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Edited Episode Transcript:

"Today I want to discuss fundamental breast imaging concepts for the Core Examination.

Management of Atypical Breast Lesions for Core Exam:

Let's dive into the material by talking about high-risk lesions that may require surgical excision. In terms of high-risk lesions in the breast, I'm talking about atypical ductal hyperplasia, atypical lobular hyperplasia, lobular carcinoma in situ, radial scar, complex sclerosing lesions, papillomas, and so forth. There are a few quick tricks to help you sort through what appropriate management for these are for the Core Exam.

First, if the name has atypia in it, your recommendation following biopsy is to excise it. In real life there is variation between institutions on how atypical lesions are managed, but for the purpose of the Core Examination, keep it simple and if they ask you what to do with pathology that has the term atypia in it, your answer is excision. If you get a question that says biopsy was performed and the results showed atypical ductal hyperplasia, atypical lobular hyperplasia or flat epithelial atypia, all of these contain the word "atypia" or "atypical", and it is an easy answer for you to select excision.
The rationale is that at time of surgical excision, the surgeon can excise more tissue than we get on a core needle biopsy and you can be more confident on whether there is malignancy present rather than pure atypia.

So for example, what would you do if a biopsy is performed and you get usual ductal hyperplasia? Follow the rule I just gave you. If they tell you it's usual ductal hyperplasia and not atypical ductal hyperplasia you do not excise it. This is benign BIRADS 2.

What about lobular carcinoma in situ? That one is pretty easy. It has the word carcinoma (in situ). It sounds bad. You want to excise that (for the Core Exam, real life may vary).

If they give you something that is a radial scar or complex sclerosing lesion, the difference between these is probably not likely to be tested on the Core Examination. A complex sclerosing lesion is considered a larger entity than a radial scar. If you get either of these, you want to excise (on board exams, real life may vary). There is risk of coexisting cancer. You want to ensure that there is no additional cancer. For example, something like a tubular carcinoma.

Also remember with a papilloma there is some increased risk of malignancy. What to do in real life can be very controversial, but for the Core Examination it is straightforward: you excise papillomas as well. So, excise anything with atypia in the name, excise lobular carcinoma in situ, excise radial scars, complex sclerosing lesions and excise papillomas on the Core Examination.

Genetic Conditions that Increase Breast Cancer Risk:

Make sure that you know the common genetic syndromes and what associations there are with these genetic syndromes. This is pertinent not only to breast imaging, but essentially all areas of radiology. Hence, one reason why I think these can be so highly tested is because each organ system can ask you about some of these. You will encounter a lot of them in terms of breast imaging.

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Remember that patients with genetic syndromes that confer a 20% or greater lifetime risk of developing breast cancer are patients that should be considered for high-risk supplemental screening with annual MRI. The number to remember is 20% or greater lifetime risk. These genetic conditions that confer that degree of risk include the BRCA1 or BRCA2 mutations and any of their untested first-degree relatives. They should be considered for MRI. Their risk of breast cancer development during their life is definitely greater than 20%.

Remember Li Fraumeni syndrome is associated with the P53 mutation and has an increased risk of breast cancer.

Remember that Cowden syndrome has an increased risk of breast cancer. Also associated with benign hamartomas, thyroid malignancy, CNS malignancies with Lhermitte-Duclos.

Additionally, Banaya-Riley syndrome has GI polyps and increased breast cancer risk. That is an autosomal dominant condition.

Also Peutz-Jeghers syndrome, which has GI polyps, freckling on lips, mouth and hands, and an increased risk of breast cancer.

Make sure that you spend the time whenever you encounter one of these genetic conditions in your board study to learn the most common associations.

Other Considerations for High-Risk Breast Cancer Screening:

Remember that chest irradiation between ages 10 and 30 confers a high lifetime risk of breast cancer and makes one eligible for annual MRI screening.
Remember that MRI is the most sensitive modality to screen for breast cancer, not tomosynthesis or mammography. However, MRI also has relatively low specificity and a high false positive rate. Both of those concepts can be tested.

Mammographic Views: Fundamental Concepts:

Remember that magnification views are typically performed in the craniocaudal and lateral views with a full lateral view. Another term for full lateral is ML or LM depending on whether the detector is positioned lateral or medial (respectively). The purpose of magnification views is to work up calcifications that were seen on a screening mammogram.

On a screening mammogram you should be cautious to characterize the calcifications (I.e. assign morphology, distribution, etc.) because you maynot see all of the calcifications and you do not see their morphologic features entirely until you get the magnification views.

Remember that one purpose of the lateral views is to evaluate for milk of calcium. You should know what milk of calcium looks like. If you don't, please look up images. In general you are looking for calcifications that change configuration between craniocaudal and lateral views. Typically on the craniocaudal view they will look round in smudgy and then you go to the lateral view and you will see layering or tea-cupping. Again, if you do not know what this looks like, you need to look it up.
Also know some of the physics behind how magnification views are performed.

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You should know that spot compression views are used to evaluate asymmetries and masses, to sort out whether there is superimposition of tissue or a true finding and allow you to better see the margins of a mass.

Fundamental BIRADS Concepts:

Let's now discuss BIRADS because there are many opportunities to test on concepts of BIRADS. First, let's cover the BIRADS scores. BIRADS scores range from zero to six. You need to know what each level is. Let's run through this quickly.

BIRADS 0 is reserved for anything that is suspicious on a screening mammogram. In real life, there's a little bit more complexity. Sometimes you can give a BIRAD 0 off a diagnostic examination if you need prior imaging for comparison, but for the Core Exam reserve BIRAD 0 for a screening exam.

Do not fall into the trap of calling something that is clearly a cancer, a BIRADS 4 or a BIRADS 5 if they tell you it's a screening exam. That is a common trap. If it looks suspicious on a screening exam, you still need additional evaluation. It is a BIRADS 0.

BIRADS 1 means it is negative. BIRADS 1 can be given on a screening mammogram. It can also be given on a diagnostic mammogram, the same as for BIRADS 2.

BIRADS 2 means that it is a benign finding.For example a benign simple cyst, other things that are commonly considered BIRADS 2 such as post-surgical changes from breast conservation therapy or breast reduction. I suppose you could give a breast implant a BIRADS 2. There's some variability there in practice, just remember that BIRADS 2 means benign and you will have annual routine follow up. BIRADS 3 should really only be used in certain situations which I will discuss. You need to know that the risk of developing cancer for a BIRADS 3 lesion is less than two percent. As a general rule, do not call a new finding BIRADS 3 on the Core Exam (Note: Exceptions can be something like a suspected hematoma following trauma for which short-interval BIRADS 3 follow-up could be assigned for confirmation of a hematoma by seeing resolution on follow-up). In General, BIRADS 3 regions will be most common on a baseline mammogram, so if you have a prior mammogram and they're showing you that something is new, be cautious in giving it a BIRADS 3.

BIRADS 4 means that the finding is suspicious. The risk of cancer for a BIRADS. 4 lesion ranges from 2% to 95%. That is a very wide range. Sometimes, in practice you may break this down to BIRADS4A, 4B and 4C to denote low, medium and high suspicion for malignancy respectively. On the Core Examination I wouldn't worry about the sub-classification of 4A, 4B, or 4C. Do know that BIRADS 4 means the finding is suspicous for malignancy. The risk of breast cancer for a BIRADS 4 version is 2% to 95%.

You should also know that if you give something in BIRADS 4 and you perform a biopsy that comes back benign, and that fits with the imaging findings (I.e. a benign explanation can account for the imaging appearance), you can accept this as benign and concordant. htat is different from a BIRADS 5 lesion where if you give something in BIRADS 5 you are essentially saying this is so suspicious that even if you get benign pathology on biopsy, you will not accept this and this will go on to surgical excision. The risk of cancer for something that is a BIRADS 5 lesion is greater than 95%. If there is, for example, a spiculated mass on a mammogram, and you appropriately give it a BIRADS 5, and you perform a biopsy

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and it comes back as something benign, the answer on the Core Exam is always to next excise the lesion with surgery.

Do not call anything on a screening mammogram a BIRADS 4 or BIRADS 5. If something is suspicious on a screening mammogram, it should always be a BIRAD 0 if you see something suspicious on a screening mammogram. On the Core Exam I would avoid going straight to ultrasound for a mass that you clearly see on a screening mammogram, although you may sometimes do that in actual practice. This is an increasing trend in breast imaging since the advent of tomosynthesis, but the pure answer is that if you see a mass even very well on a screening mammogram, you still need to get spot compression views to better see the margins of the mass, and then you go to ultrasound after that.

BIRAD 6 is a known, pathologically proven cancer that is still present. If there is a cancer history in a patient, but they've already had definitive therapy, meaning surgery and possibly radiation or chemotherapy but the lesion is treated and no longer in the breast it is no longer a BIRAD 6 but BIRADS 2 because you will see benign post-surgical change. BIRADS 6 is most commonly used for a recent diagnosis of breast cancer that is still having some work up, so you might be doing imaging like MRI to make sure that there's no other region in the breast. Someone who is refusing or declining for whatever reason to have definitive therapy would also be a BIRADS 6. A tricky question that may or may not show up on the Core Exam is that if you see a known cancer that is not of breast origin but is in the breast, and that most commonly would be lymphoma or melanoma, and there is no finding on imaging to suggest that a primary breast cancer is present, this not a BIRAD 6 but it is a BIRADS 1. Remember the B in BIRADS stands for breast. BIRADS is specifically for breast cancer, so if there is a cancer in the breast that is not breast cancer, it does not fall under BIRADS and would not be a BIRADS 6. If the imaging shows no evidence of a breast cancer, is a BIRADS 1.

Another common reason to give a BIRADS 6 lesion beyond having a known cancer in the breast is for a patient who is on neoadjuvant therapy when you are evaluating response to therapy. In this setting, the cancer is still present in the breast, and you're evaluating whether the tumor is responding to therapy. Because the cancer is still present, if there is no additional finding besides the known cancer, this remains a BIRAD 6. However, if there is a new mass or other suspicious finding that develops in the interim the overall BIRADS assessment would become a BIRADS 4 or potentially a BIRADS 5 and not a BIRADS 6 because there is now a new actionable finding in the breast. When considering whether a case should be a BIRADS 4 due to a new lesion in the breast in a patient who already has a breast cancer present, or a BIRAD 6 because a known cancer is present, remember the most immediate actionable finding wins. If there is a new actionable finding the case would be a BIRADS 4 or BIRADS 5 and that would trump a BIRAD 6 assessment for your overall BIRADS assessment.

Asymmetries:

Let's now talk about asymmetries. How many different types of asymmetries are there?
There are four types of asymmetries you should know about. These are:

1. Asymmetry
2. Focal asymmetry
3. Global asymmetry
4. Developing asymmetry

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An asymmetry is seen only on one view. If you see an asymmetry on 2 views it becomes a focal asymmetry, key point.

If you see an asymmetry on one view and then they link it to a second question, they may ask you what the next step is for management. The appropriate thing is to go on and perform spot compression views to see if the asymmetry persists. If it does, then it may be a real finding. You also would look for it on orthogonal views. For example, if the asymmetry is on the CC view, you would also want to then evaluate for a correlate on the full lateral view. After you've done your spot compression views and confirm that this is a real finding, you would then go on to ultrasound to see if there's an ultrasound correlate. If you see something on ultrasound and it looks suspicious, you need to biopsy it. If you see the asymmetry on mammography but not on ultrasound, you still need to biopsy it. Remember that using stereotactic biopsy or tomosynthesis biopsy you can biopsy an asymmetry even if it is only seen on one view. You do not need to see an asymmetry on 2 views to be able to biopsy it. However, when we're talking about wire or radioactive seed or radiofrequency localization of a lesion, in that setting, you do typically need to see it on 2 views (possible exception if using tomosynthesis guidance for localization but this still not commonplace in breast imaging at the present time).

If you see a suspicious finding on both mammogram and ultrasound, always default to perform the biopsy with ultrasound. In general, however, you do not try to biopsy calcifications under ultrasound. If the finding of concern is calcifications, always proceed to biopsy with mammogram guidance. What is a global asymmetry? It is an asymmetry that is present in greater than one quadrant of the breast. These are more likely to be benign, but not always. For now, remember that a global asymmetry involves more than one quadrant of the breast.

What is a developing asymmetry? The word developing means that you have a prior mammogram showing that it wasn't present, so you will never see a developing asymmetry on a baseline mammogram. A developing asymmetry is a BIRADS 4 lesion, as the risk of cancer is over 2% and you typically will be performing a biopsy for developing asymmetry.

There is an exception to this rule. If the developing asymmetry is seen in a setting where there may be a benign explanation, such as trauma to the breast, for example, a person in a car accident and the seat belt caused bruising of the breast, and you see a developing asymmetry. Look for clues in the question stem to let you know that the trauma happened. They will probably tell you there is bruising and significant force injury to the breast. In that setting, a developing asymmetry can be considered a BIRADS 3 lesion. To manage, you would answer to obtain short interval follow up. Generally, the time frame for follow-up will be something between 4 to 8 weeks and at follow-up you would be looking to see that the finding has either decreased in size or gone away. If the finding is smaller or gone, it was not cancer.

BIRADS and Procedures for Symptomatic Relief Only

Let's talk about a few reasons why you may biopsy or aspirate something that is not a BIRADS 4 or 5 lesion.

If you give something a BIRADS 3, for example, a probable fibroadenoma, but the patient requests a biopsy, the BIRADS Atlas tells you that you should still make it a BIRADS 3 lesion but state in the report that the patient requests biopsy. It would be appropriate to biopsy in that setting.

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If you have a cyst on imaging and the patient reports that this is painful or irritating you can aspirate this finding, but it should still be considered a BIRADS 2 lesion.

However, if you are performing an aspiration or biopsy to exclude cancer this should not be BIRADS 2, but BIRADS 4.

If you see a cyst on imaging and you are given information that this is painful or bothersome to the patient and the patient requests aspiration, you can perform an aspiration but this should still be considered a BIRADS 2 lesion.

If you are performing a biopsy for a lesion because you are worried there may be cancer—perhaps a complex cyst that may have a soft tissue component—that is no longer BIRADS 2, but it would be BIRADS 4. Procedures performed for symptomatic relief with no concern for cancer are BIRADS 2. A procedure performed given concern for cancer would be BIRADS 4 or 5 depending on the imaging appearance.