

**SURGICAL ADVANCES IN AXILLARY AND SENTINEL LYMPH NODE
DISSECTIONS
UNIVERSITY OF CALIFORNIA, MOORES CANCER CENTER
LA JOLLA, CA
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ANNOUNCER: The program is sponsored by Ethicon Endo-Surgery Inc. Welcome to Moores Cancer Center, University of California San Diego in La Jolla, California. Over the next hour, see an expert discussion of surgical advances in axillary and sentinel lymph node dissections. During the presentation, doctors Anne Wallace and Karen Darricau will demonstrate the use of Harmonic technology and the neo2000 Gamma Detection system in axillary and sentinel lymph node dissections during a sentinel node biopsy. OR-Live makes it easy for you to learn more. Just click on the "request information" button on your webcast screen and open the door to informed medical care. Now let's join the surgeons.

00:01:28

ANNE MARIE WALLACE, MD, FACS: Welcome, internet audience, to this live broadcast. We are coming from the University of California San Diego Moores Cancer Center. I am Dr. Anna Wallace. I am a surgical oncologist of the breast and a plastic surgeon, and I am the director of the breast-care unit here at the Moores Cancer Center, and I am joined today by Dr. Karen Darricau, from Denver, and I'm going to let her introduce herself. Karen.

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KAREN KAY DARRICAU, MD, FACS: Thank you, Anne. I'm a general surgeon from Denver, Colorado. I'm a breast surgeon at the Breast Cancer Care Center in Aurora.

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ANNE MARIE WALLACE, MD, FACS: Great. What we're going to be doing today is discussing sentinel node dissection and axillary node dissection, and specifically we're going to discuss the Harmonic technology and the new new2000 Gamma Detection system, which is the Bluetooth gamma probe, basically. And I'd like to remind the audience that we will be taking questions by e-mail, and so if the audience would like to click on the MDirectAccess button on your screen, and we'll be taking those questions throughout the entire broadcast here. So now I would like to begin our presentation. Basically, you're here today to learn about sentinel node and axillary node dissection, so let's start this with why do we evaluate lymph nodes, why do we do a lymph node biopsy at all? Well, basically, this goes back to the '40s and '50s with the radical lymph node dissections, the radical mastectomies where traditionally they took 50, 60, 70 lymph nodes. And the main reason was for prognosis because the presence or absence of lymph node metastases is still the most important predictor of whether or not the cancer is going to recur. We have evolved over the last 50 years from doing the radical lymph node dissections to doing the level-three dissections to doing the level one and two dissections to really just looking at the sentinel node biopsy. But prognosis is still determined by that sentinel node and by whether or not there's cancer in the lymph node. And you know, we talk about molecular markers, we talk about estrogen receptors,

progesterone receptors, HER2/neu, all the things that are really important in breast cancer, but it still gets down to with the patient: is she node-positive or is she not? And not only do we need to know is she node-positive but we really still need to know how many nodes are positive. So that's the first reason that we look at lymph nodes. The other reason that we evaluate lymph nodes is because there is control of local disease in the axilla. When a patient has bulky disease from lymph node metastasis, this can lead to arm swelling, to nerve pain, to really severe problems with the patients arm, and so to control the disease locally, surgery has always been kind of the mainstay. So like I mentioned, you know, through the decades, we've evolved from doing radical lymph node dissections that left the patients with terrible arm swelling and terrible pain to now just doing the sentinel node biopsy. The concept of sentinel node has been around for many years and has been now common practice probably for at least about the last 10 years. So how is a sentinel node biopsy performed? Most of us use the two modality techniques. Not everybody does. My colleague next to me actually doesn't always use the blue dye, but most of us probably use both, and that involves the morning of surgery, the patient goes down and she is injected with a radioactive material. Traditionally, that's technetium sulfur colloid. And I think a lot of us still take a picture, called a lymphoscintigraphy, and you can see on this slide here, you see the large dark spot is the injection site. And the small dark spot is the sentinel node, so the -- the technetium sulfur colloid is being taken up by the sentinel node and it lights up there. In the operating room, most of us also then inject some sort of blue dye. For years, we used Lymphazurin blue, but that is now back-ordered for probably at least another six months to a year. And so I think most of us, if we're using blue dye, are trying to use methylene blue. Methylene blue is a little bit more toxic on the skin and so requires being diluted and requires more of a subcutaneous injection. For the radioactive injection, we're usually injecting that interdermally or just under the skin, and it's most of the time then taken up in the axillary area. We then take out the sentinel node, we find it by the gamma detector that I'll show in a minute, and we find it by the blue dye. And we take it out, and again, most of us send it immediately for some sort of pathologic evaluation. Traditionally, that is frozen section analysis where the pathologist will bivalve the lymph node and look at the two halves of the lymph node and then immediately call in to the operating room and tell us whether or not there's cancer. Now, there have been numerous validation studies where the lymph node has been looked at and then the full axillary node dissection has been performed to tell us what the sensitivity of sentinel node biopsy is. And I think it's kind of held standard that the false negative rate is somewhere between 0 and 10%, and that means that the sentinel node is negative but there really were positive lymph nodes somewhere between 0 and 10%. And it's really closer to 0 as the skill of the surgeon goes up, and that's been validated on numerous times. So this whole concept of sentinel node biopsy and really just taking the sentinel node if it's negative has been really the mainstay in breast surgery now for quite a few years.

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This is the new Bluetooth probe. I used to use the probe that's on the right-hand side of the screen, which is the neo-probe 2000, which has a cord with it. The new Bluetooth probe is cordless, and basically makes my life a lot easier in the OR, and I think, you know, that's what we're all gearing for is accuracy and speed and good patient outcome. And the benefit to this probe is that not only do I not have to labor with a big plastic drape that goes over the cord that gets in my way and everything else, but it's actually a lot more sensitive. It's 50% more sensitive than the corded probe is, and the corded probe by neo-probe was the most sensitive that's on the market. It is completely wireless, like I mentioned. And the total physician control is just amazing. The 10-second average count from the probe is very accurate and very

easy to determine. The probe comes in a straight tip or an angle tip, depending on, you know, basically the surgeon's choice. This is the other technology that has really changed sentinel node biopsy and axillary node dissection, and this is the Harmonic FOCUS. This is an ultrasound device which allows us to dissect and ligate the lymphatics and the vessels that are in the axillary contents, making the need for electrocautery much less and making the need for the old-fashioned clip a lot less. I used to go through a lot of clips on even a sentinel node biopsy, and certainly on a lymph node dissection I might go through several clip applicators. What we're going to do right now is show you a brief video of the Harmonic FOCUS.

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VIDEO NARRATOR: In the Harmonic system, an ultrasonic wave operating at a frequency of 55,500 cycles per second causes the active blade to vibrate, creating excursion of the blade tip from 50 microns at power-level one to 100 microns at level five. The transducer, housed in the Harmonic handpiece, converts electrical energy to mechanical energy. It consists of a stack of piezoelectric ceramics sandwiched under high pressure between two metal cylinders. When pulsed with a high-voltage electrical signal from the generator at the resonant Harmonic frequency of the ultrasound acoustic system of 55,500 hertz, the transducer, blade extender, and blade expand and contract with each wavelength along the entire length of the device. Longitudinal expansion and contraction increases from just a few microns of longitudinal motion at the transducer to 50-100 microns at the blade tip, where maximum motion occurs.

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ANNE MARIE WALLACE, MD, FACS: The tissue effect with the Harmonic shears is such that the blade comes into contact with the tissue, causing pressure, and that causes coaptation of the blood vessels. Then hydrogen bonds are then broken and protein in the cells are denaturing. The denatured proteins then form kind of a sticky coagulum. This then allows for kind of a simultaneous cutting and coagulation to take place different than electrocautery and certainly at a much lower temperature than electrocautery. The nice thing about this, too, is that not only don't you have the heat with the electrocautery but you spend -- you spend the energy like a tiny little lymphatics that maybe would be too small to clip, so you would quickly go through them with the electrocautery, but because they're being properly ligated, they're not loose lymphatics that might also lead to seroma. What we're going to do next is show a video of the technology being used in sentinel node biopsy. So this is a patient who has a small breast cancer, is very amenable to sentinel node. And I should remind everybody that you do sentinel node on a patient that doesn't have known nodal disease already. If a patient has a known positive lymph node, then at that point, you're going to proceed with axillary node dissection and not need a sentinel node. So this patient has been injected in the morning with technetium sulfur colloid, and the picture which we don't show here, but the lymphoscintigraphy showed a nice lymph node in the axilla. She was injected with dilute methylene blue subcutaneously and the Bluetooth device here is being used to look for the hot lymph node. This was a little bit more tricky lymph node than normal. It wasn't -- didn't just pop up immediately, it was a little bit deeper, and so it took us a few minutes to actually find it. At this point, I'd like to ask Dr. Darricau what she was doing before the Harmonic shears and how you proceeded with your sentinel node biopsy, because you do it a little bit differently.

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KAREN KAY DARRICAU, MD, FACS: I do do it differently. We -- I'm very fortunate to have a very strong breast radiologist available, and instead of injecting with methylene blue, my breast radiologist will actually put a guidewire into the hot lymph node, the sentinel node, the lymph node that has the most radioactivity. It's a

very similar technique that they use with breast -- needle localization, and so I can avoid the methylene blue and when I get done with my axillary or with my sentinel node dissection, I actually have the sentinel node on the tip of the localizing needle.
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ANNE MARIE WALLACE, MD, FACS: And as you can see here, the Harmonic shears are being used to ligate all of the tissue as we go through it. And those tiny little lymphatics that you see in the axilla, we don't always see all of them, and so to be able to just kind of put your bovie aside and just dissect with shears and with your finger allows less bovie-ing of that tissue and more actual ligating of that tissue. Karen, what were you using before you used the shears?
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KAREN KAY DARRICAU, MD, FACS: I was using electrocautery. And with the Harmonic technology and the FOCUS, I've actually found less lymphatic drainage, so less problems with seromas post-op. Also, I find that because there's no electrical current going through the body into the surrounding nerves that I've had a whole lot less pain associated with an intercostal nerve stimulation during the surgery.
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ANNE MARIE WALLACE, MD, FACS: Right, that's a very good point. Because as you get close to that nerve, even if you don't cut it, this is the intercostal brachial nerve that we're talking about, it's the sensory nerve that crosses over to the back of the arm and can cause the patient a lot of nerve pain. Even if you don't cut that nerve, if you traumatize it and make it very hot with electrocautery, then that patient's going to have a lot of problems postoperatively. So have you seen less seromas since you started doing sentinel biopsy with this?
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KAREN KAY DARRICAU, MD, FACS: I have. Yes.
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ANNE MARIE WALLACE, MD, FACS: And I was probably, you know, seeing maybe 1 in 20 of my sentinel node biopsies, despite clipping a lot of the little lymphatics, were still coming back with a seroma. Because we don't traditionally put a drain after sentinel node biopsy. And actually, since I've started using it, I have not had a single sentinel node. And I remember telling the rep after about the first 10 cases, "I haven't seen a single seroma yet, I haven't seen a single seroma yet." And now it's actually been, you know, hundreds of cases, and we haven't seen any seromas using these, so I think we're being more diligent about actually clipping those with the -- with the Harmonic shears as opposed to just going through the bovie. Now, you know, the other question that I have is after we take out our sentinel node, what do we do with it? And everybody's different with that. There are a group of surgeons that are starting to not send their sentinel node immediately for tissue evaluation because it is time-consuming and not all surgeons have immediate access to a pathologist to look at this. We do still do frozen section on ours. The statistics are that about 35% of invasive breast cancers will have a positive sentinel node. We're probably a little lower than that because our radiologists are fairly good at picking up positive nodes preoperatively, but that's still a significant amount of women that will need a full node dissection, and so we want to be able to do it right then and there, and we do look at it. And what do you do, Karen?
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KAREN KAY DARRICAU, MD, FACS: We have a pathologist there on the site that will actually do a touch-prep on the lymph node and let us know within about 10 or 15 minutes.
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ANNE MARIE WALLACE, MD, FACS: And have you had any problems with false negatives on that touch-prep?

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KAREN KAY DARRICAU, MD, FACS: We do, we do. And I always counsel my patients that there's always a chance that once they take the lymph nodes back to the lab and do the immunohistochemistry that there's always a possibility of having a positive lymph node after that. And at that point, then we take them back to surgery for a full axillary dissection.

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ANNE MARIE WALLACE, MD, FACS: Right. The other thing that -- she mentioned touch-prep, that's one method of examining the lymph node. We do frozen section. What's new on the market is a very detailed molecular analysis of the sentinel node that can be done in about a half an hour's time. It's based on RTPCR analysis and it's supposed to cut down a little bit on that false negative rate. And the overall false negative rate that's quoted in the literature is somewhere between 5 and 10% of your truly positive sentinel nodes will be called falsely negative in and that means you have to have that discussion with the patient postoperatively, "oh, your lymph node came back positive on the permanence, what do you want to do now?" And it's a difficult thing for the patient, because she's been told she was lymph node negative, and now she's told, no, she's really lymph node positive. But as long as you let them know that preoperatively that that may happen, then they're usually prepared for it. I think some surgeons, because that does happen occasionally and because they don't have easy access to a pathologist will elect to just send the sentinel node for permanent section and then wait. What you see here is the sentinel node is out and we're now examining the bed with the Bluetooth and finding very little radioactivity left behind. I have one question that I want to ask Karen here: how many sentinel nodes do you take? If we're really lucky, we have one very, very, very hot lymph node and then the tissue bed goes back down to no radioactivity, but sometimes you see two, three, four sentinel nodes. I tend to take anything that's over 10% of the hottest lymph node. What do you do, Karen?

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KAREN KAY DARRICAU, MD, FACS: I try to get a clean or a cold axilla within reason. I usually tell my patients between one to three lymph nodes will be removed, however if I have a slightly hot lymph node that's difficult to reach and I've already harvested one to two very good lymph nodes, I don't think it's worth the risk to go after those.

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ANNE MARIE WALLACE, MD, FACS: Right. And there is data that obviously if you take all of the hot lymph nodes that you're going to lower your false -- your truly false negative rate down to as minimum as possible, so if you have one that's 5,000 and you have another one that's 1,000, the bottom line is you need to go after that. And certainly if you have ones that are multiply blue, you need to go after that. And you will occasionally have that person who will have multiple sentinel nodes, and it's difficult to know if it's because there truly are multiple tracks or if the agent has just kind of drained down multiple ones. So the advantage of the Harmonic technology in breast surgery is that it seals the lymphatics, reducing that need for clips. And certainly when we turn to the axillary node dissection where we're using a lot of clips, this can actually even be cost efficient. It seals the vessels up to 5 millimeters. Traditionally when you do an axillary node dissection, you get that one big vein that's right before the thoracodorsal vein that you usually -- I usually put two clips on. There are some people that even tie. I was, you know, a little bit nervous at first about using this on such a big vein right coming off the axillary vein, but the Harmonic shears come right through it and seal it. And if you don't have bleeding right away, you're not going to have bleeding. It works very, very well. Overall, this can lead to fewer drain days, reduced postoperative seroma, as I mentioned, in both

the axillary dissection and the sentinel node. And then overall lower temperatures than the electrocautery, so there's less thermal tissue damage. And as a plastic surgeon, every time we can have less thermal tissue damage, it's less risk that I'm going to get an implant infection or something else, which we're always fighting against those problems. So knowing that sentinel node is here to stay, and it's been here to stay for quite a while, and I should mention that obviously this is not just in breast cancer. Sentinel node technology is used in really all solid tumors now. That includes melanoma, prostate, colon, head and neck. You know, multiple uses of sentinel node technology. What are some of the hot, currently debated issues in its use that still, you know, puzzle us as surgeons? Well, one of them is sentinel node after neoadjuvant therapy. And neoadjuvant therapy meaning we give the patient chemotherapy or we give them some sort of therapy in order to shrink the tumor before they go into surgery. So, Karen, what do you do when the patient has chemotherapy, she had clinically negative nodes from the beginning but she's now ready for her surgery? What do you do?

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KAREN KAY DARRICAU, MD, FACS: I think it depends upon the reason why she had the neoadjuvant chemotherapy. If it's because she was wishing breast-conservative treatment in a lumpectomy but the ratio of the cancer size to the breast size wasn't appropriate for breast-conservative treatment, then I'd feel very comfortable doing a sentinel node with the final surgery. If however, they're getting neoadjuvant chemotherapy just because of the very, very large amount of breast tumor, then I would feel uncomfortable that the actual mapping would be accurate and I'd do a full axillary dissection in that situation.

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ANNE MARIE WALLACE, MD, FACS: Right. And that's a good point. We have to remember that sentinel node technology is a minimally invasive less surgical technology for patients who have reasonable disease. When you start getting into patients who have inflammatory breast cancer and locally advanced breast cancer, then a minimal lymph node evaluation may not really be appropriate for them. So that's at the point where you may want to consult with your medical oncologist and see how they feel about accurately knowing the lymph nodes. The other issue is when there's a known positive lymph node before chemotherapy, I always do the full axillary node dissection. I have actually been burned many times with this and found that even after chemotherapy, the patient still has multiple positive lymph nodes, and so I have not elected to do sentinel node when they have a known positive cancer after chemotherapy. And I think most of us probably feel that way.

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KAREN KAY DARRICAU, MD, FACS: I agree.

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ANNE MARIE WALLACE, MD, FACS: The accuracy when you have known positive disease that you downstage with chemo, the sensitivity of the sentinel node also is not as high as it normally would be, and those studies have been performed in small numbers of patients. I do have a question that has just come in, and the question is: what is the learning curve with Harmonic, how many cases? That is such a good question, and I'm in a teaching hospital here, and the video that you just saw was me together with one of my residents. And I'll tell you, usually I don't get the benefit of a chief resident, usually I have one of the more junior people, and so I'm always really walking on eggshells when it comes to new technology and using it in my operating room because I want to make sure that the residents that are with me know the basics before they try to struggle with something new. I'll tell you that using this just once or twice, once your hand just really gets used to the unit, it becomes an immediate, easy thing to use. And the residents are telling me that they

like it much better than the clips because they don't have to struggle and keep asking the scrub nurse for another clip and then get the scissors to divide between the clips. So it's not like, you know, learning sentinel node, where you had to do 20 or 30 of them to get good at it. This is something very basic that if you've made it to the level of being a surgeon, you can easily use this. Do you agree?

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KAREN KAY DARRICAU, MD, FACS: I felt that it was very easy to go to the FOCUS. I had had just a little bit of previous experience using the Ace with the axillary dissection and felt like it was so cumbersome and difficult that I really didn't use it very much. To use the focus, you can use it to dissect, you can use it to control bleeding, seal off the lymphatics. It was very easy. And I did, I agree, one or two cases with the FOCUS, it was very simple to learn.

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ANNE MARIE WALLACE, MD, FACS: And she brings up a good point: you're not seeing the Harmonic Ace in this presentation right now, you're seeing the FOCUS. The Ace was a larger shear that had buttons on it, and I actually didn't mind it too much because I have fairly big hands, but the residents would complain about that one more. They like the FOCUS much more now, and so you will still occasionally see that one floating around. The next issue is multicentric disease in sentinel node. I think when the technology first came out, we were very cautious, thinking that each area of the breast had a specific sentinel node to it. So if you had two or three breast cancers in the breast and were doing a mastectomy or two or three breast cancers in a quadrant, was the sentinel node really accurate? And this was actually, again, looked at in validation studies, where they did the sentinel node and then completed it with the axillary node dissection and found that sentinel node is still very accurate in multicentric disease. Karen.

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KAREN KAY DARRICAU, MD, FACS: Yeah, it really depends upon the patient. I actually have had them localize both sites and just do a sentinel node. And then sometimes I feel more comfortable if there are larger tumors just going ahead just because of the bulk of the tumor, doing an axillary dissection.

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ANNE MARIE WALLACE, MD, FACS: Okay, I have another couple of questions that have just come from the audience. One of them is: how many cc's of blood do you usually lose in this surgery? I think none. I mean, if the -- if the anesthesia ever even asks me that question, I don't think they ask me that question in sentinel node biopsy at all, but the question would be minimal, so you know, one or two cc's, something like that.

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KAREN KAY DARRICAU, MD, FACS: Oh, I agree.

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ANNE MARIE WALLACE, MD, FACS: I can't say that I lost a lot of blood when I did any sentinel node surgeries, so we were very cautious always about using clips and everything, but this is even less. It's very dry surgery.

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KAREN KAY DARRICAU, MD, FACS: It's turned it into really a bloodless surgery, so you can see the nerves, you can see the veins and the arteries so much easier.

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ANNE MARIE WALLACE, MD, FACS: Right. Then another question: why do I still inject the blue dye around the tumor instead of under the areola? Well, first of all, the -- the data on periareolar blue dye or any dye injection is that it's about 97% accurate compared to injecting near the tumor, so I've always just, you know, taken that extra couple percentage of accuracy. The other thing, too, is I'd rather have some

blue staining. There is blue staining that happens with methylene blue and Lymphazurin blue, and I'd rather have the blue staining away from my nipple-areolar complex. And if, you know, if I'm doing a mastectomy and I'm saving the nipple, which I do do nipple-sparing mastectomies, then the blue dye can actually confuse me and make it look like there may be some ischemia around my nipple. So it's really just kind of a convenience thing and you know, the data -- the data tells you that you can really do it either way. Moving back to some of our currently debated issues, prior breast augmentation in sentinel node, that was another thing we were worried about if a patient had a previous breast reduction or had had prior breast augmentation. And I think it was Armando Juliano, the John Wayne, who studied this in a small group of patients, and again in a validation study, did show accuracy in the sentinel node after -- after previous surgery. And so again, in 1997, we were telling patients, "oh, you've already had your breast surgery, you can't have your sentinel node." And we're really not saying that anymore, are we?

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KAREN KAY DARRICAU, MD, FACS: Right. I feel very comfortable doing sentinel node after breast augmentation.

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ANNE MARIE WALLACE, MD, FACS: Yeah. Frozen section analysis, we already talked a little bit about that. And that there is the false negative rate, that it may not show positive in the OR and you have to let the patients know. For some reason, it always seems to happen to me around Christmastime when we get that 5 or 10% all in a clump, like three to five patients come back and they were supposed to be negative and they're really positive. What is confusing, though, is how to use immunohistochemistry. I think we're all doing that on our sentinel nodes, but when they come back with just clusters of cells positive in the node, it's not even -- if you look at your staging form, it's not even registered as an N1 disease. If it's just a less than 0.2 millimeter metastasis, it's considered a submicro metastasis, and it's not even considered node-positive. You know, do you go back to the OR on one of those?

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KAREN KAY DARRICAU, MD, FACS: Right, that's really controversial. It opens up a really big question mark. I find that I have some oncologists that really like to know if there's one positive lymph node, even a little bit positive, what the rest are doing. And they wish for me to go back in and take out more of the lymph nodes for a better staging. Then I have some that really feel that it's not necessary.

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ANNE MARIE WALLACE, MD, FACS: It's a difficult one for the medical oncologists, because to hear they have a one centimeter tumor that has a submicro metastasis, and they're like, "ugh, do I have to chemotherapy to this?" And so that may be really why they're then wanting us to look at the rest of the node so that they can define it better. We have other things now to define that better: Oncotype DX, which is the gene mapping of the actual tumor can sometimes help us to find whether or not that patient really is a high risk or not. So it may not always need going back to the OR. I do not go back for immunopositive lymph nodes. Male breast cancer -- male breast cancer is probably 0.2 to 0.5% of all breast cancers. It's higher in the genetic patients, the BRCA1 or 2 mutation patients. If you have a male breast cancer, please test them for the gene for breast cancer. There's not a lot of data on how to treat them, so we tend to treat them just like we treat women, and if the tumor is an early tumor, we offer sentinel node biopsy to them.

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KAREN KAY DARRICAU, MD, FACS: I agree, and I really encourage my male breast cancers to get bilateral mastectomies.

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ANNE MARIE WALLACE, MD, FACS: Ductal carcinoma in sentinel node biopsy. This -- you know, you could spend just an hour on this topic. The modern ductal carcinoma in situ is diagnosed usually on a mammogram via a core biopsy. And that core biopsy is usually an eight-gauge or an eleven-gauge core and is extremely accurate. When you go to the operating room and do a lumpectomy for that patient, occasionally it will come back more than just ductal carcinoma in situ and will actually show microinvasion or actually invasion. And so the argument is that if it shows invasion and you haven't done a sentinel node, then you have to go back to the operating room to do the sentinel node biopsy. In our institution, the conversion to an invasive cancer after core showing DCIS is extremely low and the lymphoedema rate with sentinel node is still about 2 to 3%, so if I'm going to do a lumpectomy for ductal carcinoma in situ, unless it's huge volume or there's suspicion of microinvasion, I do not do the sentinel node. Now, if I'm going to do a mastectomy because I can't go back and do a sentinel node after I've done that mastectomy, then I will do it. And I actually do sentinel nodes on even prophylactic mastectomies just in case we find some cancer. How about you?

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KAREN KAY DARRICAU, MD, FACS: I agree. If the ductal carcinoma in situ shows evidence of comedonecrosis or a high grade or if I have a radiologist that says, "you know, this really looks really serious" on the mammogram or the ultrasound, I will go ahead and do a sentinel node.

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ANNE MARIE WALLACE, MD, FACS: And then finally, full-node dissection after positive nodes. I think that's probably where there's really more discussion than anything right now. I think most of us feel very comfortable with not doing full-node dissection when a sentinel node is negative, but do all of these women really have to go back if they're positive? And there is a group of surgeons now in the United States that are strongly in favor of even when you know there's a good positive metastasis in the lymph node, not doing the completion node dissection. And the argument is is that 50% of those patients will not have any further nodal disease, and that means 50% of women are getting more nodes than they need. And the truth be known, there is no benefit in taking out negative lymph nodes. The benefit is in taking out positive lymph nodes and so those surgeons who believe this way feel that maybe radiation could control the rest of those nodes, and they feel that their medical oncologists are happy with knowing the one lymph node. It is still the standard to complete the node dissection when you have a known positive node, and that certainly is what we're doing here in the university. Karen?

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KAREN KAY DARRICAU, MD, FACS: That's what we're doing at our center. If -- if the woman is elderly or if the oncologist says, "you know what, I really don't need to know any more than what I know to treat her," then I think we can forgo the complete axillary dissection. But I still think it should be considered as control, of local control.

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ANNE MARIE WALLACE, MD, FACS: Great. All right. And that, we cannot say that enough. If you've ever had these cases where patients have recurred with severe disease in their axilla where they're adherent to the brachial plexus or the axillary vein, if nothing else, that is a terrible morbidity to have in end stage breast cancer. So just for palliation to get rid of the positive nodes, and I'm really a believer that surgery does it better than radiation. I just don't think radiation control-- can control gross axillary disease as well as surgery can. With that being said, we're now going to move on to a video of the Harmonic device being used in a full axillary node dissection. Here the incision is being made in the axillary crease, and I have to say

this is kind of an interesting patient, as the first thing that Karen said when she saw this was, "oh, yeah, big positive lymph node there." This was an 80-year-old lady who had a one and a half centimeter poorly differentiated cancer -- it was estrogen receptor positive but progesterone receptor negative -- whose surgeon didn't feel that she needed any lymph node evaluation because she was elderly. And we have to be careful with that. We have some very, very healthy elderly patients that may have quite a long life expectancy despite being already octogenarians. And we need to make sure that we offer them all of the same technology that we offer anybody else. We then allow them to make the decision if they want to have it or not, and I certainly am not going to argue with an 80-year-old if she doesn't want to have it, but I do need to offer it to her. She was then followed by her medical oncologist, who placed her on one of the aromatase inhibitors and felt something in the axilla a couple months later and got a PET scan. And the PET scan showed a very large positive lymph node. So I counseled this patient regarding doing a full node dissection for control of disease, and sure enough, she did have three very large positive lymph nodes with extracapsular extension out of 15 lymph nodes. So, Karen, you don't make a difference, no matter what age your patient is?

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KAREN KAY DARRICAU, MD, FACS: I think if you do decide not to do a full axillary dissection, then you do need to follow the patient closely with PET scans, ultrasounds, and if they do show that they have some significant progression of their disease, then I think you really have to do get local disease control.

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ANNE MARIE WALLACE, MD, FACS: Right, right. And this is showing the axillary node dissection because as soon as we opened, we were faced with this big plump lymph node, we kind of worked to get it out of the way a little bit so that we wouldn't tear it, but basically this is a standard level-one and level-two lymph node dissection, where we're dissecting laterally and behind the pectoralis minor muscle. We use the electrocautery basically just to go through the dermis and then through the clavipectoral fascia. And then use the Harmonic shears to dissect through the tissue. I'm -- in this surgery, there's a resident with me who hasn't done very many node dissections. Axillary lymph node dissections are a little bit becoming a lost art similar to open abdominal surgery is becoming a lost art to a lot of the laparoscopic techniques. So I'm having to kind of direct this a little bit because I'm with a resident. But normally when you're doing this, if you're just working with a scrub nurse or an assistant, that person can be holding the retractors for you or you can put a self-retracting retractor and you can do most of this yourself. I actually sometimes enjoy when the residents are busy and can't scrub with me and I can just let the nurse hold the retractor and use the Harmonic device to divide through things. And you can see here, the Harmonic is being used really nicely on these blood vessels and nothing is bleeding. So we dissect classically down to the axillary vein and just above the vein and up to the pectoralis vessels, usually sparing those. And then along the chest wall, viewing and sparing the long thoracic nerve and then over to the latissimus muscle. And we obviously save the thoracodorsal nerve. And I like to save, obviously, the thoracodorsal artery and vein as well, especially if you have any plans of reconstructing that patient's with a latissimus flap or something.

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KAREN KAY DARRICAU, MD, FACS: Do you try to preserve the intercostal nerve?

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ANNE MARIE WALLACE, MD, FACS: You know, I -- before sentinel node, I always tried to preserve the intercostal nerve because so many of those patients were node-negative and didn't need, really, the more aggressive lymph-node dissections. The lymph node dissections that we're doing now like you can see in this picture

here, there's nas-- nasty disease there, and I'm a little uncomfortable trying to like divide the lymph node to get to the nerve. And so if there's a big fat juicy lymph node right on my nerve or right near my nerve, then I won't do it. If it's -- if I can tease it out, then I will. How about you?

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KAREN KAY DARRICAU, MD, FACS: I agree. If I have to manipulate the nerve so much that I'm really fearful that they're going to get inflammation of the nerve, I will go ahead and sacrifice it. I really think patients would rather be numb, and it's just a small little area underneath the lower -- or the upper portion of the arm, compared to having pain down that arm for a while.

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ANNE MARIE WALLACE, MD, FACS: Right, right. And the other thing, too, is I traditionally would clip my nerve because my husband is a pain specialist and he's taught me all these things about neuropathy, and I'm a believer that when you do divide sensory nerves, that if you cut off their blood supply and clip them that maybe they won't travel to the skin and cause a neuroma. There's no data on that, but that's just kind of my belief. And so now I've used the shears to actually kind of ligate the nerve and it just seals the nerve off so the blood supply to it is cut off and it's not going to grow back towards the skin and cause a neuroma. I haven't had any problems so far. We do have a couple new questions from the audience. The first one is: have I seen a reduction in OR time since using the FOCUS? And I think definitely. You know, certainly in the axillary node dissections, because there isn't that constant asking for clips. I think -- the clip applicators that I was using contained, like 10-15 clips, and I was very aggressive about clipping because I don't like seromas, I don't like fluid collections. And so we would go through, you know, many clip applicators and in our OR, we keep like one in the OR and then the nurse would have to go running for the second one, and so we were always waiting and we were waiting for it to be passed to us, we were waiting for the scissors to divide in between. So -- and in a training institution, where you're always a little bit slower anyway because you're training residents, I found it to be much faster. Do I have good data on that yet? I don't. That's going to actually take a study to look at it, but I certainly feel like I'm a lot faster.

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KAREN KAY DARRICAU, MD, FACS: Oh, faster and much more simpler. I'm not putting instruments down, picking up the scissors, picking up the clips. I can do it all with the FOCUS. I can dissect with it, I can control hemostasis, I can seal off the lymphatics. No more switching instruments. The first time I used this on an axillary node dissection, I actually said to the rep, "wow, this is really going to be great for the community surgeons who don't have a resident with them." Karen's fortunate she has an assistant, a surgical assistant, in the OR with her, but I know that for lymph node dissections, not everybody has that in the community, they just have the scrub nurse, and if the scrub nurse can just maybe hold a retractor, you don't need anything from her once you've got your pickups and your Harmonic in your hand. You don't need anything else for like the next 15 or 20 minutes and, boom, the lymph node dissection is done. So what -- who helps you in the operating room?

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KAREN KAY DARRICAU, MD, FACS: It's a surgical tech, but they are, you're right, in the community, they're getting harder and harder to be available.

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ANNE MARIE WALLACE, MD, FACS: Right, right. So he may be out of a job.

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KAREN KAY DARRICAU, MD, FACS: That's right.

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ANNE MARIE WALLACE, MD, FACS: Next question that we have from the audience is: have I gotten to the point of not leaving a drain when doing an axillary node dissection using the focus? I haven't yet, and some of it is because -- if you remember, one of the reasons that you place a drain is not just because of open lymphatics but you place a drain because of a cavity. And there is quite a cavity, you know, after you've performed this surgery, and that needs to seal down. And so I still do place a drain, and I probably -- I can't see myself not placing a drain. I've never placed a drain for sentinel node biopsies, and that's, I think, why my old seroma rate was a lot higher, because that purely is a lymphatically leak problem. I've had no problem with the seromas. But Karen has some experience in having her drains stay in less time.

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KAREN KAY DARRICAU, MD, FACS: Oh, much less time. I usually use about 25-30 cc's of 24-hour output before I remove the drain, and before the FOCUS, I was usually removing the drains around day five to seven. Now I purposely bring my patients back around two to three days post-op and can remove it. And the incidence of having post-op seromas after removing that has been really low.

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ANNE MARIE WALLACE, MD, FACS: And that's great, because we all know that the thing the patients hate the most after breast surgery is that drain and they can't wait to get it out, so I have to actually track my numbers. I can't say whether or not my drains have stayed in a little less. Really, probably the one for me to ask is my nurse, because she's the one who follows those. But she definitely has noticed that there's way less seromas and way less, you know, axillary complications. And not that we had tons of complications, but you know, these patients are going through enough as it is, and if they have one issue that they have to come back in your office for, it's too much. So you know, this video, we're seeing, we're completing it here. The drain is in and you know, there it is. It's really pretty straightforward, pretty simple. It's, you know, just basically, you know, combining the technology of a clamp-type instrument with the ultrasonic ligation so that you can perform the full node dissection easily. The next slide that we have up here is actually showing the Harmonic blade, which utilizes the ultrasound technology in a blade-like fashion so that you can do dissection. This would be applicable for like the mastectomy flap or even in a plastic surgery application, you know, raising muscle or raising a TRAM flap or something like that. And as a plastic surgeon, I have struggled many years with kind of the -- I want to make appropriate skin flaps where all the breast tissue is removed, and we have these thin, fit women out here in southern California that don't have a lot of subcutaneous fat that, in order to do a proper mastectomy, you're going right up underneath the dermis sometimes, and the electrocautery, especially when you're training a junior resident to do it, can be a dangerous instrument to those skin flaps. And so I've been searching for devices that would leave my mastectomy flaps healthier, because the healthier they are, then the healthier my reconstruction's going to be. And you've been using the blade for quite a while.

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KAREN KAY DARRICAU, MD, FACS: I have been, and I've been very impressed with it. Initially, my problem was hemostasis, especially with the big, big large fatty breasts. With smaller breasts that are moderate size, I -- there's no problems with hemostasis. With the larger breasts, I've actually gone to a solution of 50 cc's 1% lidocaine with epinephrine mixed with 250 cc's of normal saline. And I believe it's a plastic surgery technique where you just inject it right underneath the subdermal area, right where you would dissect off between the skin and the fatty tissue. And I've found, using that technique, that the hemostasis is a much less problem.

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ANNE MARIE WALLACE, MD, FACS: And I'm actually going to try that, because that's probably the one -- the learning curve with the blade is more than with the shears. The shears are obvious, they're a clamp-like device, you cut, cut, cut. The blade, you do have to push a little harder, and so finding that plane and teaching that plane is a little bit harder. And because it's a different -- it's not electrocautery, it's not heat, that sticky coagulum on some of the larger blood vessels can, you know, make it bleed a little bit more. So I think utilizing that technique that Karen has just described with injecting it just like you would in a face lift or something else where you're injecting, you know, saline with epinephrine is a fabulous idea. That's the same thing we would do with liposuction or something else. The -- the feel of the skin flaps, though, after using the Harmonic is so much different. The flaps are moist. They're not dessicating, which they can look like. And you know, really when you think about it, if you are working with a plastic surgeon, a lot of general surgeons will err on leaving a lot of tissue on that skin flap because they don't want the plastic surgeon to have to deal with, you know, skin necrosis and things like that. And so we don't want to do that. We want to do proper mastectomies where, you know, everything is taken up to Cooper's ligaments, and so we're not leaving a great deal of tissue behind. Do you have anything else to add on to that?

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KAREN KAY DARRICAU, MD, FACS: I also found using the blade, taking the breast tissue off the pectoralis muscle, and as a plastic surgeon, I wanted to ask you. Have you noticed a difference in the healthiness of the muscle, taking the breast tissue off using a Harmonic versus electrocautery?

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ANNE MARIE WALLACE, MD, FACS: Yes, certainly if the patient doesn't have very good fascia, I typically leave the pectoralis fascia on our lower-level tumors. On our more severe tumors, we obviously take the pec fascia. But we need that pectoralis fascia when we deal with implants, and we do a lot of implant reconstruction because our women are thinner here and are not as good candidates for the flap reconstruction. And if you coagulate through that fascia, as soon as you get into that muscle, that muscle will not hold suture and it won't hold the implant well. And implant complications in reconstruction are high, and you have to -- they have to take multiple steps in order to keep those complications down. And one of the things that I do is a total submuscular pocket where I raise the pectoralis muscle, I raise the rectus fascia, and I raise the serratus muscle so that expander sits 100% underneath the muscle. And if that muscle is burned and charred and tearing, then I have a hole right over my expander that the skin is sitting right on, and then your infection rate goes up because that skin has already been traumatized by the flap. So every little thing helps, and I think that that's the bottom line. You know, we're skilled enough, we know what we're doing, we can do the basics, but we're trying to get the patient through this with no complications and a great outcome in the end, because she's already going to have a lot to go through with having to get into chemotherapy and radiation and whatnot. So you know, like I say, every little bit helps with these devices if it reduces the complications. So summing that up with the Harmonic blade, the advantages of ultrasonic energy over electro-surgery are that there is minimal lateral thermal tissue damage with less sticking and less smoke formation. The smoke is also something to consider, because if you're in a cavity using this, somebody has to suction out the smoke so that you can see well. It also always bothers the OR nurses when there's too much smoke, and so there's a lot less smoke with this. There's really no neuromuscular stimulation, so I think Karen was mentioning that just injuring the intercostal brachial nerve can cause pain, and so if you -- if you don't have injury to any of these nerves and you're much better off, you can get injury to the long thoracic with just electrostimulation even if you

don't cut it. And there's really no electrical energy to or through the patient, so there's benefit there. So with all that being said, I think there are a couple other questions that have been proposed that I'm just making sure that we've answered them all here. I think we talked about lymphoedema after sentinel node, 2-5%. Use of methylene blue, hopefully Lymphazurin blue will be back on the market in the next six months to a year, and that is a little bit easier to use. And so I think we have covered most of what we have here. And I would just like to really thank Dr. Darricau for being here today. And my final comments are that again, using these devices, both the neo probe Bluetooth making it easier to find the sentinel node and then easier to dissect out the sentinel node with less complications is what we want for our patients. We want faster, easier time with better complications -- or less complications. That is what we all want. So I'd like to thank the UCSD Moores Cancer Center for letting us be here today, and I'd like to thank Dr. Darricau for assisting me.

00:45:38

KAREN KAY DARRICAU, MD, FACS: Thank you, Anne.

00:45:40

ANNE MARIE WALLACE, MD, FACS: Thank you.

00:45:44

ANNOUNCER: This has been an expert discussion of axillary and sentinel lymph node dissections during a sentinel node biopsy using Harmonic technology and the new2000 Gamma Detection system from the Moores Cancer Center, University of California San Diego in La Jolla, California. OR-Live makes it easy for you to learn more. Just click on the "request information" button on your webcast screen and open the door to informed medical care. The program is sponsored by Ethicon Endo-Surgery Inc.

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