

Breast Ultrasound Protocol

1. When completing a Breast Ultrasound, if you see an abnormality, please include:
 - a. A transverse and longitudinal image both with and without measurements
 - b. 1 color Doppler flow picture in either dimension
 - c. An image in the longest dimension of the finding, even if you are scanning in radial or anti-radial

2. If no abnormality, take negative images in transverse and longitudinal
 - a. If you are uncertain if you see an abnormality, please discuss with the Radiologist so they can decide if they want to scan the area of interest themselves.

3. If you see a solid mass, or is a BIRADs 4 or 5, please also scan the same side axilla and save images of lymph nodes.
 - a. An ipsilateral axillary ultrasound is to be performed on all diagnostic patients who, after their imaging evaluation, are categorized as BIRADS 4 or 5.
 - b. This will include patients that will be having a stereotactic biopsy performed for a new breast asymmetry without an ultrasound correlate.
 - c. The radiologist will comment on the axillary imaging, both in the Findings and Impression of the report.

Ultrasound Characterization of Breast Masses

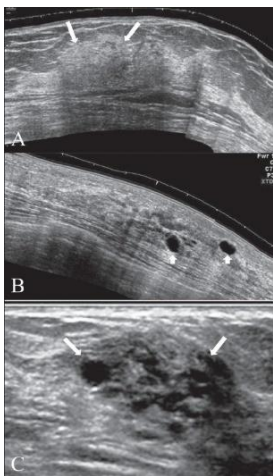
Breast Cysts

Breast cysts are the commonest cause of breast lumps in women between 35 and 50 years of age. A cyst occurs when fluid accumulates due to obstruction of the extralobular terminal ducts, either due to fibrosis or because of intraductal epithelial proliferation. A cyst is seen on USG as a well-defined, round or oval, anechoic structure with a thin wall. They may be solitary or multiple.



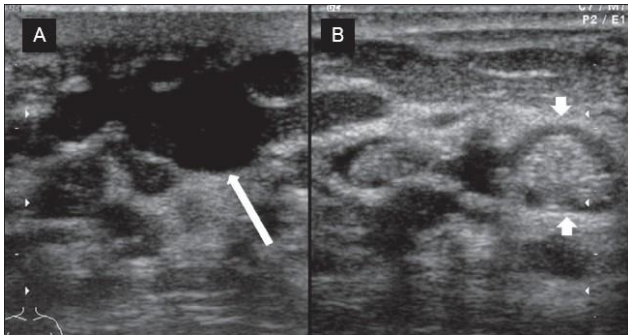
Fibrocystic

This condition is referred to by many different names: fibrocystic disease, fibrocystic change, cystic disease, chronic cystic mastitis or mammary dysplasia. The USG appearance of the breast in this condition is extremely variable since it depends on the stage and extent of morphological changes. In the early stages, the USG appearance may be normal, even though lumps may be palpable on clinical examination. There may be focal areas of thickening of the parenchyma, with or without patchy increase in echogenicity. Discrete single cysts or clusters of small cysts may be seen in some. Focal fibrocystic changes may appear as solid masses or thin-walled cysts. About half of these solid masses are usually classified as indeterminate and will eventually require a biopsy.



Duct Ectasia

This lesion has a variable appearance. Typically, duct ectasia may appear as a single tubular structure filled with fluid or sometimes may show multiple such structures as well. Old cellular debris may appear as echogenic content. If the debris fills the lumen, it can be sometimes mistaken for a solid mass, unless the tubular shape is picked up.



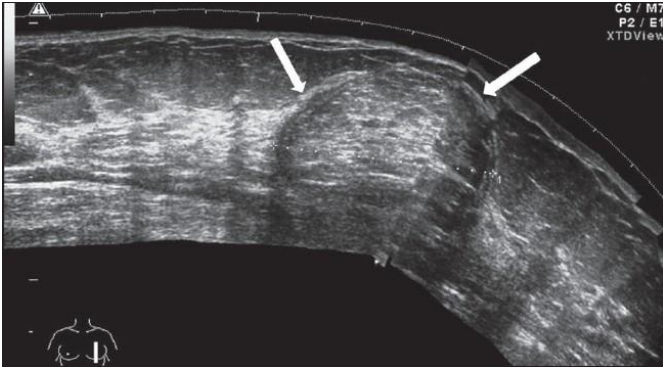
Fibroadenoma

Fibroadenoma is an estrogen-induced tumor that forms in adolescence. It is the third most common breast lesion after fibrocystic disease and carcinoma. It usually presents as a firm, smooth, oval-shaped, freely movable mass. It is rarely tender or painful. The size is usually under 5 cm, though larger fibroadenomas are known. Fibroadenomas are multiple in 10–20% and bilateral in 4% of cases. Calcifications may occur. On USG, it appears as a well-defined lesion. A capsule can usually be identified. The echotexture is usually homogenous and hypoechoic as compared to the breast parenchyma, and there may be low-level internal echoes. Typically, the transverse diameter is greater than the anteroposterior diameter. In a small number of patients, the mass may appear complex, hyperechoic or isoechoic. A similar USG appearance may be seen with medullary, mucinous or papillary carcinoma.



Lipoma

Lipoma is a slow-growing, well-defined tumor. It may be a chance finding or the patient may present with complaints of increase in the size of the involved breast, though no discretely palpable mass can be made out. The tumor is soft and can be deformed by compression with the transducer. A thin capsule can usually be identified and the tumor often reveals an echogenic structure, with a stippled or lamellar appearance.



Characteristics of Malignant Lesions

Malignant lesions are commonly hypoechoic lesions with ill-defined borders. Typically, a malignant lesion presents as a hypoechoic nodular lesion, which is 'taller than broader' and has spiculated margins, posterior acoustic shadowing and microcalcifications. Three-dimensional scanners with the capability of reproducing high-resolution images in the coronal plane provide additional important information. The spiky extensions along the tissue planes can be well seen in coronal images. It was initially believed that color Doppler scanning would add to the specificity of USG examination, but this has not proven to be very efficacious; however, in certain situations it does help resolve the issue, particularly when there is significant vascularity present within highly cellular types of malignancies.

