Breast Imaging

Guest Experts:

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Welcome to Yale Cancer Center Answers with Dr. Francine Foss and Dr. Lynn Wilson. Dr. Foss is a Professor of Medical Oncology and Dermatology, specializing in the treatment of lymphomas. Dr. Wilson is a Professor of Therapeutic Radiology and an expert in the use of radiation to treat lung cancers and cutaneous lymphomas. If you would like to join the conversation, you can contact the doctors directly. The address is canceranswers@yale.edu and the phone number is 1-888-234-4YCC. This week, Dr. Foss is joined by Dr. Regina Hooley and Dr. Liane Philpotts. Dr. Hooley is Assistant Professor of Diagnostic Radiology and Dr. Philpotts is Professor of Diagnostic Radiology and Chief of Breast Imaging at Yale Cancer Center. Here is Francine Foss.

Foss I would like to ask both of you exactly what you do at Smilow Cancer Hospital and how you got involved in this area of breast imaging, perhaps we could start with Regina.

Hooley At Smilow Cancer Hospital we see patients and screen them for breast cancer with mammography primarily, as well as we screen with ultrasound and MRI. We also do a lot of interventional biopsy procedures to make a diagnosis. I am really lucky to be actively involved in breast imaging. I have been an attending at Yale in the Breast Imaging Section for 12 years. I did my fellowship there many years ago, and before I was at Yale as an attending, I was an attending at a private practice in New York. The field has changed dramatically while I have been in practice, I got in very early on when it was mostly just mammography and then we started to do percutaneous biopsies to replace surgical biopsies and then we relied more on ultrasound and MRI over the years so it has been very interesting.

Foss And Liane how about you?

Philpotts I have been here for 20 years actually, spending all of my time in the breast imaging department. And, like Regina, I did a fellowship at Yale and stayed on since then, completely doing breast imaging.

Foss Typically we think about the radiologist as the person behind the scenes, the person that the patient never sees, but you ladies are in there with patients everyday. Can you tell us a little bit about what that is like, that part of your job where you actually come in contact with the patients?

Philpotts Breast imaging is very clinical, unlike other areas of radiology, as you said, we have a connection with the patients all day long, it is a very busy area, and it is important that we have that connection, that we are seeing the patient, that we are talking with the patients about their symptoms, and we are performing physical exams and doing hands on ultrasound and biopsies and it would be very difficult to do that without this contact with the patient.

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Foss: Has it traditionally been that way, I know both of you have been in this field now for a quite some time, has the field evolved so that you are seeing more of the patient?

Hooley: Absolutely, when I was in training back in the early 1990s, we would just read the mammograms and tell our technologist everything is fine and let them go and we would not talk to the patients, we did not take a history from the patients, and we just read them sort of out of a box like most radiologists sort of do when they just read the cases without seeing the patients, but as we started to take a more active role in doing the biopsies on the patients, then we needed to talk to them and get more involved and so now we talk to at least half of our patients. Some of the patients who have just screening mammography, who do not have any breast issues, can just have their mammograms and not see the radiologists at all, but those patients who have issues with their breasts or problems, and we see a lot of that at Smilow, they need to talk to the radiologist and we can help them manage their care.

Foss: If a patients say is having a mammogram at Smilow and has a question or an issue, would the technologist get you involved?

Hooley: Yes, we get involved. The technologist takes a preliminary history and finds out what the chief complaints are of the patient and then they relay it to us and sometimes the technologist knows in advance what images and what kind of study to do and other times there is a question of what we need to start with and so we will go and then talk to the patient and figure things out and then decide what imaging test is best.

Foss: Can we back track a little bit and talk a little bit about breast cancer. It is obviously still one of the top cancers and certainly one of the top cancers for women in the United States. Could you tell us a little bit about breast cancer, how prevalent it is in the United States and then we’ll talk a little bit about some of the risks.

Philpotts: Yes, breast cancer is very prevalent. Unfortunately, North America does have the highest rate of breast cancer in the world and here in Connecticut, we have a very high rate, one of the highest in the country. So, it is definitely a big issue for us, for women in Connecticut. The statistics state that one in eight women in their lifetime will be diagnosed with breast cancer, so that is 12% of women. It is really second to skin cancer as being the most common cancer.

Foss: And that has changed from one in nine, I seem to remember one in nine a couple of years ago?

Philpotts: Yes, it was one in twelve at one point, and now it just keeps going down.

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Foss Can you comment on socio-economic issues with respect to that rising incidence? Is that due to different socio-economic mixing in the United States or is it perhaps due to the fact that women do not have access to health care to get the breast cancers picked up sooner?

Philpotts There are certainly some disparities that are of concern and are being studied actively and it is very interesting that there are different ethnic incidences of breast cancer, for example, African-American women do not have quite as high an incidence of breast cancer as white women, but they have a higher mortality rate. They also have a slightly different timeframe where they will have it at a younger age and so that is definitely an important thing to keep in mind when we are screening and making guidelines for screening.

Hooley In general, I think non-Hispanic white women have the highest incidence of breast cancer across the board as opposed to other populations and I am not sure we really know why whether it is dietary factors, environmental or genetics, it is unclear.

Foss Do we have any idea why Connecticut has such a high incidence or is that something that we are still investigating?

Philpotts Yeah, I do not think anyone really knows, as Regina said, it is probably a combination of socio-economic and ethnic factors.

Hooley I think Long Island also has a high incidence, so maybe it has something to do with the Long Island Sound?

Foss Speaking of that, can we talk a little bit about the risks, what are the known risk factors for breast cancer?

Hooley The number one risk for breast cancer is actually being a woman, increasing age also increases your risk. Men, by the way, do get breast cancers. It is very rare, but it is about 1% of breast cancers are diagnosed in men, which accounts for about 2000 per year. But there are other risks for women and there are genetic risk factors including those women who have the BRCA 1 or BRCA 2 gene and if they have these genes then these women have a higher risk, up to 80% over their lifetime of developing breast cancer, and these breast cancers tend to be diagnosed at a younger age and cancer that is diagnosed in younger ages tends to be little bit more aggressive. If a woman just has a family history of breast cancer, a first-degree relative, a mother or a sister with breast cancer, then her risk doubles as well. There are other factors, for example, if a woman is of Ashkenazi Jewish heritage, the risk is increased to be a carrier of the BRCA gene as well. There are some rare genetic syndromes such as Cowden disease, which may increase ones risk. But again the #1 risk is being a woman.

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Foss  Should women be coming in for mammograms at a younger age if they fall into that high risk group, if they have one of those risks factors?

Philpotts  Yes, we will definitely start screening those women with family history or other risk factors at an earlier age and we also use modalities other than just mammography, in fact, we do not always want to do mammography, which involves radiation to the breast when a woman is young, particularly under 30. So we will use modalities like MRI (magnetic resonance imaging) of the breast which is very helpful for screening some of these women at high risk.

Foss  That is really a change in the paradigm, traditionally we thought only about mammography and now these other tests are really coming to the forefront. Perhaps we should spend a little bit of time talking about what these other tests are and what the utility of these tests are for different women, so do you want to start Regina?

Hooley  Sure, we have to realize that over time our recommendations for screening have changed and before it used to just be everybody got the same thing, at 40 you start with your yearly mammogram and now it is much more individualized and I do think patients have choices. For women who are at high risk, that is if they are at greater than 20% lifetime risk where they are a BRCA carrier, then they should start screening probably at the age of 30, with yearly mammography and MRI. The mammogram is a great test, it has been proven to reduce mortality by the early detection and treatment of breast cancer, but it is not perfect and it can miss on average, about 10% to 15% of breast cancers and it can be higher in women with dense breast tissue. It can miss maybe 40% to 50% of cancers in women with a dense breast as opposed to women with fattier breast tissue. These women, if at high risk can start usually at the age of 30, we never like to start screening women before the age of 25. But in general, high risk women get yearly mammography and MRI. In women who are greater than 40 years of age, we will screen them with mammography yearly and if they have dense breast tissue, they have the option of having a screening breast ultrasound as well. And the screening breast ultrasound is helpful because it can pick up some cancers that are mammographically occult. Multiple studies have shown that the screening breast ultrasound can pick up about three to five cancers per thousand that are missed by mammography, which sounds really low, but is actually comparable to mammography because mammography itself can pick up in the order of two to seven cancers per thousand. So it is comparable to that at sort of picking up these additional cancers by supplemental screening with ultrasound. So it is a great test. The drawbacks for that are that there are a lot of false positives and so women end up with additional follow-up studies and we are not quite sure, it could be benign, it might need additional followup at six months, so they have to come back for another appointment or they might need an aspiration or biopsy of something that is seen, so the positive predicted value of lesions that we recommend for biopsy and ultrasound is much lower compared to mammography. The positive predicted value for a lesion seen on mammography is in the order of about 30% to 40%, but with ultrasound, the positive predictive value is closer to the order of about 6% to 10%. So there are a lot of false positives of ultrasound. Women who have a dense breast need to

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know that if they choose the ultrasound screening, which can be a little bit more accurate, it may be pick up more cancers, they have to be willing to accept the possibility of having a false positive result, and so that is the drawback.

Foss You talked about a woman choosing to go forward with the ultrasound. Can you talk about that process? Say a woman is in getting a mammogram done, what happens to then prompt that decision and then in what case would this woman perhaps say she does not want to get the ultrasound done?

Hooley Generally, if a woman has a screening mammogram, she gets a letter in the mail saying her mammogram result was normal, and then if she has dense breast, by law in Connecticut, we have to say that your mammogram shows that you have dense breast tissue and you would benefit from another screening test such as ultrasound and/or MRI, and that is what our law in Connecticut states, and it is a unique law, which we can also talk about separately, and then the patient needs to talk to their doctor, or the referring clinician, about the pros and cons. We do not automatically schedule the patients.

Foss So, a patient then goes back to their original physician ordering that test and the decision is made as to whether or not to come back for the ultrasound?

Hooley Correct. Now that we are three years into this law, many women are having this done every year and now some women are just scheduling the mammogram and the ultrasound together.

Foss I would like to talk a little bit more about this law when we come back, but unfortunately we have to take a break now for a medical minute. Please stay tuned to learn more information about breast imaging from Dr. Hooley and Dr. Philpotts.

Medical Minute This year over 2000 Americans will be diagnosed with lung cancer and in Connecticut alone there will be over 2000 new cases. More than 85% of lung cancer diagnoses are related to smoking and quitting, even after decades of use, can significantly reduce your risk of developing lung cancer. Each day patients with lung cancer are surviving, thanks to increased access to advanced therapies and specialized care. New treatment options and surgical techniques are giving lung cancer survivors more hope than they have ever had before. Clinical trials are currently underway at federally designated comprehensive cancer centers like the one at Yale to test innovative new treatments for lung cancer. An option for lung cancer patients in need of surgery at Yale Cancer Center is a video-assisted thorascopic surgery also known as a VATS procedure, which is a minimally invasive technique. This has been a medical minute. More information is available at yalecancercenter.org. You are listening to the WNPR Health Forum on the Connecticut Public Broadcasting Network.

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This is Dr. Francine Foss and I am joined today by my guests, Dr. Regina Hooley and Dr. Liane Philpotts, and we are here discussing the issue of breast imaging and breast cancer. Before the break we talked a little bit about the process of getting a mammogram and about a law in the State of Connecticut that a woman has to be informed if she has dense breast. Could we go back to that one more time and talk a little bit about that, is Connecticut unusual in this regard?

Philpotts Connecticut was the first state to pass this law and since then a few other states have followed suit. Texas and Virginia have both passed similar laws and it is being looked at in multiple other states at this time, and federally. It is a very important thing because mammography is not equal in everyone and for people with very clear fatty breast, mammography does very very well, but those people with dense tissue, an abnormality certainly can be hidden and that is why this law was passed to inform women if they do have dense tissue that the mammography may not be as sensitive, and then as Regina has been speaking about, to have the choice to talk it over with their doctor whether they would like to pursue additional imaging.

Foss We talked about some of those other imaging techniques, we talked about ultrasound and mammography and MRI, but there is also another one that we have not really touched on yet and I wanted to ask Liane about that because I believe this is your area of expertise, and that is tomosynthesis. Can you tell us what that is and what it is used for?

Philpotts Tomosynthesis is basically three-dimensional mammography and this is a very exciting development that has been available now for just a year; it was FDA approved in February 2011. We have had it here at Yale since August and we were the first in Connecticut to have it. And it is basically similar to a mammogram. The patient would hardly know the difference, it does still require the same positioning and compression, but it obtains three-dimensional images and so for the radiologist, when we sit down at the work station, we can look at the breast in 1-mm slices and go through the breast in all different directions. It really helps in two ways. It helps us detect a few things that might be hiding in that dense tissue that we were not seeing otherwise, but it also helps reduce a lot of the false positives. When a patient just has a two-dimensional mammogram and tissue is compressed, there is often a lot of overlying areas that look like densities, so we have to then recall the patient for additional imaging to determine is that something there or not, and this is where tomosynthesis reduces a lot of those false positives and we have seen a reductions in our recall rate by 40%, which is really very very good for patients.

Foss Does the tomosynthesis require more radiation?

Philpotts It is the same amount of radiation as a two-dimensional, but what we are doing now is we are doing them both together because we need a two dimensional image to be able to compare with the patient’s prior images in order to get the whole big picture, we are

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doing both together. I think in the future we will probably be able to the tomosynthesis alone and there are developments along that line to generate a sort of synthetic two-dimensional mammogram, again this gives the big picture just with the radiation from the 3D. That is probably a year or so down the road, so for now we are doing both which doubles the radiation. It is important though that with digital mammography the radiation dose is less than it was with film mammography and we can do the tomosynthesis and the 2D together for the same amount of radiation as people received when they used to have film mammography, which was not too long ago.

Foss Can you briefly talk about which patients will be getting this tomosynthesis? Would it be everybody, or just a select group of patients?

Philpotts Yes, certainly we chose to do everyone, so all patients who are coming for screenings. Certainly the benefit is probably going to be more in patients with the denser tissue, but we decided to do everyone just to be able to determine that and what we found so far is that indeed, the patients with the denser tissue have bigger reductions in their recall rates. But even the patients with the scattered tissue, so not very dense but not completely fatty, those patients are also helped with the tomosynthesis. So, we have done everyone.

Foss We did not really talk in too much detail about the MRI, so I just want to touch on that before we move on, Regina could you tell us a little bit about the role of the MRI scan?

Hooley MRI is used to screen the patients who are at high risk for breast cancer. There are other uses too, but as far as screening goes, we like to use it in patients with a greater than 20% lifetime risk. MRI is great also because it has a very high sensitivity, in the order of over 90%, so it can pick up most breast cancers if they are present in the breast. The problem is that again there are a lot of false positives, so the specificity is somewhat lower. The other problem I think with MRI, and one of the reasons why we do not use it in everyone is because it is a very expensive test, it is much more expensive than a mammogram, probably 10 to 15 times higher. It also requires an IV contrast injection and the patients also have to go into the MRI scanner, so it is a little bit more uncomfortable for the patients. So, we do not offer it to everyone. Primarily we use it for these high-risk women to screen them. We can also use it in women with a new diagnosis of breast cancer to help stage the breast cancer and sometimes we use it also for problem solving.

Foss If we just back up a little bit, we have talked about a number of these tests now, but going back to the patient, most women when they walk in to your diagnostic imaging facility do not have a diagnosis of breast cancer. Can you step us through the process? A woman would come in and have a procedure, probably a mammogram, and we talked about false positive and false negatives, so there might be a second and a third step for that woman. Can you just walk us through that process?
Philpotts  We generally do start with mammography unless the patient is young, under 30, then we would just do ultrasound, and after the mammogram we will use ultrasound for many patients if there are findings on the mammogram, or if there is a palpable finding, we use ultrasound. So those studies are done back to back and then we usually discuss with the patient our findings and if we feel that there is something to biopsy or if we feel that they are fine, we will see them next year, or if there is maybe something we do not think is worthy of a biopsy but we might want to keep an eye on, then we tell them to come back in six months. If the patients needs a biopsy, we set them up then, we explain to them the process and give them all the information, and sometimes we can even do it that day if it is possible.

Foss  Many of these biopsies are done with the radiologist being present to localize the tumor. Can you step us through that process?

Hooley  The biopsies are done in the breast imaging suite by the radiologist and a biopsy is done percutaneously, it is not a surgical biopsy, we use a specially designed needle, it sounds a lot worse than it is. I think for most patients the biopsy takes about 30 to 40 minutes. We have two ways of doing it. We can do it with mammo-guidance or stereotactic guidance, or ultrasound guidance. We use a local anesthetic, we make a tiny little incision that does not need stitches and then using the imaging as our guide, we place the needle right next to the suspicious area and then we can biopsy it. The actual biopsy itself is very quick, it usually takes five minutes or less, most of that 30 to 40 minutes is setting up, finding the right spot, and getting everything ready. The biopsy itself is very quick and most patients have very little pain.

Foss  Is there pain after the procedure and is there anything that a woman would need to worry about if they undergo one of theses biopsies?

Hooley  Afterwards there is very little pain, we usually just tell patients that they require Tylenol and ice-packs and of course we have to have the patient look out for infections, which is very rare. I think I have seen two infections in my career, and the patient will most often have a bruise, so it is not going to look pretty for a week or two, but other than that most patients do very well.

Foss  The important question for most patients is how long is it going to be before they get the results?

Philpotts  Generally we tell people three working days, sometimes it is available sooner than that, but sometimes it takes a little a bit longer. That it is the average and there is only so much we can rush these. It does involve careful examination under the microscope and so it is generally three days for the results and we know that is hard for the patient but it is a necessity.

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We also talked a little bit about the numbers, and I just wanted to get back to that issue of false positives and false negatives. If a woman is in the mammography suite and something is found and then she is recommended to come back and have a procedure and have a biopsy, for the average woman, not in the high risk group, what is the chance that that biopsy is going to be positive for breast cancer?

It is probably about 20%. It definitely depends on the abnormality. For calcifications, for example, that we see on a mammogram, that has a higher rate of being benign actually and a lower rate of representing cancer, and when it does it is usually very early cancer. With the solid masses, often we are able to see those and biopsy those with ultrasound. There is a range, there are a lot of benign fibroadenoma that women develop as well as cancers and the rate may be a little bit higher for that. With MRI detected lesions, as Regina said, there are a lot of false positives with that and so the actual chance of cancer is going to be even a little bit lower, in the teens, 10% to 15%.

I think in general the percentage is really wide. If a woman comes to us and we say it is probably benign and we do not need to biopsy, there is a less than 2% chance of it being malignant, but if we are worried about this suspicious lesion then it can be anywhere from 3% to 95% chance of malignancy. There is quite a range, so it really depends on the lesion and how it looks and we can sometimes characterize them and put them in the 95% or higher, or 10% but this is quite variable.

I guess the take home message for the audience and certainly my mother was, in this position, if you are told you need a biopsy that does not mean that you have breast cancer.

Absolutely. The majority in fact are benign.

Absolutely, and if it is a breast cancer, for the most part they are small and highly treatable and I mean that is why a lot of these cancers are caught from screening and that is why women have the mammograms in the first place, they catch something while it is still small and highly treatable.

What about the woman who comes in with a lump that they say just popped up all of a sudden, a relatively rapid onset of something that they can feel? Is there a greater chance that that is going to turn out to be breast cancer?

Not necessarily, because often that will represent a cyst. Some of these things that sort of popup overnight are benign and of course the patient is very anxious about it, but cysts are very common lesions that can change rapidly during the course of a few days or over the
menstrual cycle. It is possible though that there are some aggressive cancers that all of a sudden the patient has noticed it and by the time they notice it and go to their doctor and feel like it is increasing every day, but that is very rare.

Foss  Just to touch on the issue of male breast cancer, because we brought that up early on in the show, are there any differences for men when they come in to the breast imaging center in terms of the kind of procedures that they are going to have done?

Philpotts  No, we do the same thing; we do a mammogram and generally an ultrasound if needed. They do not always need one, but we definitely start with the mammogram.

Hooley  We keep them separate for our other patients though.

Foss  Is there any higher chance that a male who shows up in the breast imaging center is going to have a cancer as opposed to a woman?

Philpotts  No, most men with a palpable lump in their breast have a benign entity called gynecomastia, which is just proliferation of the breast tissue usually secondary to some other factor like drugs or medications, liver problems, for the most part that is what they have and we just reassure them that they do not have cancer and it is rare to have a breast cancer in a male.

Foss  Can we talk a little bit about screening, because still in the United States I presume most of our breast cancers are picked up by screening, is that correct?

Philpotts  There is a variety. Not all women get screened. Unfortunately, it is still quite variable depending on where you are in the country and so there is quite a variety. There still is a combination of screen detected cancers and then a patient either finding it themselves or their doctors.

Foss  We talk about age 50 as an age when women should start getting regular mammograms, what about women younger than that and how does a women know when she actually should be getting mammograms?

Philpotts  There is certainly a lot of debate about that. Back in 2009 the US Preventive Services Task Force did issue new guidelines which had changed from the 2002 guideline to actually not recommend a routine screening in that age group, as you said, the 40 to 49, and that it should be individualized and the patient should discuss it with their doctor. There was an awful lot of backlash about that, and there is some ongoing controversy over that. I think some of the issues are that some of the studies that they have analyzed, the randomized control studies, were done a long time ago and with very different imaging than we have today and although those studies have shown a mortality benefit to screening,
which was not denied, everyone knows there is some degree of mortality benefit, but there are the
false positives and when you have a lower rate of breast cancer in that younger patient, the feeling
is that there are too many false positives to outweigh the benefit. That is why I think with the
tomosynthesis, which the reductions in the recall rate, if we can reduce those false positives then it
makes it a lot more beneficial for patients to consider doing screening, and again I think we are in
an area of the world that has a high breast cancer rate and an area of the country that has a high
breast cancer rate and I do not think that some these studies that have been done in other countries
necessarily apply to us.

Foss    So for most women it is still age 50, at this point?

Philpotts    Well the American Cancer Society and American College of Radiology suggest 40 as the age to
start annual screening, but the American College of Physicians does stick with 50, so it is variable
amongst the medical societies.

Hooley    It is variable but the Department of Health and Human Services after the Task Force made the
recommendation decided to stick with the yearly screening at age 40. So, it is very controversial.

*Dr. Regina Hooley is Assistant Professor of Diagnostic Radiology and Dr. Liane Philpotts is a
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