

REVIEW ARTICLE

Evaluating Breast Masses in Adults

David Wood, DO¹ & David J. Park, DO, FAAFP, FACOFP²

¹ Family Physician with Golden Valley Memorial Healthcare

² Vice Dean and Southern Utah Campus Dean, Rocky Vista University College of Osteopathic Medicine

Keywords:

Breast

Mass

Clinical Breast Exams

Mammogram

Breast Cancer

Oncology

Health Women's Issues

According to the CDC, the second leading cause of death in females is cancer, with breast cancer being the most common type of female cancer and the second deadliest. It is predicted that there will be over 200,000 diagnoses of breast cancer made this year in the United States, with nearly 40,000 deaths attributed to breast cancer.¹ It is important to be able to identify a breast mass to assess whether it is benign or cancerous. One of the most frequent medico-legal claims in the United States is the missed diagnosis of breast cancer, with the majority of malpractice claims being awarded to women whose breast cancer diagnoses were delayed due to the physician not performing a mammogram and/or a clinical breast exam.² Nearly 10% of breast mass work-ups actually end up being breast cancer.³ Therefore, it is imperative to be able to adeptly assess a breast mass to accurately determine its pathology. Screening and diagnostic modalities can easily be ordered by any physician and a discovered breast mass can be worked up effectively by using simple guidelines, which this paper will discuss.

INTRODUCTION

Breast mass complaints are common in the clinical setting and physicians should be comfortable performing breast mass evaluations. One study found that 40% of breast complaints in women aged 40-69 were for breast lumps or masses.⁴ The discovery of a breast lump can cause significant anxiety and distress to the patient. Fortunately, approximately 90% of masses are benign in women in their 20's to early 50's, with fibroadenomas and cysts being the most common benign masses.^{4,5} See Table 1 for types of breast masses.

The overall incidence of breast cancer has decreased by 0.9% and mortality decreased by 2.1% from 2000-2009. According to the CDC, the incidence of breast cancer still remains the most common cancer diagnosed in women.⁶ It is important to work-up any breast mass in a thorough and concise process to prevent missed diagnoses and also to ensure an early diagnosis. Being diagnosed with a breast mass can be quite frightening to a patient and efficient management could greatly help alleviate worry and stress for the patient.

EVALUATION

The evaluation of a patient with a breast lump requires a thorough medical history of the lump, including when and how the patient discovered the lump, progression of size, and any associated symptoms.⁸ It is also important to identify and assess any risk factors for breast cancer, including age, race, family history, smoking and

various others (See Table 2). In 2009, the United States Preventive Services Task Force (USPSTF) recommended against routine self-breast examinations (category D). However, the January 2016 USPSTF breast cancer screening guidelines removed self-breast examination recommendations as it now supports patients being aware of changes in their bodies and discussing these changes with their clinicians.⁹

PHYSICAL EXAM

A thorough clinical breast exam (CBE) is imperative in assessing a breast mass. The physician should start the CBE by looking at both breasts and noting any abnormalities or asymmetry. The visual inspection typically starts with the patient in the sitting position. The patient should be asked to place her arms above her head, as this may cause dimpling from a fixed mass. A mirror is sometimes helpful to look at the inferior portions of the breast. The breasts should then be checked for skin color changes, texture changes, skin thickening, dryness, and temperature changes.^{11,12} The nipples should be checked for inversion and the areola should be checked for relative symmetry as these may be signs of an underlying mass. Only after a thorough visual exam should the physician then palpate the breasts. The visual exam portion may give important clues to surface area differences and help the clinician be more specific and attentive to a certain area during palpation. The palpation portion of the CBE should be performed while the patient is in the supine position. Palpation of breasts should be performed in a systematic fashion by following a linear or circular pattern. It is considered good practice to overlap palpations so as not to miss any areas. Axillary, supraclavicular, and infraclavicular lymph nodes should also be palpated in this systematic process. Finally, the nipples should be expressed to check for any nipple discharge or bleeding.

CORRESPONDENCE:

David J. Park, DO, FAAFP, FACOFP | dpark@rvu.edu

TABLE 1:Common Breast Masses ⁷

Benign	Cancerous
Fibroadenoma	Infiltrating Ductal 76%
Cyst	Invasive Lobular 8%
Traumatic Fat Necrosis	Ductal Carcinoma In Situ 7%
Fibrocystic Changes	Lobular Carcinoma In Situ
Intraductal Papillomas	Mucinous 2.4%
Lipoma	Medullary 1.5%
Abscess	Tubular 1.2%
Adenomas	Papillary 1%
Galactocele	
Diabetic Mastopathy	
Hamartomas	
Sarcoidosis	
Idiopathic Granulomatous Mastitis	
Pseudoangiomatous Stromal Hyperplasia	
Radial Scars	
Epithelia Related Calcifications	

TABLE 2:Common Risk Factors for Breast Cancer ¹⁰

<ul style="list-style-type: none"> • Gender (females 100 times more likely to be affected) • White Race • Higher Socioeconomic Class • Northeastern United States • BMI >33, 27% increased Risk • Increase in Age • Family History (BRACA-1 and BRACA-2 gene positive) • Environmental Exposure to Radiation • Benign Breast Conditions • Smoking • More than one alcoholic drink a day • Late pregnancy • Early first Menses • Nulliparity • Late Menopause • DES Exposure in Utero • Estrogen Supplementation • Increased Breast Density • Prior Biopsies

IMAGING

Mammography

Plain x-ray mammography is the most common imaging modality used for both screening and diagnostic purposes. The latest 2016 breast cancer screening guidelines by the USPSTF recommends a screening mammography every two years for women aged 50 to 74 years (Grade B). For women under 50, the decision to start screening mammography should be an individual one (Grade C).⁹ If a mass is found on screening mammography or on the CBE, a diagnostic mammogram should be ordered as the first line testing for women over the age of 30.^{7,10} If a breast mass is identified in a woman under 30, mammography is not the first line choice for diagnostic purposes due to the generally increased density of breast tissue in this group.

Mammograms can pick up two types of lesions: soft tissue masses and clustered micro calcification masses. Radiologists use the Breast Imaging-Reporting and Data System (BI-RADS) criteria to assess whether a mass is benign or potentially malignant.¹² The BI-RADS system was developed by the American College of Radiology to describe mammographic findings (*See Table 3*).

Mammograms may also be useful to the surgeon in determining the location and size of the mass. Further, preoperative mammograms can aid in the follow-up assessment of the postoperative course.⁷

Some clinicians may tend to perform the CBE quickly due to the sensitive and potentially embarrassing nature of the exam. However, it should be noted that more extensive exams tend to be more thorough and allow more masses to be identified.¹³ The CBE alone detects up to 10% of breast cancers while more than 90% of breast cancers are found through mammograms.¹⁴ It is important to be reminded that discovering a mass on the CBE does not mean other masses do not exist. Therefore, it is important to order a mammogram in conjunction with the CBE at all times. It is also important to note that imaging does not always detect all masses. In fact, 10-15% of breast masses are not seen on mammography.¹⁵ Therefore, both CBE and mammograms are recommended in conjunction for any breast mass evaluation.

TABLE 3:

BI-RADS Assessment Categories

0: Incomplete
1: Negative
2: Benign finding(s)
3: Probably benign
4: Suspicious abnormality
5: Highly suggestive of malignancy
6: Known biopsy – proven malignancy

Ultrasound

Any female under the age of 30 should have masses evaluated by ultrasound due to the dense nature of breasts in young females.¹⁶ Ultrasonography can help determine whether a mass is solid or fluid filled (cystic) and has been shown to be remarkably accurate. In one study, breast ultrasonography demonstrated a sensitivity of 98.4% for correctly classifying a breast mass as malignant or indeterminate.¹⁷ If found indeterminate, a mammogram should be performed next.

MRI

MRI with gadolinium enhances most invasive breast cancers.^{7,18-21} MRIs are probably the best radiologic method to assess the size and location of a breast mass, which would give beneficial information to the surgeon, especially if other modalities fall short.²² One study found the sensitivity of MRI for malignant breast masses to be 100%.¹⁵ However, the specificity of MRI is relatively low; around 70%.²³⁻²⁵ Since all suspicious breast masses should be biopsied, the addition of an MRI is not critically necessary or cost effective in the evaluation of breast masses.²³

MRI does play a role for patients with silicone breast implants whose mammographic images are fully or partially obscured. MRI gives the highest spatial resolution and contrast between implants and soft tissues of the breast.

Biopsy

Fine Needle Aspiration (FNA) biopsy is commonly used as a technique for breast mass biopsy because any trained clinician can perform it in the office setting. The procedure is not difficult to perform and is easily done in the family physician's office. Most often, FNA is performed with skilled palpation, but may also be performed under ultrasound guidance. Good FNA technique has 98% sensitivity and 97% specificity when performed by skilled operators.²⁶ The procedure is usually done with a 10-20 ml syringe with a 23-27 gauge needle. The fine needle is systematically advanced in and out of the mass multiple times, collecting tissue specimens. If aspirated fluid is clear and not bloody, the fluid does not need to be sent for cytology and can be discarded. Bloody or blood-tinged contents should be collected in a CytoLyte solution and sent for a pathologic analysis.²⁷

Core needle biopsy is similar to the FNA biopsy but a larger needle is used, usually a 14-18 gauge cutting needle. This technique is more advantageous due to the collection of larger tissue samples. However, core needle biopsies require larger volumes of local anesthesia and have an increased risk of bleeding compared to FNA biopsies, due to larger needle sizes. Ultrasound imaging is usually used for better accuracy and therefore, core needle biopsies are usually done by a surgeon or an interventional radiologist.

An excisional biopsy is usually performed when FNA biopsy, core needle biopsy, or imaging provides insufficient results.^{7,12,28} It is the most definitive method for histological analysis of a breast mass. An incisional biopsy can be done when the mass is very large and the patient is concerned about cosmetic effects. However, most patients opt for the excisional biopsy because they feel more comfortable having the mass completely removed. Cysts or microcysts are not indications for an excision due to possible interfer-

ence with future mammograms.^{7,10,29} However, excision is indicated whenever cysts reoccur, grow large, are complex, or if needle aspirations show malignancies.

CONCLUSION:

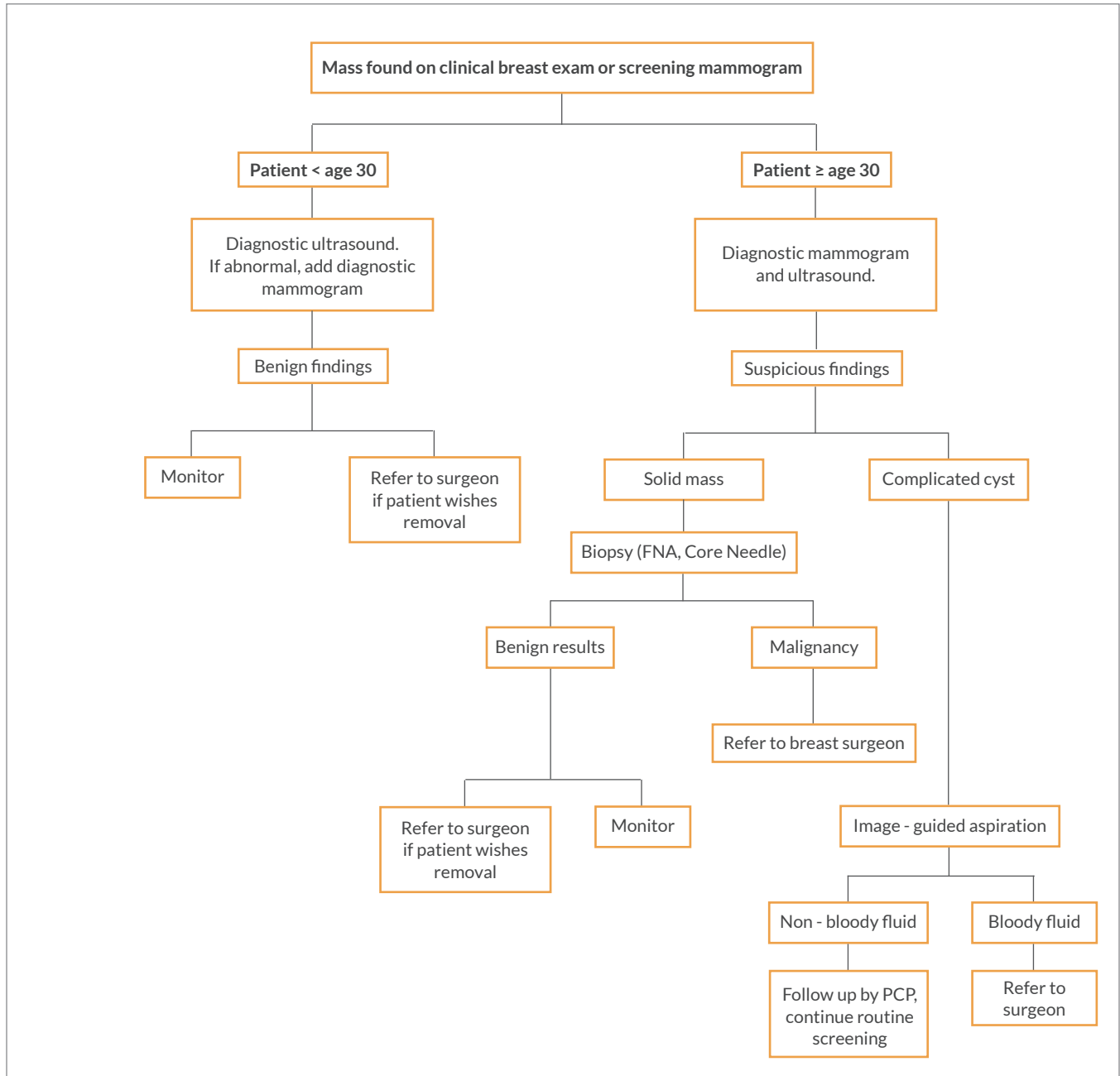
Although most breast masses are benign, a physician should evaluate all breast masses swiftly and properly. The incidence of breast cancer may be declining, but it still remains the second most common form of female cancer.¹ The controversy of recommending for or against self-breast examinations has largely been resolved as both the United States Preventive Services Task Force (USPSTF) and the American College of Obstetricians and Gynecologists (ACOG) have recently taken more neutral positions that self-identified breast masses should be discussed with a clinician and may help in detecting breast cancer. Therefore, the authors do not recommend teaching and instructing patients to perform routine self-breast examinations. The Triple Test (clinical breast exam, imaging, and tissue samples) should be used for diagnosing breast masses and to alleviate any anxiety and doubt for a patient.¹² Biopsy and tissue sample analysis remain the gold standard for making a definitive diagnosis and can be easily performed in the outpatient setting. The evaluation of a breast mass should not be delayed. A specialist referral is not a requirement in the early stages. Any primary care physician can initiate the work-up, and with proper training perform the biopsy in the office setting. Unsuccessful biopsies or lesions suspicious for malignancy upon work-up warrant an immediate referral to a breast surgeon. See Figure 1 for evaluation algorithm.

REFERENCES

1. American Cancer Society. Cancer facts and figures 2012., <http://www.cancer.org/downloads/STT/CAFF2003PWSecured.pdf>, August 14, 2012
2. Physician Insurers Association of America. Breast cancer study, 3rd edition, Physician Insurers Association of America, Rockville 2002.,<http://www.neomatrix.com/pdfs/PIAASStudy.pdf>, January 11, 2012).
3. Donegan, WL. Diagnosis. In: Cancer of the breast, Donegan, WL, Spratt, JS (Eds), WB Saunders, Philadelphia 1995. p.157.
4. Elmore JG, Barton MB, Mocerri VM, et al. Ten-year risk of false positive screening mammograms and clinical breast examinations. *N Engl J Med* 1998; 338:1089.
5. Svane G, Silfverswärd C. Stereotaxic needle biopsy of non-palpable breast lesions. Cytologic and histopathologic findings. *Acta Radiol Diagn (Stockh)* 1983; 24:283.
6. NCHS Data Brief, Mortality in the United States 2013, <http://www.cdc.gov/nchs/data/databriefs/db178.htm>, December 2014.
7. Esserman, Laura J. and Joe, Bonnie N. Diagnostic evaluation of women with suspected breast cancer. Up-to-date August 20, 2015
8. Morrow, M. Physical examination of the breast. In: Breast diseases, 3rd edition, Harris, JR, et al (Eds), Lippincott, Williams, and Wilkins, Philadelphia 2004. p.29.
9. USPSTF Recommendations for screening of Breast Cancer. Available at <http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/breast-cancer-screening1> January 2016
10. Sabel S., Micahel., Clinical manifestations and diagnosis of a palpable breast mass., Up-to-date., April 24, 2015
11. Bickley, Lynn S. Bates' Guide to Physical Examination and History Taking.

FIGURE 1:

Decision pathway for work-up of a breast mass



9th ed. Publ. June 13, 2007. Lippincott Williams & Wilkins.

12. SUSAN KLEIN, M.D., Evaluation of Palpable Breast Masses, *Am Fam Physician*. 2005 May 1;71(9):1731-1738.
13. Campbell HS, Fletcher SW, Pilgrim CA, Morgan TM, Lin S. Improving physicians' and nurses' clinical breast examination: a randomized controlled trial. *Am J Prev Med*. 1991;7:1-8.
14. Smart CR, Hartmann WH, Beahrs OH, Garfinkel L. Insights into breast cancer screening of younger women. Evidence from the 14-year follow-up of the Breast Cancer Detection Demonstration Project. *Cancer* 1993; 72:1449.
15. Lin C, Moore D, DeMichele A, et al. Detection of locally advanced breast cancer in the I-SPY TRIAL in the interval between routine screening (abstract 1503). www.abstract.asco.org/AbstView_65_31279.html, *J Clin Oncol* 2009; 27:1503s.
16. National Comprehensive Cancer Network (NCCN) guidelines for Breast Cancer, https://www.nccn.org/store/login/login.aspx?ReturnURL=http://www.nccn.org/professionals/physician_gls/pdf/breast.pdf, April 22, 2014.
17. Stavros AT, Thickman D, Rapp CL, et al. Solid breast nodules: use of sonography to distinguish between benign and malignant lesions. *Radiology* 1995; 196:123.
18. Kaiser WA, Zeitler E. MR imaging of the breast: fast imaging sequences with and without Gd-DTPA. Preliminary observations. *Radiology* 1989; 170:681.
19. Schelfout K, Van Goethem M, Keresscot E, et al. Contrast-enhanced MR imaging of breast lesions and effect on treatment. *Eur J Surg Oncol* 2004;

30:501.

20. Fischer U, Kopka L, Grabbe E. Breast carcinoma: effect of preoperative contrast-enhanced MR imaging on the therapeutic approach. *Radiology* 1999; 213:881.
21. Silverstein MJ, Recht A, Lagios MD, et al. Special report: Consensus conference III. Image-detected breast cancer: state-of-the-art diagnosis and treatment. *J Am Coll Surg* 2009; 209:504.
22. Breast Imaging Reporting and Data System (BI-RADS) Atlas, 4th ed., American College of Radiology, Reston, VA 2003
23. Olsen ML, Morton MJ, Stan DL, Pruthi S. Is there a role for magnetic resonance imaging in diagnosing palpable breast masses when mammogram and ultrasound are negative? *J Womens Health (Larchmt)*. 2012 Nov;21(11):1149-54.
24. Bleicher RJ, Ciocca RM, Egleston BL, et al. Association of routine pretreatment magnetic resonance imaging with time to surgery, mastectomy rate, and margin status. *J Am Coll Surg* 2009; 209:180.
25. Berg WA, Gutierrez L, NessAiver MS, et al. Diagnostic accuracy of mammography, clinical examination, US, and MR imaging in preoperative assessment of breast cancer. *Radiology* 2004; 233:830.
26. Esserman, Laura J. and Joe, Bonnie N. Breast Biopsy. Up-to-date, July 15, 2015.
27. Masood S. Fine needle aspiration biopsy of nonpalpable breast lesions. In: *Cytopathology Annual 1993*, Schmidt W (Ed), Williams and Wilkins, Baltimore 1994.
28. Svane G, Silfverswärd C. Stereotaxic needle biopsy of non-palpable breast lesions. Cytologic and histopathologic findings. *Acta Radiol Diagn (Stockh)* 1983; 24:283.
29. Bleiweiss, Ira J. Pathology of Breast Cancer. Up-to-date., December 19, 2013