

## ADOLESCENTS' BREAST PAIN–RETROSPECTIVE US STUDY.

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Article Received on 10/03/2016

Article Revised on 02/04/2016

Article Accepted on 21/04/2016

## ABSTRACT

**Objectives:** Adolescents are often thought of as a healthy group. Breast pain is any discomfort, tenderness, or pain in the breast or underarm region, and it may occur for a number of reasons. Many adolescence have breast tenderness and pain, also called mastalgia. Problems can be alarming, but they are common and rarely serious. The severity of breast pain varies and approximately 15% of patient require treatment. The aim of the paper was to evaluate the diagnostic efficacy of ultrasound on adolescent girls and boys with breast pain. **Materials and Methods:** The study was designed as retrospective investigation. The study population consisted of 137 children between 10 and 21 years of age who were examined clinically, followed by sonography using a linear transducer between the years 2010-2015. **Results:** The group included 128 girls and 9 boys. Cysts were found in 13 girls. Breast abscess was found in 1 girl. Gynecomastia was found in 9 boys. Benign solid lesions were found in 14 girls. Hematoma was detected in 1 girl. 100 patients had not had any pathology. **Discussion:** There is a wide range of pathology that can affect the adolescent breast which can cause pain. Ultrasonography is the examination of choice in breast pain in adolescents. **Conclusion:** Ultrasonography allows for an exclusion or confirmation of an abnormal tissue structure, and determination of its type on adolescent girls and boys with breast pain.

**KEYWORDS:** adolescents, breasts, pain, ultrasound.

## INTRODUCTION

Adolescents are often thought of as a healthy group. Breast pain is any discomfort, tenderness, or pain in the breast or underarm region, and it may occur for a number of reasons. Many adolescence have breast tenderness and pain, also called mastalgia. Problems can be alarming, but they are common and rarely serious. The severity of breast pain varies and approximately 15% of patient require treatment. The aim of the paper was to evaluate the diagnostic efficacy of ultrasound on adolescent girls and boys with breast pain.

## MATERIAL AND METHODS

The study was designed as a retrospective investigation. This study was conducted in the US service department at Bilecik State Hospital. All exams were performed by one radiologists, with more than 10 years of experience with breast US. The US examinations were performed with a TOSHIBA-APLIO machine (2009 model year) equipped with a 12 MHz linear transducer. Study population was consisted of 137 children between 10 and 21 years of age who were examined clinically, followed by standardized sonography using a 12 MHz linear transducer for breast pain between the years 2010-2015. The lesions presenting typically benign features were categorized as probably benign (BI-RADS 3), even if they were palpable lesions with 1 suspicious

malignancy criterion (or more) were classified as BI-RADS 4 or 5. Following a gray-scale evaluation, each patient whom breast lesion was detected was assessed with color Doppler US. The lesions were classified as probably benign if they were avascular or hypovascular lesions with regular and peripheral vessels and as probably malignant if they were hypervascular lesions with irregular vessels and a central distribution, with or without an observable penetrating artery, or as suspicious with any other pattern variant. After the US analysis, all patients, including those whose masses were graded as BI-RADS 3, were returned to the US department for a percutaneous breast biopsy.

## RESULTS

The group included 128 girls and 9 boys (Figure 1 and Figure 2 and Figure 3). Breast cysts were found in 13 children. The cysts ranged in size from 3 mm to 21 mm. Breast abscess was found on US in 1 adolescent girl. Gynecomastia was found in 9 adolescent boys. Benign solid breast lesions were found in 14 adolescent girls. These lesions ranged in size from 5 mm to 44 mm. Hematoma was detected in 1 adolescent girl. 100 patients had not had any breast pathology (Figure 4 and Figure 5).

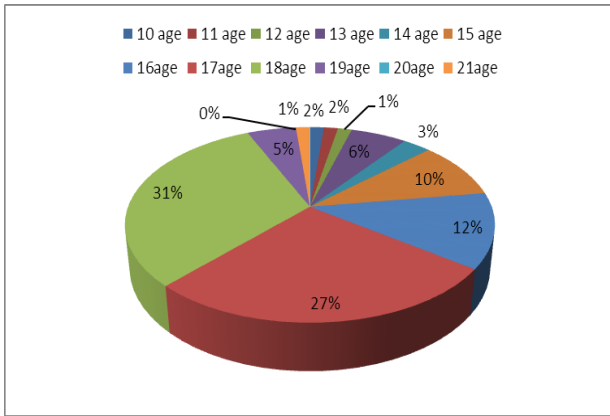


Figure 1: shows the age distribution of patients.

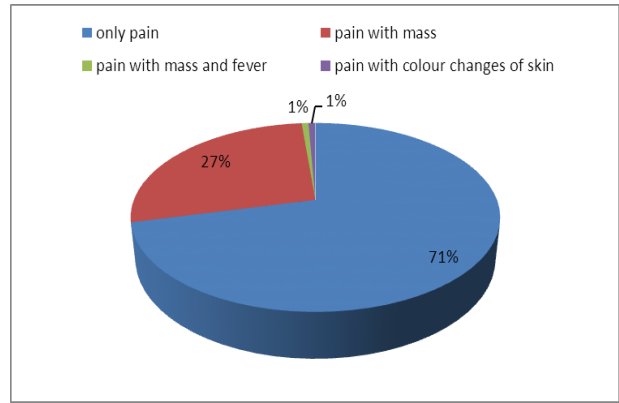


Figure 5: shows the distribution of clinical findings on study group.

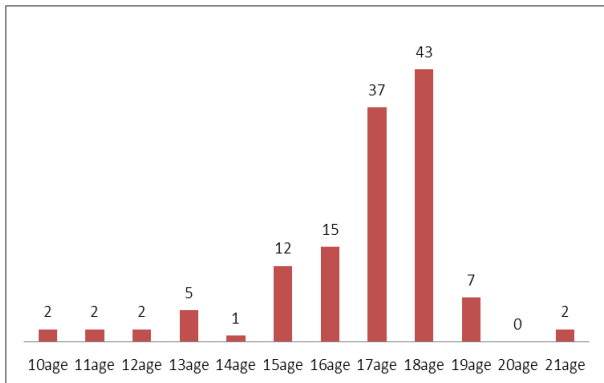


Figure 2: shows the age distribution of adolescent girls.

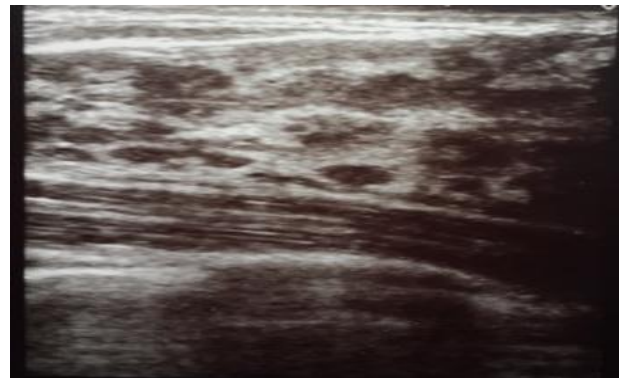


Figure 6: Normal fibroglandular adolescent breast tissue.

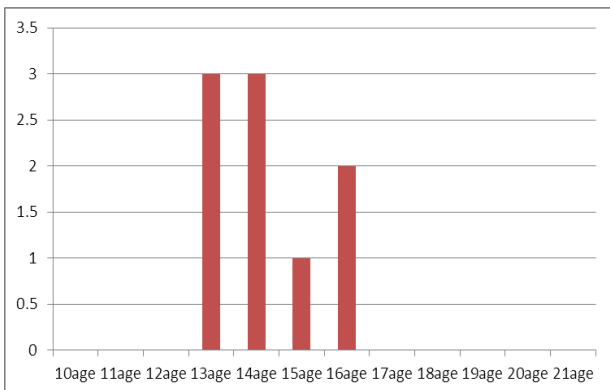


Figure 3: shows the age distribution of adolescent boys.

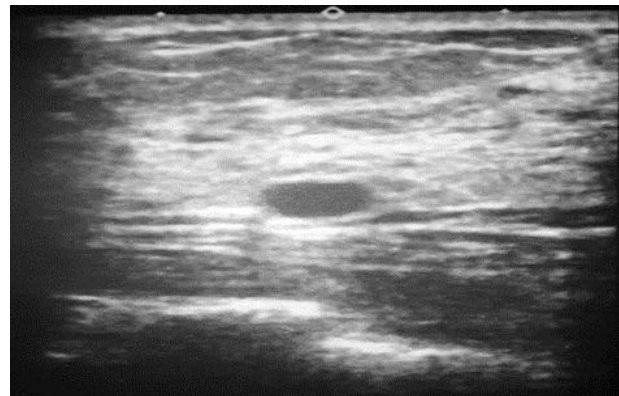


Figure 7: Cyst. Cysts usually reveal thin walls and through transmission.

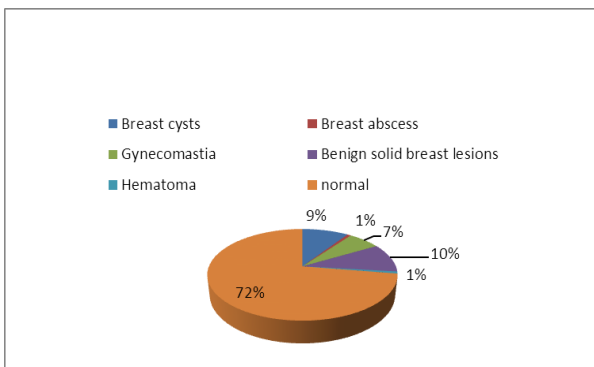


Figure 4: shows the distribution of breast pathologies on study group.

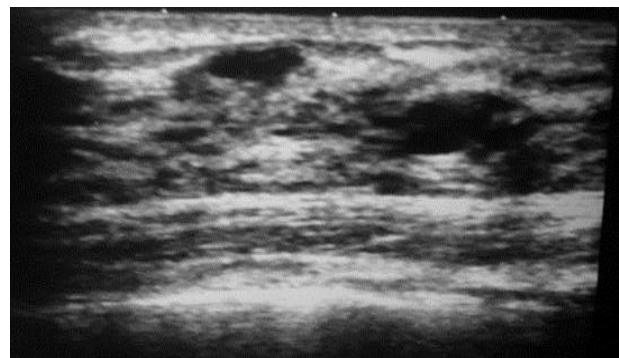
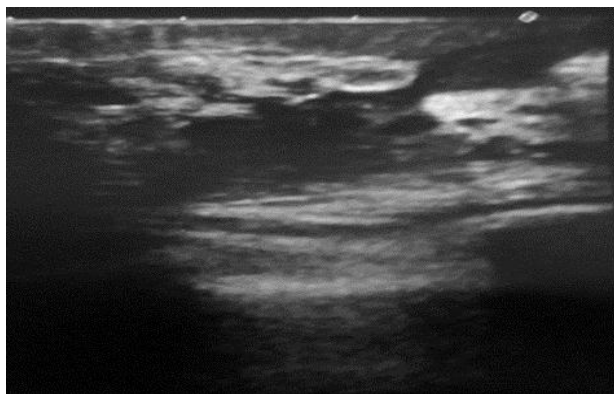
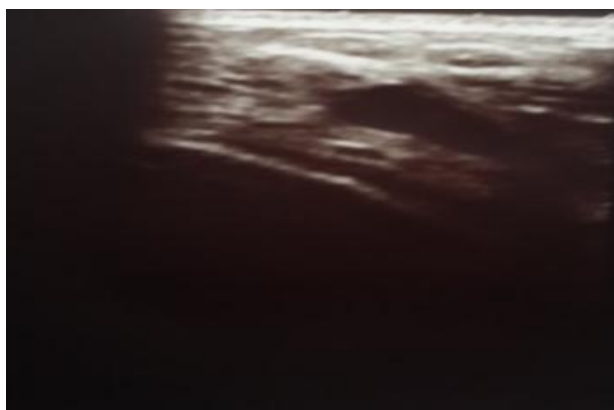


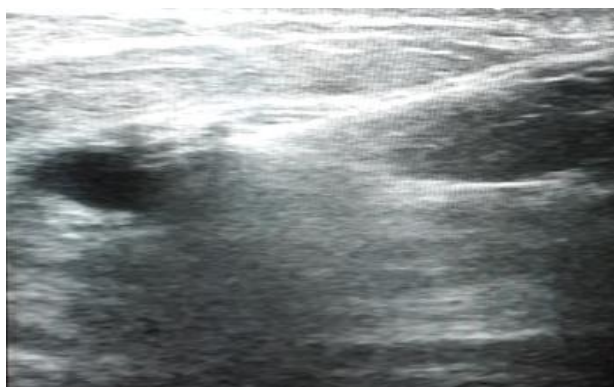
Figure 8: Fibrocystic change. Image shows scattered, discrete, thin-walled cysts.



**Figure 9: Abscess.** Image shows ill-defined outline and low-level internal echoes, posterior enhancement with skin thickening and sinus tract. Patient was admitted with fever, pain, tenderness to touch and increased white cell count.



**Figure 10: Probably benign (BI-RADS 3) lesion** with oval in shape, hypoechoic in comparison to the surrounding fat, with circumscribed margins, and is parallel to the chest wall.



**Figure 11: Percutaneous aspiration biopsy, ultrasound** can also be utilized for image-guided intervention.

## DISCUSSION

Adolescents are often thought of as a healthy group. Breast pain is any discomfort, tenderness, or pain in the breast or underarm region, and it may occur for a number of reasons. Many adolescence have breast tenderness and pain, also called mastalgia. Breast pain (mastalgia) is the most common breast related complaint; nearly 70% of

women experience breast pain at some point in their lives. Breast pain may occur in one or both breasts or in the underarm (axilla) region of the body. The severity of breast pain varies and approximately 15% of patient require treatment. It may come and go with monthly periods (cyclic) or may not follow any pattern (noncyclic). Cyclical breast pain accounts for nearly 75% of all breast complaints. Of all who experience breast pain, two thirds experience cyclical breast pain. Physicians often have patients chart their pain to determine whether the pain is cyclical. Though cyclical breast pain is usually related to the menstrual cycle, stress may also affect hormone levels and influence breast pain. Physical activity, especially heavy lifting or prolonged use of the arms, has also been shown to increase breast pain (pectoral (chest) muscles may become sore from physical activity). This pain usually occurs in both breasts. It is generally described as a heaviness or soreness that radiates to the armpit and arm. The pain is usually most severe before a menstrual period and is often relieved when a period ends. Most cyclic pain goes away without treatment. Non-cyclical breast pain is far less common than cyclical breast pain and is not related to menstrual cycle. Patient who experience non-cyclical breast pain often experience pain in one specific area of the breast(s). Injury or trauma to the breast or breast biopsies may cause non-cyclical pain. Usually, non-cyclical breast pain does not indicate breast cancer. Occasionally, noncyclic pain may be caused by a fibroadenoma or a cyst. If the cause of noncyclic pain can be found, treating the cause may relieve the pain. Breast pain can get worse with changes in your hormone levels or changes in the medicines you are taking. Stress can also affect breast pain. Teenage pregnancy is pregnancy in a woman 19 years of age or younger and may also contribute tenderness on breasts. Other factors that may contribute to breast pain include: Weight gain and bras that do not fit properly. Rarely, a breast tumor especially Inflammatory Breast Cancer may cause pain, but generally cancerous tumors are not reported as painful.

Physicians will evaluate the pain, taking into account the personal history, family history, the area of pain, the intensity and duration of the pain, and the extent to which the pain interferes with her lifestyle. Physicians will also perform clinical breast examinations, and if necessary, order additional breast imaging exams (such as ultrasound) to help determine whether the pain is related to another breast condition or possibly cancer.<sup>[1]</sup> If no breast abnormality is indicated, the physician and patient should decide together whether drug treatment is necessary.

The larche, or the onset of pubertal development, usually begins between the ages of 8 to 13. The development of the breasts can be asymmetric, and patients may present for evaluation of a palpable mass and pain that in fact is a normal breast bud. At different stages of development, the appearance of the breast bud varies on ultrasound. If

breasts fail to develop at all, or if they are so large they are causing neck or back issues. It is common for breasts to become tender before or during menstrual periods. This is due to hormone changes and is not a cause for concern.

Gynecomastia is the presence of excessive, benign subareolar tissue in the male breast. Clinically, patients present with a tender, mobile, subareolar mass. It is a common finding in the adolescent boy, present in 75% of boys with a peak incidence at age 13 to 14 years. It can be asymmetric, unilateral, or bilateral, and usually resolves within 2 years. Though the diagnosis is usually made clinically, ultrasound shows a variable appearance to gynecomastia. It can be nodular with an oval hypoechoic region in the subareolar breast, poorly defined as a vague hypoechoic structure in the retroareolar region, or flame-shaped with finger-like extensions into the surrounding tissue.

Fibroadenomas, fibrocystic breast changes, infection are breast conditions that are fairly common in teens.<sup>[2]</sup> They cause symptoms that may be worrisome. But they are not serious. In many cases, they don't even need treatment.<sup>[3]</sup> Fibroadenomas represent over half of breast masses in the adolescent population in surgical series, presenting as palpable, circumscribed, rubbery, mobile sometimes painful masses.<sup>[4]</sup> The cause of fibroadenomas is unknown, but hormonal influences are believed to play a factor in their development as a significant number of fibroadenomas change with hormonal stimulation. The average size is 2 to 3 cm.<sup>[5]</sup> The term giant fibroadenoma refers to lesions > 5 cm in diameter. The average patient age at diagnosis is 15 to 17 years. On ultrasound, fibroadenomas are typically oval or lobulated in shape, isoechoic or hypoechoic in comparison to the surrounding fat, with circumscribed margins, and are parallel to the chest wall. They are not cancer, and are harmless. Fibroadenomas may come and go around periods. If the lump is growing in size or is painful, it can be removed.

Fibrocystic change represents a range of findings from benign solitary simple cysts to proliferative fibrocystic changes. Breast cysts or fibrocystic changes are present in approximately 8.5% of this population. Breast cysts can be solitary or multiple, simple or complicated.<sup>[6,7]</sup> The differential diagnosis of a complicated cyst includes a hematoma, galactocele, or abscess.<sup>[8]</sup> Clinical history will usually assist in distinguishing these entities. They make the breast feel lumpy, tender, or painful. They are not cancer. And they don't make a girl more likely to get breast cancer. Treatment can help relieve symptoms.

Posttraumatic lesions in the adolescent breast include hematomas and fat necrosis, which frequently are secondary to sports-related injuries or iatrogenic trauma. On ultrasound, hematomas are complex cystic masses that vary in appearance with the age of the hematoma, initially hyperechoic and becoming increasingly

anechoic with time. Fat necrosis also has a widely variable appearance on imaging, on ultrasound, a hyperechoic or mixed echogenic mass with variable cystic spaces, a cystic lesion, or hypoechoic mass with or without posterior acoustic shadowing can be seen. Clinical history of a traumatic event to the breast can lead to the appropriate diagnosis; short-term follow-up of these lesions allows evaluation of their expected benign evolution.<sup>[9]</sup>

Patients who develop an infection of the breast can present with fever and an erythematous, painful breast with or without fever. Mastitis is most often seen in lactating women, but nipple injury or piercing, areolar hair plucking, ductal obstruction, breast trauma or cellulitis can be other etiologies.<sup>[10]</sup> With ultrasound, the breast is edematous and hyperechoic, the tissue can be difficult to penetrate with a high-frequency transducer. If an abscess develops, a complex cystic mass with a thick wall and peripheral Doppler flow may be seen. Ultrasound-guided aspiration is both diagnostic and therapeutic. Treatment with antibiotics may be needed.

Most patient with moderate breast pain are not treated with medications or surgical procedures. The following suggestions have been shown to reduce breast pain in some women (although there is not sufficient scientific evidence to establish the effectiveness of any of these suggestions): Wear a good, supportive bra to reduce breast movement, limit sodium intake, reduce caffeine intake, maintain a low fat diet, maintain an ideal weight, take vitamins (Vitamin B6 (pyridoxine), Vitamin B1 (thiamine), and Vitamin E), cyst aspiration and relax.

Adolescent breast imaging exams are typically triggered by a specific concern, in contrast to the adult population where the focus of breast imaging is most often on screening.<sup>[11]</sup> The mainstay of breast imaging in the adolescent is ultrasonography. Targeted ultrasound is the primary modality used for evaluation of the adolescent breast. There is occasionally a need for additional imaging, particularly with magnetic resonance imaging (MRI). Imaging of the adolescent breast differs substantially from the adult in both the imaging modalities utilized and the relative likelihood of pathologies encountered. The majority of lesions in the adolescent are benign. It is important to prevent unnecessary radiation exposure while answering the clinical question.<sup>[12,13]</sup>

Breast ultrasound is the imaging modality of choice for the evaluation of an adolescent presenting with a breast concern and should be performed with a high-frequency (10 MHz or higher) linear array transducer. There is no radiation exposure. Exams are targeted to a specific area of concern, and in conjunction with a detailed physical exam, an accurate diagnosis can be achieved for most children with a breast mass. Ultrasound is effective in differentiating cystic from solid masses, while maintaining a negative predictive value of 99.5% when



the Stavros criteria for benign and malignant masses is utilized.<sup>[14]</sup> If percutaneous aspiration or biopsy is necessary, ultrasound can also be utilized for image-guided intervention.

Breast magnetic resonance imaging (MRI) is not routinely used, MRI may be useful for a better definition of lesions.

## CONCLUSION

There is a wide range of pathology that can affect the adolescent breast which can cause pain. US is the examination of choice in breast pain in children and adolescents. It allows for an exclusion or confirmation of an abnormal tissue structure, and determination of its type.

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