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Edited podcast transcription: Note this all applies to the BI-RADS 5th edition which is soon due for an update. Please refer to the most recent BI-RADS atlas for Core Exam preparation.

Let's talk briefly about calcifications.

Let us start with amorphous calcifications. I already gave you some information on amorphous calcifications (in a prior episode). These may be fine if they are scattered in both breasts, these are not concerning if they are layering on the lateral view, but if these are segmental, new, and grouped, that is concerning, and you should biopsy them and consider these BI-RADS 4.

Course heterogeneous calcifications are also considered BI-RADS 4 and need to be biopsied.

Fine pleomorphic, fine linear, and fine linear branching calcifications are always concerning and need biopsy in general. If the Core Exam gives you information that calcifications are any of these terms—fine pleomorphic, fine linear, or fine linear branching—I would make them a BI-RADS 4 and I would also assume (for the Core Exam) that these will end up being cancer. Most likely DCIS or potentially something invasive. You need to biopsy those.

In terms of all calcifications, you really need to know what each type of morphology looks like.

The BI-RADS Atlas contains notable examples of how each of the types of breast calcifications look. Remember on the core exam that they do not have mammography diagnostic quality monitors, and so if they show you calcifications, they will have to be obvious on the image (Note—this applied to prior testing in the test center, though you likely will still take the exam on a monitor that is below the quality of that used on a mammography service). This means they are unlikely to show you very subtle calcifications because the monitors may not be good enough to show you these.

Some calcifications are typically benign. Others are suspicious. You need to know which is which.

Typically benign calcifications include skin calcifications, vascular calcifications, and coarse or popcorn-like calcifications. If you see or are given the term popcorn-like for calcifications the first thing that should come to mind is a degenerated fibroadenoma.

You also need to know large rod-like calcifications are typically benign. That is a buzzword for secretory calcifications (also termed plasma cell mastitis). Remember that secretory calcifications typically develop 15 to 20 years after menopause. If you see large rod-like calcifications in a 30- or 40-year-old, you need to be concerned that these are not secretory calcifications but are ductal carcinoma in situ. Remember that secretory calcifications are also typically bilateral and diffuse.

Other typically benign calcifications are round calcifications.

Rim calcifications are a manifestation of a calcified oil cyst. A calcified oil cyst is a way of saying that this is fat necrosis. In this setting on board exams, you typically would have some sort of history of prior breast surgery or trauma. The sequelae of that trauma is fat necrosis and an imaging manifestation that confirms fat necrosis is rim calcification with a lucent fat containing center.

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Dystrophic calcifications are typically benign.

Milk of calcium are also typically benign. This is an important concept for the Core Exam. Remember these are benign, BI-RADS 2. Look for the amorphous appearance on CC and layering or tea-cupping on MLO or ML images for confirmation. The change in configuration between orthogonal views helps confirm this diagnosis.

Sutural calcifications. Those are more an entity of the past as surgeons aren't using sutures very much anymore in their surgery. Look at an image to see how these appear.

Calcifications that are suspicious based on morphology are amorphous, coarse heterogeneous, fine polymorphic, and fine linear or fine linear branching.

Please don't get confused that amorphous calcifications are seen on CC with milk of calcium and assume that all amorphous calcifications are benign. Amorphous calcifications on orthogonal views cannot be assumed to be milk of calcium. Suspicious amorphous calcifications do not change between CC, MLO or full lateral views.

Coarse heterogeneous calcifications are different from coarse or popcorn-like calcifications. If you see the term coarse heterogeneous on the Core Exam assume these are concerning and a BI-RADS 4 lesion. You need to biopsy these.

If they ask you a question on which morphology of calcifications are most likely to be cancer, the answer is fine linear or fine linear branching. That makes sense because fine linear or fine linear branching is basically our description of calcifications within the ductal system of the breast. Imagine that the branching ducts in the breast are calcified internally. You would expect to see a fine linear branching pattern that is highly suspicious for cancer.

Distribution also comes into play with calcifications.

Diffuse distribution means that these are scattered throughout the breast. Typically, diffusely distributed calcifications would be bilateral and will commonly be benign. You may also see diffuse round calcifications. On the Core Exam assume these are benign.

Regional calcifications encompass a smaller area than diffuse calcifications. Regional calcifications occupy about 2 centimeters of the breast. On the Core Exam these are also typically benign.

Our suspicion for malignancy starts to increase with grouped calcifications. BI-RADS specifically uses the term "grouped". Sometimes in practice you may hear "clustered". Some breast imagers use the term "grouped" to denote that the calcifications are more likely benign and "clustered" to denote that there is higher suspicion. The Core Exam will only use "grouped". I would remember that the pure term from BI-RADS is grouped.

A linear distribution of calcifications is more concerning.

I think of segmental calcifications as a triangular distribution with the pointy tip pointing towards the nipple. A segmental distribution is another way calcifications manifest as an in ductal distribution because the ductal system is most narrow at the nipple and then branches out towards the chest wall.

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A few other quick concepts in terms of calcifications:

Skin calcifications tend to be rounded and they often will have a lucent center.

Sutural calcifications tend to be oval-shaped or roundish, like a tiny suture. As they calcify you may see the linear portion peripherally (the tails of the knot) and the calcified knot centrally.

Know that for milk of calcium, a way to bring out the layering is to perform a magnification lateral view with an extended hold. What that means is you place the breast in compression and leave it in compression for longer than you would on a normal mammogram. That gives the calcification time to layer down into the cystic areas and form that classic layering or tea cupping of milk of calcium when you image.

Know that milk of calcium is related to fibrocystic changes and is literally calcifications layering dependently within cyst fluid.

An interesting thing with secretory calcifications is that the classic descriptors comprise many terms that are typically suspicious. For example, linear branching segmental calcifications. The reason is that secretory calcifications are calcifications that form in the ductal system of the breast so you will see linear branching patterns and a segmental distribution. However, the difference from suspicious calcifications is the appearance. Benign secretory calcifications are coarse or rod like. Sometimes the term may be cigar-like calcifications. They are typically bilateral, and they form about 15 to 20 years after menopause.

Now let's transition to masses.

Remember that margins are key for management of masses. If the margin is obscured on mammography, make sure to get an ultrasound to see them better.

Highly suspicious margins include spiculated, indistinct, and microlobulated margins.

If the margin is well circumscribed, that is typically a benign or a probably benign feature. Common circumscribed masses include fibroadenomas and cysts. However, I would be aware that triple negative cancers also present as very circumscribed masses.

On ultrasound benign characteristics of a mass are circumscribed margins, wider than tall orientation, and anechoic echogenicity with posterior acoustic enhancement. Concerning findings on ultrasound include an antiparallel orientation, where the mass may be taller than it is wide, an irregular shape, indistinct margins, and posterior shadowing, angular margins, an echogenic halo, which suggests that there may be irritation and edema around the lesion, and any spiculation on ultrasound.

Let us talk about the rule of multiplicity, sometimes called Sickel's rule. What this rule tells us is that on a baseline mammogram you can give a BI-RADS 2 assessment in the following situation: if there are at least three benign appearing masses, two of which in one breast and one in the other. Let me say that again: at least three benign appearing masses and you must see at least two of these in one breast and one in the other. If any of these are palpable, you should still perform ultrasound to confirm that they are cysts. If any of these masses are an outlier in terms of being significantly more dense, larger, or if any of the margins look suspicious, you should work it up and make it a BI-RADS 0 on a screening

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mammogram. But if they all generally look similar, benign, bilateral, circumscribed, and low density, these may be assigned BI-RADS 2.

You should know that benign cysts tend to wax and wane over time. If you see bilateral circumscribed, waxing and waning masses, that's also a safe bet for BI-RADS 2 on the Core Exam.

On the Core Exam, if any lesion has concerning margins or any other concerning findings, you should work it up.

Remember on the core exam, the imaging manifestations will typically be obvious. If they are trying to show you a suspicious mass on a background of other benign masses, the suspicious mass will be obvious.

Standardized tests such as the Core Exam frequently ask questions about multifocal versus multicentric cancers. Expect some questions on this because it is just too easy to ask.

Multicentric lesions are lesions in different quadrants of the breast.

Multifocal lesions are lesions in the same quadrant of the breast.

To me the word focal means that the masses should be closer in proximity. They are more focal to each other. They are in the same quadrant of the breast.

Remember multicentric means masses in different quadrants and multifocal means masses in the same quadrant.

The general though oversimplistic concept is that multicentric lesions typically require a mastectomy.

That's what the Core Exam would want you to say. In real life, it is more complicated. For example, you can have two lesions that are just on the edges of adjacent quadrants and the distance between them could be very small, but they are still (barely) in different quadrants. Technically that's multicentric even though the actual distance or extent of disease may be as small as multifocal masses would be.

Fortunately, on the Core Exam they should make the difference between multifocal and multicentric masses obvious. They are more likely to show a mass in the upper outer quadrant and another mass far away in the upper inner or lower inner quadrant to test the concept of multicentricity, for example.

What's the difference between a lumpectomy and breast conservation therapy?

As a resident, I thought these were the same, but they are not. Lumpectomy simply refers to the surgery wherein a surgeon has removed the lump and spared the rest of the normal tissue in the breast. Breast conservation therapy includes lumpectomy, but also means you may have had chemotherapy, hormonal therapy and/or radiation. Therefore, the term "breast conservation" includes the combination of therapies that may have been utilized to treat the cancer, including, but not limited to, lumpectomy.