Issue 04/09

NEWSPAPER POST

TheSynapse

The Medical Professionals' Network

MEDICAL IMAGING

Breast Masses in Children - Part I

by **Pierre Vassallo**
MD PhD FACA Artz für Radiologie
Consultant Radiologist

Discovery of breast masses in children and adolescents often causes tremendous parental and physician concern because of the high prevalence of breast cancer in the adult population. However, the prevalence of breast cancer in this age group is low, and knowledge of the spectrum of pathologic conditions and radiological findings that affect the pediatric breast is important in guiding management.

Breast lesions in children and adolescents are managed differently from those in adults. Unlike in adults, the initial breast imaging study performed in pediatric patients is ultrasound, whereas mammography is reserved for selected cases. Advantages of ultrasound over mammography include lack of ionizing radiation in a susceptible population and greater sensitivity in the relatively dense fibroglandular tissue of young girls. Mammography has a role in the evaluation of microcalcifications and of suspicious discrete masses in older adolescents. Also biopsy and surgical intervention are more cautiously employed in children and adolescents due the low prevalence of breast cancer in this age group and the risk of injuring the developing breast.

The onset of breast development is called Telarche and occurs in white girls at 7-8 years of age and about a year earlier in the black population. At telarche breast development may be asymmetrical, which may cause concern. However ultrasound can confirm normal glandular development and exclude a lesion. It is important to recognise the stages of breast development (Tanner stages 1-5, Figure 1) that are visible on ultrasound examination between the ages of 7 and 13 years, whereby initially the ductal system is develops followed by the fibroglandular tissue and subcutaneous fat.

Premature thelarche may occur as an isolated event or as part of precocious puberty. Isolated premature thelarche generally occurs in girls aged 1–3 years and is nonprogressive. Reassurance is all that is required. However, if the patient has clinical evidence of other forms of sexual maturation, such as axillary and

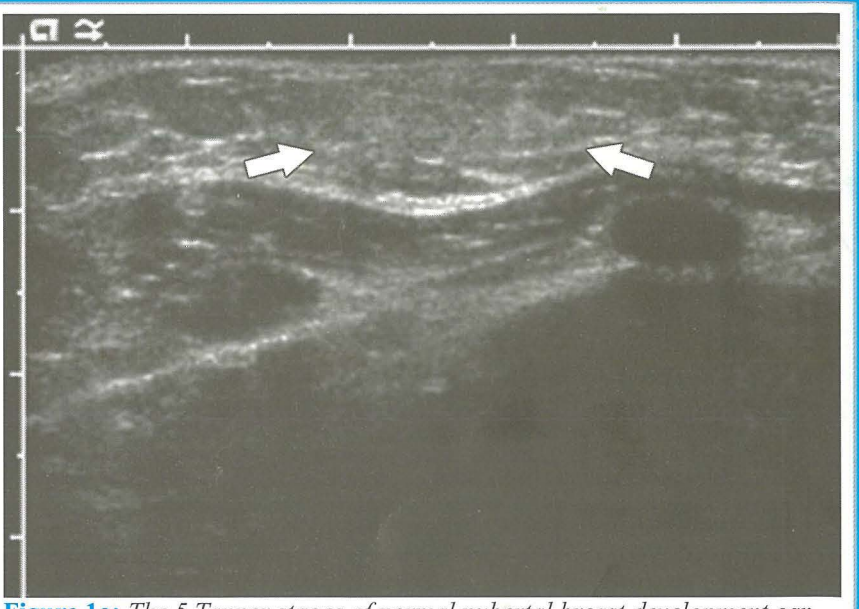

Figure 1a: *The 5 Tanner stages of normal pubertal breast development can be recognised on ultrasound. Tanner stage 1 appears as a small area of ill-defined echogenic tissue in the retroareolar region (arrows).*

groin hair growth or vaginal bleeding, a work-up for precocious puberty should be pursued. Radiologic evaluation for suspected precocious puberty should include a bone age assessment and abdominal and pelvic ultrasound to look for evidence of maturation of the uterus and ovaries. In addition, the ovaries and adrenal glands should be evaluated for oestrogen-producing lesions, including functioning ovarian cysts, juvenile granulosa cell tumors of the ovary, and rare feminizing adrenal cortical tumors.

Excessive development of the male breast is called gynaecomastia and clinically manifests as tender, firm subareolar nodules. In children, gynaecomastia often occurs during the neonatal period and puberty. Bilateral enlargement of the breasts is common in neonates because of the influence of maternal hormones. At puberty, two-thirds to three-fourths of boys have some degree of breast enlargement, which peaks at age 13–14 years and usually resolves within 2 years. The condition is usually bilateral but may be unilateral, and it may be familial. The aetiology of gynaecomastia is thought to be a decrease in the ratio of testosterone to oestrogen. Excessive body fat may lead to increased conversion of testosterone to oestrogen.

continues on page 18

Breast Masses in Children - Part I

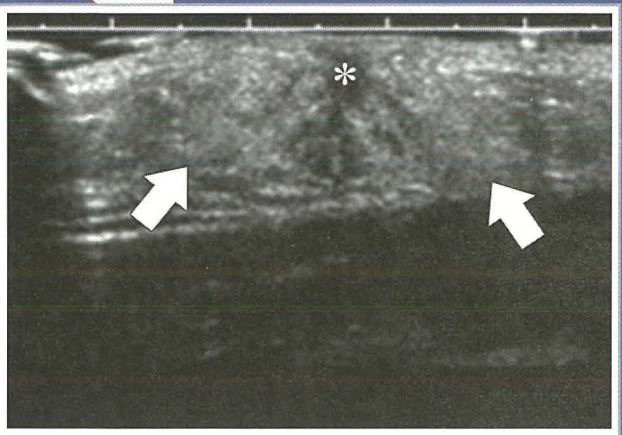

Figure 1b: *Tanner stage 2 is characterised by an echogenic nodule with a retroareolar, stellate, hypoechoic focus (*).*

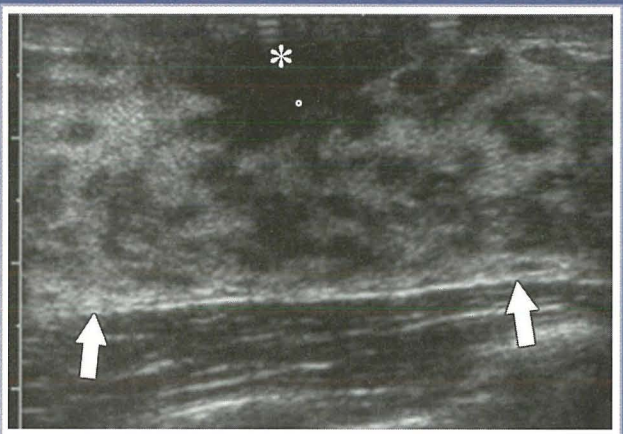

Figure 1c: *Tanner stage 3 demonstrates more echogenic, glandular tissue (arrows) with a central spider-shaped hypoechoic focus (*).*

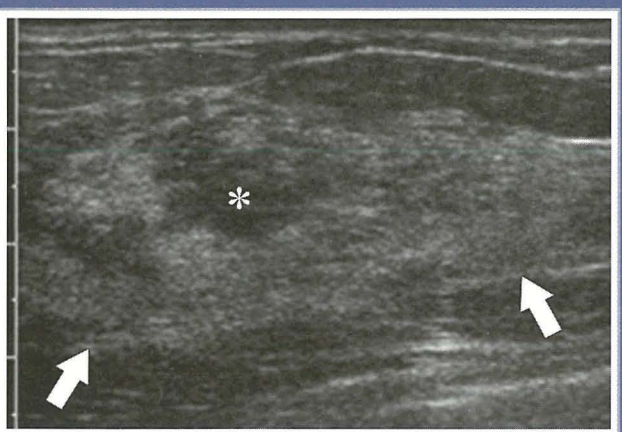

Figure 1d: *Tanner stage 4 shows more echogenic fibroglandular tissue (arrows) with a central hypoechoic nodule (*) with increased subcutaneous fat anterior to the glandular tissue.*

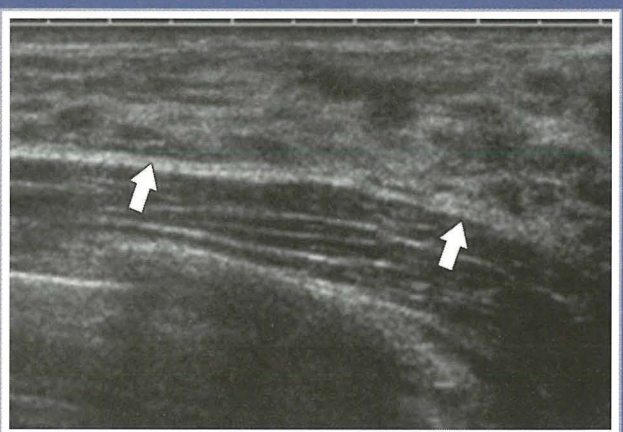

Figure 1e: *Tanner stage 5 demonstrates echogenic fibroglandular tissue (arrows) without a central hypoechoic focus.*

Excessive and more rapidly progressive gynaecomastia or development of gynaecomastia in a prepubertal boy suggests the presence of an endocrinopathy or other underlying disease. Uncommon causes of gynaecomastia include oestrogen-producing tumors of the testis, such as Sertoli or Leydig cell tumors; rare, feminizing adrenal cortical tumors; gonadotropin-secreting tumors, such as hepatoblastoma and fibrolamellar carcinoma or choriocarcinoma; prolactinomas; liver disease; Klinefelter syndrome; testicular feminization syndrome; and neurofibromatosis type 1. In addition, use of drugs such as marijuana (Figure 2), anabolic steroids, corticosteroids, cimetidine, digitalis, and tricyclic antidepressants can cause male breast development.

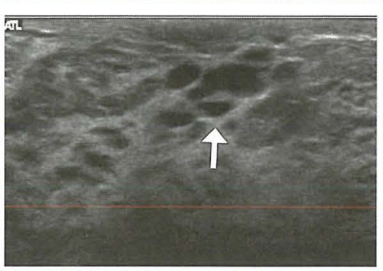

Figure 2: *Unilateral gynaecomastia proved after excision biopsy in a 17-year-old adolescent who admitted frequent use of marijuana. Ultrasound scan shows a biconvex focus of decreased echogenicity (arrow) compared with adjacent subcutaneous fat, deep to which is the pectoralis muscle with hypoechoic muscle bundles separated by linear echogenic fascial bands (arrowhead).*

Juvenile hypertrophy, which is also known as virginal hypertrophy or macromastia, is excessive female breast enlargement that occurs in a relatively short period of weeks to months that often begins shortly after menarche but may occur during pregnancy. Usually both breasts are symmetrically, diffusely enlarged, but the condition may be asymmetric or even unilateral. Patients are often very symptomatic, but surgery should be avoided in girls with ongoing breast growth. These patients are generally treated with anti-oestrogen agents, such as tamoxifen. After growth has stabilized, surgical options include reduction mammoplasty and mastectomy with reconstruction.

Premature telarche, gynaecomastia and juvenile hypertrophy all present with ultrasound features of breast development as described in the above Tanner stages with no distinct mass lesion.

Cystic lesions of the breast include duct ectasia, galactocoele, retroareolar Montgomery cysts, abscesses, haematomas and fibrocystic change; with the exception of haematomas, all are uncommon in this age group.

continues on page 22

Breast Masses in Children - Part I

Duct ectasia usually presents with nipple discharge (often blood stained) and may progress to mastitis; the tubular nature and continuity of the "cysts" on ultrasound is usually diagnostic (Figure 3). Galactocoeles may be distinguished by the fat/fluid levels both on ultrasound and mammography. Haematomas and abscesses can usually be confirmed on clinical grounds and as with galactocoeles, and may be aspirated for confirmation and treatment. Montgomery's glands are located at the perimeter of the nipple. Ductal obstruction of these glands may result in a debris-containing cystic lesion (<2cm in diameter) that may or may not be painful; the structure is readily evaluated with ultrasound. Fibrocystic changes in the breast are usually physiologic alterations that are very common in the 3rd decade of life, although such changes may be seen to some extent in late adolescence. Patients present with cyclically tender breasts that are nodular on palpation. The findings of fibrocystic change at ultrasound are nonspecific and include multiple cysts of varying sizes, dilated ducts, and echogenic foci representing fibrous tissue that may cause posterior sound attenuation.

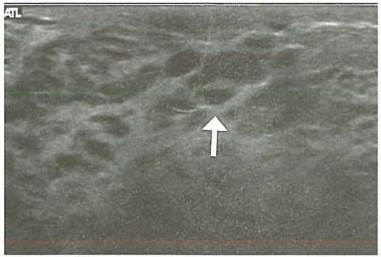

Figure 3: *Retroareolar duct ectasia: Ultrasound scan demonstrates dilated anechoic ducts (arrow) seen in cross section deep to the areola.*

To be continued

Dr Pierre Vassallo can be reached at the DaVinci Hospital on 21 491 200 or by email on pvassallo@davincihospital.com.mt