue that they have can mask or obscure or actually slightly increase their risk of breast cancer. So, in some instances, we may not be able to see their breast cancer with mammography, and in that situation, ultrasound can be particularly useful in screening the breast and looking for signs of breast cancer, and so in fact, in Connecticut, there is a law that we inform women of their breast density and this is true for a number of states around the country, and when we inform them of their breast density, we also inform them that screening ultrasound might be useful in evaluating them, and in fact, in Connecticut, insurance companies are required to cover the cost of screening ultrasound.

Gore So, those patients then are screened annually using ultrasound?

Horvath If they chose to be, yes.

Gore And that will be in addition to her mammogram?

Horvath Correct. Screening ultrasound does not replace mammography, but it is a supplemental modality that we use in those women with dense breasts.

Gore Now, is the dense breast thing the same as fibrocystic breast or cystic breast, or we do not talk about that anymore?

Horvath No, we do not really use that term. Some women have breast cysts and that is most commonly seen in the perimenopausal years – late 40s to early 50s, but that is different from breast density.

Gore And does that make screening more difficult or it is just something you have to watch and follow?

Horvath You mean the cysts? In most cases we are able to look through them and around them.

Gore I see, so no big deal. And you mentioned about the controversy over how long to continue screening, I guess after menopause or can you illuminate that a little more?

Horvath The risk of breast cancer increases over a woman's lifetime. It is extremely uncommon to see breast cancer in women who are in their 20s or 30s, unless they have this really strong family history, but we start to see more cases as women get into their 40s, and the incidence actually rises throughout their lifetime, peaking in the mid 70s. So,

women in his 60s or 70s are really at higher risk for breast cancer than a woman in her 40s or 50s. So, there is really no upper age limit at which we recommend that screening be stopped. One factor to consider though are other health problems that the woman might have. So, if you would do a screening study and really not act on the results because of some other significant disease that a woman might have, then there probably is no reason to do the screening.

Gore So, maybe bad heart failure or kidney disease or diabetes or another cancer, something like that where you would be less aggressive potentially.

Horvath Correct. But we do screen women who are otherwise healthy into their 80s.

Gore Wow, that is great. How has the field changed in the last few years? Has the imaging modality changed much? I know that from when I was a medical student, 30 or whenever years ago now, the mammograms look quite different.

Horvath There have been a lot of changes over the course of my career. I would say that the biggest and most recent advancement has been the development and the addition of tomosynthesis to mammography.

Gore Tomosynthesis?

Horvath That is right. And you can think of it as an advanced mammography. Instead of each mammogram view consisting of a single picture, tomosynthesis gives us a stack of many images through the breast, each being a millimeter thick, so that we are able to better see through the breast tissue at different levels within the breast. It helps us to diagnose more breast cancers and also makes us less likely to mistake normal breast tissue for a breast cancer.

Gore So, it is kind of like a CAT scan in terms of taking slices?

Horvath Correct, you could think of it that way. And it provides a significant addition to the information that we are able to see on a mammogram, both increasing our sensitivity and decreasing our false positive rate. We have been using this technology for about the last 5 years and a number of my colleagues have done really good work in showing the benefits of tomosynthesis.

Gore So, you are using this as the screening tool?

Horvath It is part of a screening mammogram for most of our patients, that is correct. But the technology is an add-on to a mammography unit, so not all practices at this point have been able to acquire the tomosynthesis technology, but it is becoming more and more prevalent and more commonly used throughout the country.

Gore That is really interesting. Is this something that an informed patient might inquire when she is planning a mammogram, do you have tomosynthesis?

Horvath That is correct, yes.

Gore And they should expect it, it sounds like, perhaps.

Horvath That is correct.

Gore Got it. And what is the tomosynthesis experience like for the patient compared to a standard mammogram? Is the procedure from the patient's perspective any different?

Horvath It is very slightly different. I mean, the mammography unit looks pretty much the same, but when their breast is placed into the imaging device, the unit instead of staying stationary and taking a single picture of their breast, actually moves in a very slow arch over their breast over the course of maybe 10-15 seconds and it takes a series of very low-dose images which are computer algorithms then synthesized into the stack of images that we can scroll through. So, it is pretty much the same experience. It just takes a few seconds longer.

Gore You often hear women complaining about the imaging procedure, at least they used to, again in terms of being uncomfortable, having the breast compressed, has that changed at all?

Horvath No, compression is still a very important part of the imaging technique. It helps to hold the breast still so that we do not have any motion artifact, but more importantly, it really flattens the breast tissue and spreads it out and brings it closer to the image receptor, so there are a lot of principles of imaging related to the physics of how the images are acquired that compression really improves our imaging, and we understand that it is uncomfortable for women, but for most women, it is also tolerable, and when we explain to them the importance of the compression, they understand.

Gore Got it. Now, this is breast cancer awareness month and I know that a small number of breast cancer each year really arise in men, do you use the same kind of technology to diagnose men, and who gets referred for them, how does that work?

Horvath Yes. We do see occasionally men, most of them are presenting with symptoms. So, they might have noticed a lump or they might have pain or changes in their nipple, nipple retraction. And so, they will be referred to us for a mammogram and possibly an ultrasound, and it is the same imaging technology that we use on women. Breast cancer is uncommonly seen in men and most of the time it is in older men, but women should be aware that if there is a family history of male breast cancer, that it might be associated with a genetic mutation and predisposition.

- Gore In her family? She needs to be addressed?
- Horvath Correct. It might increase her risk for it.
- Gore Got it. Interesting. So, where do you see breast imaging going in the next few years? Are we likely to see changes?
- Horvath It is hard to predict the future because much of what we are doing now was not even talked about when I went through my training. I would say on the near horizon, there is work being done on contrast-enhanced mammography, which could compete with MRI by giving us functional information about what is going on in the breast, as we talked about people are working on the abbreviated screening MRI protocols, but that could be done in less time at lower cost. There is always work being done to enhance our ultrasound capabilities, but the goal has been and will continue to improve detection.
- Gore That sounds like you are going to be busy for a while and it sounds like you really enjoy what you do, so we are really grateful to have imagers like you who are so hugely invested in our patients.
- Horvath Thank you.
- Gore Dr. Horvath, thank you so much for joining me today on Yale Cancer Answers. This was a wonderful discussion on breast imaging for screening and diagnosis in honor of breast cancer awareness month. This is Dr. Steven Gore wishing everybody a happy and healthy tomorrow.

This has been another edition of Yale Cancer Answers. We hope that you have learned something new and meaningful. If you have questions, go to YaleCancerCenter.org for more information about cancer and the resources available to you. We hope that you will join us again for another discussion on the progress being made here and around the world in the fight against cancer.