C. FREQUENTLY ASKED QUESTIONS

1. ***Which type of breast imaging examination should I recommend for my patients?***

   When in doubt, refer to the ACR Appropriateness Criteria® (http://www.acr.org/Quality-Safety/Appropriateness-Criteria/Diagnostic/Breast-Imaging). The ACR Appropriateness Criteria® provides recommendations for both screening and diagnostic breast imaging procedures.

2. ***A woman in her 20s consulted a gynecologist, who discovered a palpable breast mass; the woman thinks that the mass has been palpable for a long time, but the gynecologist insists on imaging, which shows probable fibroadenoma. What should the assessment be? Is biopsy always necessary?***

   This scenario often presents a dilemma for the breast imager. Using feature analysis, a mass that is oval, circumscribed, solid, and oriented parallel to the skin is very likely to be benign and most commonly a fibroadenoma. Especially for a woman in her 20s, palpability of the mass will not appreciably affect the very low likelihood of malignancy. The correct assessment in this scenario would be probably benign (category 3), recommend surveillance imaging, unless the woman prefers biopsy or even excision if the mass is cyclically painful. However, even if the woman declines surveillance imaging and a biopsy is done for this category 3 lesion, the probably benign assessment should ***not*** change.

3. ***A woman undergoes breast US examination to evaluate spontaneous bloody nipple discharge, and I see a mass within a duct. How do I describe this using the BI-RADS® lexicon?***

   In such a case, the location of the mass is intraductal, in addition to a specified clock-face position and distance from the nipple. Most intraductal masses are papillomas, and a vascular stalk may be evident on color or power Doppler while scanning along the length of the duct from the nipple to the periphery. Stating the length of the duct segment that contains the mass or debris, size and intraductal location of such masses, presence of vascularity, clock-face position, and distance from the nipple is the most important information to convey, together with whether or not these masses are felt to explain the patient's symptoms (if any). Most of these masses require biopsy. The risk of malignancy in one series of intraductal masses (involving 79 associated with nipple discharge) was 8%, but the subset of cases with bloody nipple discharge was not stated.[24] Other considerations include clot or detritus, ductal carcinoma in situ (DCIS) with or without an invasive component, and intracystic papillary carcinoma (encapsulated papillary carcinoma). Some irregular masses will show intraductal extension, with the latter often representing a DCIS component to an otherwise mostly invasive malignancy; in such cases, this is an associated feature of the main mass which itself should be more fully described by its shape, margins, orientation, posterior features, and echo pattern.

   If no abnormality is identified in scanning over the length of the duct segment as it approaches the nipple, consider attempting a ductogram (galactogram), which may show peripheral abnormalities more effectively than US.

4. ***A 52-year-old woman with a family history of unilateral breast cancer (mother diagnosed at the age of 67) presents with a large, painful breast mass. Her mammograms show no abnormalities other than a 4 cm circumscribed mass, characterized at US as a simple cyst. For relief of her symptoms, she requests aspiration. What assessment and management recommendations should be provided in the breast imaging report?***

   The breast imaging report for her concurrent mammography and US examinations should provide a benign (category 2) assessment, audit negative. This is because the combination of mammographic and sonographic findings is characteristically benign (simple cyst). A management rec-

ommendation of routine screening mammography in 1 year (concordant with the benign imaging findings) should be provided. Note that the requested cyst aspiration is for therapeutic rather than diagnostic purposes. This case illustrates one of several assessment-management discordance scenarios, in which assessment should match the imaging findings, not the planned management.

5. When a woman is recalled from screening for an asymmetry, and spot-compression or spot-compression magnification views show no persistent abnormality, is it necessary to perform US?

It is neither necessary nor appropriate to perform US in this scenario, because diagnostic mammographic evaluation has proved that the asymmetry identified at screening was a summation artifact (superimposition of normal breast structures) — this, of course, assumes that the spot-compression/spot-compression magnification views were of diagnostic image quality, with the area of concern centered in the spot-compression paddle. Because there are no imaging findings at diagnostic mammography, this examination should be assessed as negative (category 1) with a recommendation for routine screening mammography in 1 year. The above described scenario is quite common. An asymmetry is a noncalcified finding seen on only one standard mammographic view, and approximately 80% of asymmetries are found to represent summation artifacts.[25]

Had this scenario been slightly different, with spot-compression or spot-compression magnification views depicting a focal asymmetry (non-mass lesion visible on two different mammographic projections) as the only imaging finding, then it would indeed be appropriate to perform US targeted at the mammographic lesion. In most such cases, US examination will not affect subsequent management, identifying either normal-appearing fibroglandular tissue as correlate to the focal asymmetry or no sonographic finding at all. Such cases would be assessed as probably benign (category 3) unless prior mammograms demonstrated at least 2–3 years of stability resulting in a benign (category 2) assessment. However, the value of US in this scenario is that in a few cases it will depict a suspicious finding instead, leading to biopsy and often a cancer diagnosis that would otherwise have been deferred.

6. In reporting the findings of a US examination, how many sonographic descriptors of a mass should be used to support its assessment? Is it acceptable to simply report that the mass has benign characteristics?

There is no specific number of descriptors that must be used, but the three feature categories whose descriptors are applicable to characterizing a mass as benign are margin, shape, and orientation, all of which should be used to completely characterize the mass. Within these feature categories, the descriptors that justify a benign assessment are a circumscribed margin, oval shape (this now includes the term macrolobulated), and parallel orientation. If any other sonographic descriptor within these three feature categories is applicable to the mass, such as indistinct margin, irregular shape, or not parallel orientation, the mass should be assessed as suspicious rather than as benign.

Reports should be clear and concise, and too many adjectives may detract from the message, but the referring clinician or the next radiologist who views the sonograms may appreciate knowing the criteria used to justify a benign assessment. ***Note that these descriptors need not be repeated in the assessment that is provided at the end of the sonographic report.***

7. How should lesion location be reported on follow-up sonograms of a mass?

A 42-year-old woman was found to have a circumscribed mass at baseline mammography. At diagnostic mammography and US, the mass was assessed as probably benign and its location at US was recorded as right breast, 10 o'clock, 5 cm posterior to the nipple. She returned for a 6-month follow-up US, and the sonographer told the interpreting physician that the mass was

located at 11:00 in the right breast 6 cm posterior to the nipple but that she had labeled her images of the mass exactly as they had been annotated on the previous US examination. The technologist asked the physician if what she had done was correct.

One could argue that there should be precise agreement concerning the location of a sonographic finding on successive surveillance examinations, for the sake of consistency. However, due to minor differences in both patient positioning and angles of insonation that are inherent in real-time scanning with a handheld transducer, it may be difficult to precisely duplicate the scanning conditions of a previous examination. As a result, the apparent clock-face location and distance from the nipple of a mass may vary slightly between examinations. The key here is to determine that the mass depicted on both examinations is one and the same. This is accomplished by real-time scanning not only at but also adjacent to the expected location of the targeted mass, to ensure that the currently visible mass is the only such finding in the area. Once this has been confirmed, a full set of diagnostic images should be recorded, with the images labeled either precisely as on the previous examination or as actually located on the current examination. If the current actual location is used in labeling, and if there is a slight difference between this location and the location labeled previously, the report could state, "The right breast mass seen previously at 10:00 position, 5 cm posterior to the nipple is the same mass seen on today's exam in the right breast at 11:00 position, 6 cm posterior to the nipple, the minor difference being due to variability in patient positioning." Thus, there will be no confusion concerning the slight differences in lesion location described in the successive US reports.

8. ***US revealed a large axillary mass in a patient with known metastatic melanoma. Previously, this mass had been biopsied and shown to represent an axillary lymph node with metastatic melanoma. Except for the axillary mass, US examination revealed no abnormalities in the breast. What is the appropriate assessment for this examination?***

   The appropriate assessment is benign (category 2). An assessment of known biopsy-proven malignancy (category 6) would not be appropriate, as this assessment is used for known breast cancers (defined in the BI-RADS® Atlas as being either invasive breast carcinoma or ductal carcinoma in situ). Note that other malignancies (lymphoma, leukemia, sarcoma, metastasis, etc.), even when present in the breast or axilla, are not considered to be breast cancer. To avoid confusion concerning a benign assessment despite the presence of a non-breast malignancy, the report should contain an added sentence explaining the situation. In this case, the report could indicate that the axillary mass represents biopsy-proven metastatic melanoma, but that there is no sonographic evidence of breast cancer.

   Had this scenario been slightly different, with a sonographic depiction of not only the axillary mass but also a mostly circumscribed but slightly indistinct solid mass within the breast, then the appropriate assessment would be suspicious (category 4). The reason is that although this in-breast lesion could represent another melanoma metastasis, it also could be a primary breast carcinoma, such that biopsy is needed to make the distinction.

9. ***Should assessment category 0 be applied to breast US examinations?***

   In general, assessment category 0 should not be assigned to ***diagnostic*** breast US examinations. This is because a full diagnostic breast imaging examination (involving both US and mammography, if both are needed) should be completed before the patient leaves the breast imaging facility. Rarely, if for either equipment or personnel issues, completion of the diagnostic US examination can not be completed or the patient decides to leave before completion of her workup, a category 0 may be given. In this scenario, if the diagnostic US examination is the one performed first, it should be assessed as incomplete (category 0), and the patient will be asked to return to complete her

examination. When the patient returns and her examination is completed, the initial category 0 assessment is replaced by a final assessment.

However, assessment category 0 indeed is appropriate for ***screening*** breast US examinations. Like screening mammography, for which a small set of standard images is routinely obtained, a similar small set of standard images is routinely obtained at screening US. When additional images are recorded to further evaluate a screening-detected mammographic or sonographic finding, the screening examination is assessed as incomplete (category 0), and the additional images then constitute the subsequent diagnostic examination, regardless of whether the patient needs to be recalled on a different day or the additional images are obtained only a few minutes afterwards.

Note that in scenarios in which both screening and diagnostic components of an examination are performed one after the other, it may be awkward to report the two examinations separately. A single report may be issued instead, containing a combined assessment that reflects the (more completely evaluated) findings at diagnostic examination. However, the screening and diagnostic components of such a combined examination must be audited separately, audit-positive for the screening examination (effectively reflecting a category 0 assessment), and either audit-positive or audit-negative for the diagnostic examination depending on the final assessment that is rendered.

10. For bilateral screening US performed either by the technologist or the physician with no abnormality identified, what images should I record?

Although no standard has been set for documenting a negative screening US examination, what was done in ACRIN 6666[26] has served well in many breast imaging practices that now offer screening US: in addition to demographics (patient's name, unique identifier, date of birth or age, facility name, and location), record one image in one plane (ordinarily radial) for each quadrant, at the same distance posterior to the nipple (4 cm for an average breast), and record one image of the retroareolar region just behind the nipple. The axilla could be scanned as well, but this was not required in the ACRIN 6666 protocol, nor was there a requirement to record a representative negative image. The standard set of five images per breast was recorded at the completion of real-time scanning, given that no abnormalities were suspected or observed.

11. Should I avoid using breast US for male patients with clinical findings because gynecomastia may be misinterpreted as malignancy?

No, US is indicated for evaluation of most palpable abnormalities, regardless of the patient's gender. Men with palpable masses located far from the nipple would be referred for US on completion of mammography. Gynecomastia itself is frequently palpable and tender, with mammography most commonly being definitive in confirming the diagnosis. If US is performed, however, gynecomastia may also be recognized (please see the discussion of anatomy in the lexicon).

As we do in mammography and in imaging other paired organs, it is important to keep the principle of symmetry in mind. If there is doubt about whether US shows a physiologic change (such as gynecomastia) or an abnormality that requires biopsy, scan the contralateral retroareolar area for a similar but usually smaller area (in this case, of gynecomastia). Palpable masses at sites away from the nipple, usually in fatty areas of the male breast, can be completely characterized using mammographic feature analysis, with the role of US limited to providing imaging guidance for biopsy, if palpation-guided biopsy is not performed.