

The Sonographic Findings and Differing Clinical Implications of Simple, Complicated, and Complex Breast Cysts

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Key Words

Fibrocystic condition, fibrocystic change, breast mass, breast cysts, breast sonography, BI-RADS

Abstract

Although palpable and mammographic breast masses are common and frequently reflect underlying fibrocystic change, they must be distinguished from breast malignancy. Clinical characterization of these masses is often unreliable, and mammographic appearances alone cannot distinguish between those that are solid and those that are cystic. Sonography is an important adjunct to characterize these abnormalities further. Management of solid masses is well established, but overlap in appearance of cystic lesions has led to variability in reporting and management. With current high-resolution ultrasound, specific observations can accurately characterize most cystic masses, thereby facilitating management decisions. (*JNCCN* 2009;7:1101–1105)

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Learning Objectives

Upon completion of this activity, participants will be able to:

- List characteristics of simple breast cysts on ultrasonography
- Discriminate between solid and cystic breast masses using ultrasonography
- Use findings on ultrasonography to diagnose the etiology of breast masses
- Diagnose the etiology of complex breast cysts

Fibrocystic change of the breast affects between 50% and 90% of women.¹ Women may be asymptomatic, but many have progressive symptoms throughout their lives that often lead to imaging evaluation. Pathologically, fibrocystic change consists of proliferative changes, fibrosis, and cysts. Given the limited specificity of mammographic findings, one must be familiar with the spectrum of sono-

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graphic features that may range from predominately solid lesions reflecting hyperplasia and fibrosis, to clusters of microcysts, to macrocysts with internal echoes that may be difficult to distinguish from solid masses.²

This article concentrates on 3 categories of breast cysts that are frequently encountered and often confused: simple, complicated, and complex. Part of the confusion stems from the overlap in ultrasound features, resulting in inconsistent classification and reporting. To address these inconsistencies, the American College of Radiology Breast Imaging Reporting and Data System (BI-RADS) offers standard terminology as part of their recommended lexicon for breast ultrasound reporting.³ This terminology can be consistently applied, and management recommendations based on BI-RADS descriptors have been validated for both solid and cystic lesions.⁴⁻⁶

The sonographic features of simple cysts have been established for many years and are incorporated into the BI-RADS lexicon. To be regarded as a simple cyst, a mass must meet 3 criteria: its margins must be circumscribed (i.e., a margin “that is well defined or sharp, with an abrupt transition between the lesion and surrounding tissue”³); it must be anechoic (i.e., “without internal echoes”³); and it must show posterior acoustical enhancement (i.e., “a column that is more echogenic [whiter] deep to the mass”³; Figure 1). The walls of the cyst must be assessed in all planes and must be thin. The cyst may be oval, round, or lobulated, and it may contain thin avascular septations. The absence of internal echoes and presence of posterior acoustical enhancement define its contents as fluid.

A sonographic mass that meets these criteria is benign and requires no further diagnostic evaluation;⁷ it would be categorized as BI-RADS 2 (benign finding).

Careful sonographic technique is critical because significant internal echoes are easy to suppress with improper gain settings; likewise, the appearance of internal echoes could be created where none exist. Demonstration of posterior acoustical enhancement may also be difficult in small cysts. The technical details of sonographic evaluation are beyond the scope of this article, but proper use of supplemental sonographic algorithms, such as spatial compounding and tissue harmonics, may help clarify equivocal findings.^{8,9} Management of a simple cyst is based on clinical features. If it is symptomatic, obscures clinical evaluation, or does not clearly explain a new palpable or mammographic finding, it may require aspiration. Breast cysts frequently change in size, and enlargement alone of an otherwise simple cyst does not require intervention.

The features of a complicated cyst are identical to those of a simple cyst, except with regard to internal echoes. Complicated cysts are circumscribed and show posterior acoustical enhancement, but are not anechoic (Figure 2). Complicated cysts contain low-level internal echoes representing proteinaceous fluid, cholesterol crystals, blood, or other material.

As those who perform aspirations know, the fluid within cysts is highly variable, ranging from clear and watery to dark and paste-like; therefore, many cysts will demonstrate these internal echoes. The question then becomes whether the internal echoes reflect debris within a fluid matrix or indicate a solid



Figure 1 Simple cyst with circumscribed margins, posterior acoustical enhancement, and no internal echoes.



Figure 2 Complicated cyst with circumscribed margins, posterior acoustical enhancement, and low-level internal echoes.

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mass. The internal matrix of a mass can be presumed to be fluid when fluid–fluid or fluid–debris levels shift with patient position or when the internal echoes move. Swirling internal echoes may be accentuated by increasing the sound energy focused on the mass, through either increasing the ultrasound gain settings or applying power Doppler.

If these features are identified and the mass otherwise meets criteria of a simple cyst, it may be managed in the same way as any simple cyst (BI-RADS 2). If these features are not present, the mass may be solid. Doppler interrogation is useful, because any internal Doppler vascularity would indicate a solid matrix. In the absence of Doppler flow, the mass cannot be definitively characterized as solid or cystic, and management will depend on the clinical setting and correlation with other imaging findings. If the mass is clinically or mammographically new or is symptomatic, aspiration should be attempted. If aspiration fails, biopsy is required because the mass would be regarded as a new solid mass. Biopsy should also be considered if aspiration is successful but yields bloody fluid. If the mass is incidentally discovered and shows no suspicious clinical or mammographic features, attempted aspiration or short-interval follow-up (BI-RADS 3) may be appropriate because the risk for malignancy is very low.¹⁰

Frequently, in a setting of fibrocystic change, ultrasound shows numerous nondominant, hypoechoic to anechoic nodules that meet criteria for simple and complicated cysts. In this setting, the risk for malignancy is again very low and, as with multiple circumscribed nondominant mammographic masses,^{10,11} no additional focused evaluation may be required (BI-RADS 2). In high-risk patients or other complex situations, breast MRI may provide additional information because most malignant masses will enhance, whereas complicated cysts will not.

Complex cystic lesions in the breast are similar to complex cysts elsewhere in the body. The BI-RADS lexicon defines a complex cyst as a “mass which contains both anechoic and echogenic components.”³ In other words, this mass has both cystic and solid components (Figure 3). The mass may be predominately cystic or solid; it may be cystic except for asymmetric thickening of its wall, a focal mural mass, or thickened septations. As with indeterminate solid masses, complex cysts usually require biopsy (BI-RADS 4).¹² If the lesion is predominately solid, core needle biopsy



Figure 3 Complex cyst with solid and cystic components.

may be appropriate. If the lesion is predominately cystic, percutaneous or surgical excision may be required because the lesion may disperse and become inapparent after initial core needle targeting, resulting in incomplete sampling.

Other cystic lesions in the breast include clustered microcysts, dermal cysts, galactoceles, seromas, abscesses, and hematomas. Clustered microcysts may be followed (BI-RADS 3),¹³ but careful sonographic interrogation is needed to ensure that the lesion is not a complex mass. Distinguishing clustered microcysts from micropapillary ductal carcinoma in situ may be difficult.¹⁴ When doubt exists, percutaneous biopsy may be required, especially in postmenopausal women not taking hormonal replacement, in whom development of new fibrocystic changes is less likely.

Dermal cysts are usually readily apparent because of their cutaneous location; they most likely represent sebaceous or epidermal inclusion cysts and vary from anechoic to echogenic. Galactoceles simply represent a specific form of complicated cyst that contains fat or milk products, and are generally managed on clinical grounds. Seromas and abscesses are variable in their sonographic features and usually diagnosed based on the clinical setting.

In summary, many clinical and mammographic breast masses represent cysts related to fibrocystic change. Although ultrasound findings are variable, most cystic lesions can be classified based on specific sonographic features as outlined in the BI-RADS lexicon, and this classification can be used to select appropriate management pathways.

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