Pediatric Breast Masses

- Breast masses in pediatric patients are uncommon and almost never (<0.2/100,000) due to cancer.
- Ultrasound, which has good sensitivity in the developing breast, is the primary diagnostic imaging method.
- Diagnostic mammography has limited use because of the density of the developing breast and its susceptibility to radiation damage.
- MRI is primarily used for problem solving in cases of deep lesions and vascular malformations.
- Biopsy is not recommended because of the potential for irreversible damage to the developing breast.

Although breast masses are uncommon in children, they are a source of concern, especially to parents, because of the fear of breast cancer. However, Surveillance Epidemiology and End Results (SEER) data from the United States from 1975 to 2010 shows that the incidence of cancer in girls under the age of 20 is <0.2/100,000.

![Image of ultrasound](image)

**Figure 1.** Static focused ultrasound image in a 17-year-old girl demonstrates an anechoic well-circumscribed mass consistent with a benign simple cyst.

**Irregularities in Breast Development**

Normal structures often account for breast complaints in prepubertal children and adolescents. Newborn infants commonly have subareolar nodules, which may be accompanied by nipple discharge. Such features are due to maternal hormones and nearly always self-limited. The presence of asymmetric breast buds in a prepubertal girl is also a source of concern, but this condition generally resolves.
Gynecomastia is a common condition in adolescent boys, typically occurring six months after the initial appearance of secondary sex characteristics. It normally resolves within two years of onset. However, pathologic gynecomastia can be caused by an increase in estrogen, a decrease in testosterone, or medication or drug use.

Imaging does not normally play a role in these irregularities; clinical examination and follow-up are sufficient. However, if a physical finding is concerning, ultrasound can exclude an underlying mass and confirm that the condition is due to normal-appearing breast tissue. Ultrasound is also used to confirm normal-appearing breast tissue when accessory nipples or supernumerary breast tissue develop. These structures, which are most commonly seen in the axilla and are sensitive to hormonal influence much like the normal breast, develop from persistent fragments of the embryonic milk line, which extends from the axilla to the groin during embryonic development.

A prominent axillary lymph node in an otherwise healthy young patient can also raise concerns. Although it is most commonly due to inflammatory processes, clinical correlation and follow-up are appropriate. If questions remain, ultrasound imaging can examine nodal morphology and hilar vascular flow to confirm that the lymph node is benign.

**Benign Findings**

Breast lumps in either boys or girls are nearly always due to benign masses. For this reason, biopsy should rarely be used to diagnose the condition because it can lead to irreversible damage.

Benign cysts are sometimes found in pediatric patients, and single cysts are more common than multiple ones. On ultrasound, they appear as anechoic structures, which may show posterior acoustic enhancement (Figure 1). Cysts are considered part of the spectrum of fibrocystic change.

The most common breast mass in girls is a fibroadenoma, a benign fibroepithelial tumor typically diagnosed between the ages of 15 and 17. Ultrasound imaging shows these tumors to have smooth circumscribed margins and a homogenous texture, and they are wider than tall (Figure 2). Since the likelihood of malignancy is <2%, they are safe to follow clinically. However, surgical excision is recommended if they rapidly enlarge or if there are atypical features, such as spiculated margins, microlobulations, angular margin, marked hypoechoogenicity, or shadowing.
Trauma to the breast can also cause the development of a palpable mass, due to a hematoma or fat necrosis. These conditions can appear as an irregular hypoechoic mass on ultrasound, and a history of trauma can confirm the diagnosis. Over time, a hematoma involutes and resolves. Lumps from fat necrosis typically persist and can be followed clinically.

Mastitis and abscesses are most frequently seen in infants and adolescents of both sexes, although most are found in girls. Neonatal mastitis is rare and is thought to result from pathogens that access the hormonally stimulated breast tissue through the nipple. In adolescents, mastitis and abscesses are associated with skin infections, piercings, or lactation. Ultrasound is helpful in differentiating mastitis from abscess and can also be used to guide needle aspiration of abscess contents for laboratory culture or drainage purposes.

Malignant Tumors
Malignant tumors are extremely rare in the pediatric population and account for <1% of breast masses. Phyllodes tumors are the most common primary breast malignancy in this age group. While most are benign, they do have malignant potential. Ultrasound and pathologic characteristics overlap with those of juvenile fibradenomas. However, ultrasound findings such as cysts, clefts and circumscribed masses (which may have posterior enhancement) with heterogeneous internal echotexture are suggestive of phyllodes tumor. In these cases, wide excision is recommended. Metastases are rare, but local recurrence is possible and does not alter the prognosis.

Secretory carcinomas are the most common type of invasive breast cancer in children. They are usually <3 cm, and ultrasound shows them as circumscribed masses with a pseudocapsule. Recommended treatment includes excision and sentinel lymph node biopsy. The prognosis is generally favorable.

The discovery of a breast mass in a child with predisposing genetic mutations, prior mantle radiation, or a known primary malignancy is suggestive of metastasis. In these cases, CT, MRI, or PET can often help define the extent of the disease.

Scheduling
Appointments for breast ultrasound can be made on ROE (mghroe.org) or by calling 671-726-8396. The examinations are performed at Mass General West Imaging in Waltham, Mass General Imaging in Worcester, Mass General/North Shore in Danvers and on the main campus of Massachusetts General Hospital in Boston.

Further Information
For more information regarding breast imaging in pediatric patients, please contact Mansi A. Saksena, MD, Breast Imaging, Massachusetts General Hospital (617-726-3093).

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References


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