

The Role of Sonography during Pregnancy and Lactation in Diagnosis of Breast Lesions

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Abstract

Background: During pregnancy and lactation, the breast changes due to different hormonal effects. These changes are parenchymal & vascular which affects accurate radiological evaluation of breast lesions. Most breast lesions during pregnancy and lactation are benign in nature; however, malignancy couldn't be excluded.

Aim of Study: Our aim was to review ultrasound findings of benign and malignant lesions common during pregnancy and lactation and differentiate between them by ultrasound and biopsy in suspected cases.

Patients and Methods: This was a prospective study included 70 pregnant & lactating women with breast findings on ultrasound. All women subjected to full history taking, clinical examination, ultrasonography and pathological examination results for some cases. Lesions had been assessed according to ultrasound BIRADS system as follows: (1) BIRADS 2 lesions had been considered benign, large painful cyst had been aspirated. (2) BIRADS 3 lesions had been followed-up for 6 months: If they are stationary or resolved, they had been considered benign lesions, If they show increased in size or changed in appearance, they had been biopsied. (3) BIRADS 4 and 5 lesions had been biopsied.

Results: Our study results revealed that one patient (1.4%) had an accessory breast. 9 patients (12.9%) confirmed to have galactoceles by aspiration from cystic lesions that contained milky secretions. Two of the lactating women confirmed to have lactational adenoma by histopathology. 30 patients (42.8%) was diagnosed to have mastitis clinically & radiologically, 14 patients (20%) resolved after medical treatment, 15 patients (21.4%) complicated by abscess formation & treated by surgical drainage & medical treatment, one patient (1.4%) was diagnosed granulomatous mastitis by histopathology and resolved after corticosteroids treatment. Two patients (2.9%) were diagnosed to have fat necrosis that decreased in size in their follow-up. Also, 16 patients (21.5%) were suspected to have benign lesions by US features, 6 patients (8.6%) were diagnosed as fibrocystic disease, 6 patients (8.5%) had few cystic lesions and diagnosed as simple cysts, 1 patient (1.4%) was diagnosed as fibromatosis after surgical excision & histopathological examination and 3 (4.3%) patients were

diagnosed as fibroadenomas after biopsy & stationary course in their follow-up after 6 months. However, 10 patients (13.13%) were suspected to have malignant lesions by US features, 9 patients (12.9%) was invasive ductal carcinoma and one patient (1.4%) was mucinous carcinoma after surgical excision and histopathology. The present study showed that regarding validity of US in the diagnosis of benign and malignant lesions; the sensitivity was 100%. The specificity was 98.3%. PPV was 90.9% and NPV was 100%. AUC was 0.99 or 99%.

Conclusion: Substantial physiological changes during pregnancy and lactation make it challenging to evaluate patients presenting with a breast problem. Most findings in pregnant and lactating patients are benign. Ultrasound is the first-line imaging modality for all pregnant women and for lactating women less than 30 years of age and for guiding interventional breast procedures.

Key Words: Sonography – Pregnancy – Lactation – Breast lesions.

Introduction

DURING pregnancy and lactation the breast changes due to different hormonal effects. These changes are parenchymal & vascular which affects accurate radiological evaluation of breast lesions. Most breast lesions during pregnancy and lactation are benign in nature; however, malignancy couldn't be excluded, in this study we try to reach the most accurate differential diagnosis of breast lesions discovered at pregnant & lactating women [1].

Serum estrogen, progesterone, and prolactin levels are responsible for the physiologic changes during pregnancy and lactation. High estrogen levels results in increasing breast size by stimulating growth of ducts, lobules & stroma. Progesterone is responsible for providing secretory capability to alveolar cells [2].

The breast become clinically enlarged, nodular & firm which affects both clinical & radiological diagnosis. These changes will continue until 3

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months after stopping breast feeding. So that, it's recommended to do clinical breast examination at first obstetric visit [2].

As for the role of radiology, Ultrasonography is the first method of choice for breast evaluation during pregnancy and lactation. It can be done at any time since it does not have ionizing radiation or require the use of contrast, and has high sensitivity for the diagnosis of breast lesions [3].

On ultrasound, the non-fatty fibroglandular component of the breast parenchyma is enlarged and demonstrates diffuse hypoechogenicity in the first trimester. In the second and third trimesters, physiological changes accompanied by lobular proliferation may cause an increase in the echogenicity of the fibroglandular parenchyma. At the end of pregnancy, hypoechoic tubular structures corresponding to ducts with colostrum are formed. During lactation, the ducts become hyperechogenic because they contain milk, with a predominance of diffuse hyperechogenicity. A prominent ductal system and increased vascularity are observed [3].

Both fine-needle aspiration biopsy (FNAB) and large core needle biopsy can be performed during pregnancy & lactation from suspicious lesions (BIRADS4 & 5 lesions) by imaging. Follow-up of benign lesions (BIRADS 3) is done by imaging [4].

Aim of the work:

Our aim is to review ultrasound findings of benign and malignant lesions common during pregnancy and lactation. To differentiate between them by ultrasound and biopsy in suspected cases.

Patients and Methods

Type of study: Prospective cohort study.

Study setting: This study carried out at Radiology Department of Ain Shams University, Sohag Teaching Hospital and Oncology Institute during the period from January 2021 till November 2021.

Study population: The current study involved pregnant & lactating women with breast findings on ultrasound.

Inclusion criteria:

All pregnant and lactating patients with clinical suspicion of breast lesion are evaluated ultrasonographically.

Exclusion criteria:

- Nonpregnant and nonlactating patients are excluded.

- Known primary malignancy.
- Postoperative patients are excluded from the study.
- Patients not willing to be part of study are excluded.

Sample size:

Using Epi Info 7 program for sample size calculation by convenience sample, assuming prevalence rate of breast masses of 50% among studied breast lesions, setting margin of error at 10%, sample size of 70 women, with breast lesions will be needed for 90% confidence level.

Ethical considerations:

The whole procedures are explained in details to the patients and they should receive detailed written information which explains the entire procedure and any possible risks that may happen, this is called the Informed consent. The Informed consent is signed by the patient. The collected data will be used in research purposes only; the study protocol will be presented to and approved by the ethical committee of scientific research Faculty of Medicine Ain Shams University.

Study tools:

- Full history taking: Including age, sex, family history, past history of breast lesions and presence of any symptoms.
- Clinical examination: To assess and validate all palpable masses.
- Bilateral breast ultrasound is performed.
- Pathological examination results for some cases.

Study procedures:

Lesions had been assessed according to ultrasound BIRADS system as follows:

- 1- BIRADS 2 lesions had been considered benign, large painful cyst will be aspirated.
- 2- BIRADS 3 lesions had been followed-up for 6 months: If they are stationary or resolved, they had been considered benign lesions, if they show increased in size or changed in appearance, they had been biopsied.
- 3- BIRADS 4 and 5 lesions had been biopsied.

1- Ultrasonography:

The US examinations were performed using LOGIQ P7 and LOGIQ P9 equipment with high-resolution linear transducers L6-12.

2- Ultra-sound guided biopsy:

A- Fine needle aspiration biopsy (FNA): FNA was indicated for breast cytology that are large, symptomatic or have turbid fluid.

B- Tru-cut tissue biopsy: This had been done for BIRADS 4 & 5 lesions as regarding the criteria by BIRADS ultrasound classification.

Statistical analysis:

Data was analyzed using SPSS version 22 (Statistical Software package version 22). Descriptive analysis was performed. Quantitative data was represented as mean, standard deviation, median and range. When the data was normally distributed independent *t*-test was used to compare between two groups. Qualitative Data are reported as frequencies and percentages. Fisher Exact test was used to compare between two categorical groups. Sensitivity, specificity, and negative and positive

predictive values were determined by using contingency tables. Graphs were produced by using Excel or SPSS version 22. *p*-value was considered significant if it was less than 0.05.

Results

There was significant difference between benign and malignant groups of in age as *p*-value=0.04.

Table (2): Summary statistics of clinical and radiological parameters of studied cases (n=70).

Clinical and radiological parameters	Summary statistics
<i>Lesion category:</i>	
Benign	60 (85.7%)
Malignant	10 (14.3%)
<i>U/S morphology of diseases:</i>	
No lesion	14 (20%)
Lesion	56 (80%)
<i>U/S morphology of lesions:</i>	
Collection	16 (28.6%)
Cyst	17 (30.4%)
Mass	23 (41%)
<i>Associated interstitial edema:</i>	
Absence	43 (61.4%)
Presence	27 (38.6%)
<i>Associated echogenic edematous fat lobules:</i>	
Absence	34 (48.6%)
Presence	36 (51.4%)
<i>Associated thickened skin:</i>	
Absence	44 (62.9%)
Presence	26 (37.1%)
<i>Associated lymph node enlargement:</i>	
Absence	20 (28.6%)
Reactive	47 (67.1%)
Suspicious	3 (4.3%)
<i>BIRADs:</i>	
BIRADs-2	31 (44.3%)
BIRADs-3	29 (41.4%)
BIRADs-4	7 (10%)
BIRADs-5	3 (4.3%)

Table (1): Characteristics data of studied women (n=70).

Demographic data	Summary statistics
<i>Age/years:</i>	
Mean ± SD	30.8±5.6
Median (range)	30.5 (20-40)
<i>Child bearing women:</i>	
Pregnant	21 (30%)
Lactating	49 (70%)

Table (3): Summary statistics of histopathological diagnosis of studied cases (n=70).

Diagnosis	Summary statistics
<i>Congenital anomaly:</i>	
Accessory breast	1 (1.4%)
<i>Lactational lesions:</i>	
Galactocele	9 (12.9%)
Lactational adenoma	2 (2.9%)
<i>Inflammatory lesions:</i>	
Mastitis	14 (20%)
Abscess	15 (21.4%)
Granulomatous mastitis	1 (1.4%)
Fat necrosis	2 (2.9%)
<i>Benign proliferative lesions:</i>	
Fibrocystic disease	6 (8.6%)
Fibromatosis	1 (1.4%)
Fibroadenoma	3 (4.3%)
Sebaceous cyst	1 (1.4%)
Other cysts	5 (7.1%)
<i>In-situ and malignant lesions:</i>	
IDC	9 (12.9%)
Mucinous carcinoma	1 (1.4%)

Table (4): Distribution of histopathological diagnosis of studied women regarding follow-up.

Diagnosis	Summary statistics	Follow-up
<i>Congenital anomaly:</i>		
Accessory breast	1 (1.4%)	No follow-up needed
<i>Lactational lesions:</i>		
Galactocele	9 (12.9%)	Milky fluid aspiration then resolved
Lactational adenoma	2 (2.9%)	Histopathology and stationary appearance after 6 month
<i>Inflammatory lesions:</i>		
Mastitis	14 (20%)	Resolved
Abscess	15 (21.4%)	Resolved after drainage and TTT
Granulomatous mastitis	1 (1.4%)	Histopathology and then resolved in her follow-up after TTT
Fat necrosis	2 (2.9%)	Resolved by the time
<i>Benign proliferative lesions:</i>		
Fibrocystic disease	6 (8.6%)	Follow-up in cases of +ve family history in screening program
Fibromatosis	1 (1.4%)	Surgical removal
Fibroadenoma	3 (4.3%)	Histopathology and stationary appearance after 6 month
Sebaceous cyst	1 (1.4%)	No follow-up needed
Other cysts	5 (7.1%)	No follow-up needed
<i>In-situ and malignant lesions:</i>		
IDC	9 (12.9%)	Histopathology and surgical removal and her routine follow-up
Mucinous carcinoma	1 (1.4%)	Histopathology and surgical removal and her routine follow-up

Table (5): Comparison between benign and malignant groups regarding age (no=70).

Parameters	Cases no	Lesion type		p-value
		Benign (n=59)	Malignant (n=11)	
<i>Age/years:</i>				
Mean ± SD	70	30.25±5.2	34.1±6.7	0.04*
Median (range)		30 (23-40)	36.5 (20-40)	

Independent t-test was used for parametric continuous data.
* = Significant.

Table (7): Validity of US in the diagnosis of benign and malignant lesions.

U/S results	Histopathology results		Total
	Malignant lesions	Benign lesions	
Positive results (malignant)	10	1	11
Negative results (benign)	0	59	59
Total	10	60	70

Case (1):

Clinical background:

A 25 year old lactating female patient, presented with left breast lump 4 days ago.

Table (6): Comparison between benign and malignant groups regarding the defined border of mass.

U/S results	Cases (no)	Histopathology results		p-value
		Malignant lesions	Benign lesions	
Well defined	26	0	26	
Ill-defined	11	10	1	<0.0001 *
Total	37	10	27	

Fisher Exact test was used for categorical data.
* = Significant.

Table (8): Sensitivity, specificity and accuracy of U/S manoeuvre in diagnosis of benign and malignant lesions.

Parameters	Diagnosis of US
Sensitivity	100%
Specificity	98.3%
PPV (Positive predictive value)	90.9%
NPV (Negative predictive value)	100%
AUC (area under curve)	0.99 or 99%
p-value	<0.0001 *

Ultrasound findings:

Left breast showed well defined oval cystic lesion measuring about 24 x 10mm located at outer lower quadrant corresponding to 4 O'clock with

mixed echogenicity, the hyperechoic content settle at dependent region. Picture suggestive of galactocele (Fig. 1).

BIRADS 2:

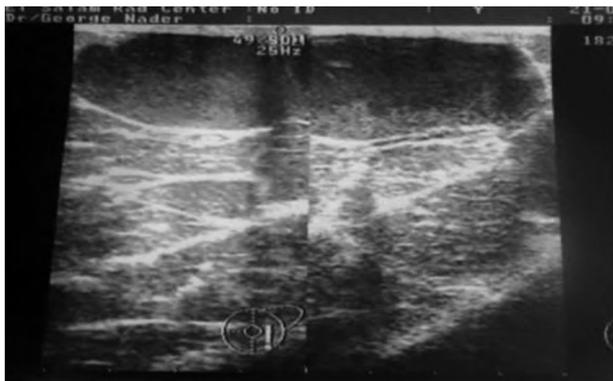


Fig. (1): Well defined oval cystic lesion with mixed echogenicity. Lactating female (Galactocele). US guided aspiration revealed whitish milky secretions.

Case (4):

Clinical background:

A 34 year old lactating Female patient, presented with right breast lump few months ago.

Ultrasound findings:

Right breast showed macrolobulated hypoechoic with angular margins measuring about 2.5 x 1cm seen at 6 o'clock deeply located away from nipple by 4cm. Picture suggestive of suspicious breast mass Fig. (2C).

BIRADS 4:

Mamographic findings:

Speculated hyperdense lesion seen at lower central at right breast (Fig. 2A,B).

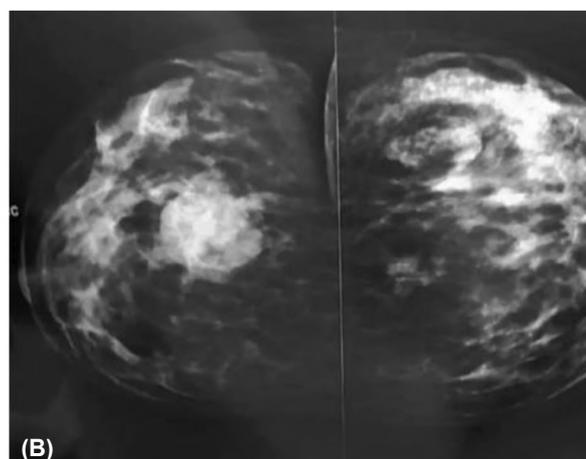
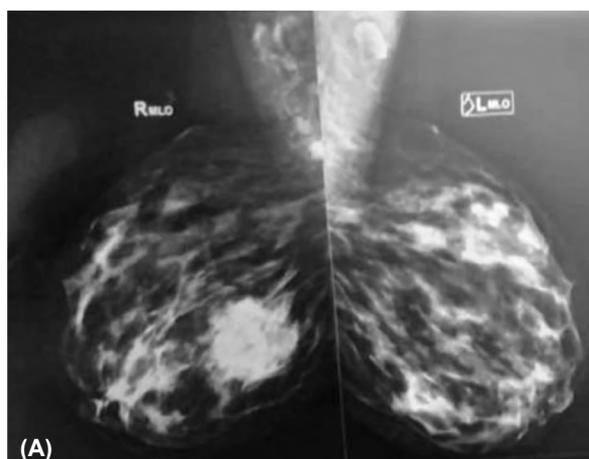


Fig. (2A,B): Spiculated hyper dense lesion seen at lower central of right breast.

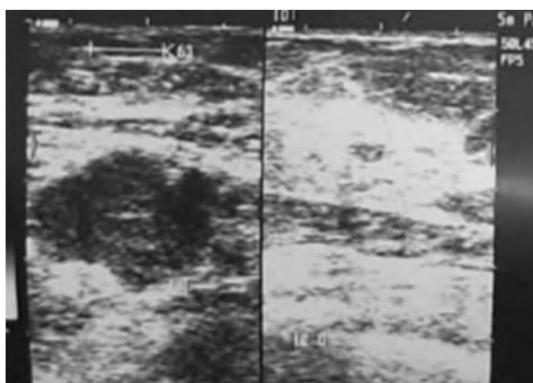


Fig. (2C): Macrolobulated hypoechoic mass lesion with angular margins. U/S guided core needle biopsy revealed mucoid carcinoma.

Case (9):

Clinical background:

A 30 year old pregnant female patient, presented with palpable left breast lump.

Ultrasound findings:

Palpable lesion seen at 6 o'clock, superficially located at subcutaneous tissue, well defined, oval shaped anechoic cystic lesion measuring about 10x5mm. Picture suggestive of sebaceous cyst (Fig. 3).

BIRADS 2:



Fig. (3): Well defined anechoic oval superficial cystic lesion (sebaceous cyst). Pregnant female.

Case (10):

Clinical background:

A 38 year old pregnant female patient, presented with bilateral mastalgia for 1 month ago.

Ultrasound findings:

Multiple cystic lesion of variable size largest one measuring about 14mm, smooth wall, clear content seen scattered at breast tissue. Picture suggestive of fibrocystic changes (Fig. 4).

BIRADS II:

The same picture by sonography follow-up after 1 year.

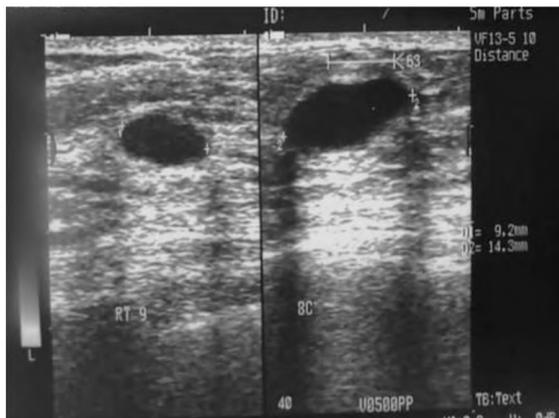


Fig. (4): Multiple cystic lesion with thin wall and clear content. pregnant female (fibrocystic changes).

Discussion

Radiological evaluation varies depending upon the age of the woman, her pregnancy and lactational status. Subsequent to a clinical history and thorough physical examination, patients are frequently im-

aged to determine whether there is an underlying abnormality to account for the patient's symptoms. For pregnant and lactating women under the age of 30 years, ultrasound is the initial imaging test of choice given the lack of radiation exposure. Mammogram could be considered in these patients if ultrasound is negative or it reveals indeterminate, suspicious or no findings [5].

Lactating women over 30 years of age are typically imaged using both mammography and ultrasound. In an effort to reduce the overall breast density, lactating patients are encouraged to express milk immediately prior to imaging. In a pregnant patient, mammography should be performed, if ultrasound reveals a suspicious finding or if biopsy of a solid lesion reveals malignancy. A complete evaluation of a pregnant patient with a lump should not be delayed until after delivery, because of fear of radiation [6].

The imaging appearance on ultrasound is variable depending upon the duration of pregnancy and/or lactating state. An overall diffuse increase in breast density accompanied by breast enlargement is commonly seen on mammography. Given increased density of the breast the sensitivity of mammography is low (30% for dense breast compared with 80% for fatty breast), and cancer detection may be somewhat difficult. According to one study evaluated patients with false-negative mammograms and symptomatic cancer, and found that 78% of the mammographically occult lesions were in women with heterogeneously or extremely dense tissue. The imaging features of breast cancer on the mammogram are identical to those seen in nonpregnant women [2].

These are speculated or irregular masses, pleomorphic linear branching or grouped microcalcifications, focal asymmetries and architectural distortion. Detection is sometimes difficult as the overlying dense tissue may obscure the findings [7].

On ultrasonography, during pregnancy, the breast shows diffuse hypoechogenicity with fibroglandular enlargement and increased vascularity. In lactating women, the breast shows diffuse hyperechogenicity with a prominent ductal system and increased vascularity. Ultrasonography is the best imaging modality to evaluate breast lesions during pregnancy and lactation, as it is sensitive and confers no radiation exposure. According to the ACR Appropriateness Criteria, pregnant woman with palpable masses or pathological nipple discharge should be initially evaluated by ultrasonog-

raphy in order to characterize the features of the lesion and plan proper management [8].

The main aim of this study was to review ultrasound findings of benign and malignant lesions common during pregnancy and lactation and to differentiate between them by ultrasound and biopsy in suspected cases.

This prospective study was conducted at Radiology Department of Ain Shams University, Sohag Teaching Hospital and Oncology Institute including 70 Pregnant & lactating women with breast findings on ultrasound. The duration of the study ranged from 6-12 months.

The main results of this study were as following:

As regard demographic data; The study was carried on 70 women. The mean \pm SD for patient's age was 30.8 ± 5.6 years old. 30% were pregnant and 70% were lactating.

In the same line, a study of Robbins et al., [9] carried out on 126 patients, 32 (26%) were pregnant and 81 (64%) were lactating. Their study reported that participants age ranged from 19 to 47 years and mean of age was 32.3 years.

Also, in the study of Haliloglu et al. [10], they included 77 actively breastfeeding patients who underwent breast US. The mean age of the patients was 31.6 years (range 20-46 years).

Pregnancy-associated breast cancer occurs with a frequency of one in 3,000-10,000 pregnancies, accounting for 1-3% all breast cancers. It is not infrequent for women to present to their physicians with a breast problem during pregnancy or within 1 year of delivery. Changes occurring in the breast during these physiological states make clinical and radiological evaluation of these patients challenging. Improving understanding of varied breast problems and their imaging appearance on multiple modalities is essential to ensure optimal management of these patients [5].

In the first and second trimester, there is proliferation and differentiation of the lobules, alveoli and lactiferous ducts, the alveolar epithelium becomes secretory. With rising serum prolactin during the third trimester, the milk-producing cells continue to differentiate and colostrum eventually fills the alveoli and milk ducts prior to delivery. These proliferative changes result in bilateral breast enlargement and increased overall density of the breast tissue on imaging. Following delivery, the lactogenic effect of prolactin results in a substantial

increase in milk production. All of these physiological changes directly impact the imaging appearance of the breast on mammography, ultrasound and magnetic resonance imaging (MRI) thereby complicating evaluation of pregnant and/or lactating patients, presenting with a breast problem [6].

The present study showed that as regard clinical and radiological parameters of studied cases; 60 (85.7%) patients were Benign and 10 (14.3 %) patients were malignant. (80%) of cases had lesion on U/S, their morphology was as the following; (41%) of them were masses, (30.4%) were cysts and (28.6%) were collection. (38.6%) had Associated Interstitial edema. (51.4%) had Associated echogenic edematous fat lobules. (37.1%) had Associated thickened skin. (67.1%) had reactive Associated lymph node enlargement.

Our results were supported by study of Haliloglu et al. [10] revealed that of the 77 patients, 28 (36%) had normal US imaging findings with lactational changes in the breast parenchyma (BI-RADS 1). The majority of breast masses detected during lactation are benign. Simple or complicated cysts were seen in 16 (20.8%) patients, among which only 1 lesion showed an increase in size compared to the pre-pregnancy US. 4 (5.2%) patients had stable fibroadenomas. 6 (7.8%) patients had US imaging findings suggestive of mastitis, 5 (6.5%) patients had galactocele, 1 patient had an abscess, and 1 patient had unilateral hypertrophy without any accompanying lesion (BI-RADS 2).

Many breastfeeding women experience breast symptoms including pain, tenderness, firmness, and palpable lumps. Thanks to the increasing breast cancer awareness, these patients are usually referred for further examination. The lactating breast is under the influence of circulating hormones which lead to glandular proliferation, ductal dilatation, and stromal involution. Hence, the physical examination of the lactating breasts is difficult, and radiologic evaluation is usually necessary. It has been suggested that, regardless of the lactational or gestational status, for symptomatic women younger than 30 years of age, US should be the first-line imaging and mammography should be saved for patients with indeterminate or suspicious lesions on US scans. US is quite successful in demonstrating true masses as well as normal breast parenchyma which may show palpable nodularity during lactation. When necessary, mammography can be performed just after breastfeeding to avoid high-density parenchyma related to retained milk products [11].

Our study revealed that one patient (1.4%) had an accessory breast. 9 patients (12.9%) confirmed to have galactoceles by aspiration from cystic lesions that contained milky secretions. Two of the lactating women confirmed to have lactational adenoma by histopathology. 30 patients (42.8%) was diagnosed to have mastitis clinically & radiologically, 14 patients (20%) resolved after medical treatment, 15 patients (21.4%) complicated by abscess formation & treated by surgical drainage & medical treatment, one patient (1.4%) was diagnosed granulomatous mastitis by histopathology and resolved after corticosteroids treatment. Two patients (2.9%) were diagnosed to have fat necrosis that decreased in size in their follow-up. Also, 16 patients (21.5%) were suspected to have benign lesions by US features, 6 patients (8.6%) were diagnosed as fibrocystic disease, 6 patients (8.5%) had few cystic lesions and diagnosed as simple cysts, 1 patient (1.4%) was diagnosed as fibromatosis after surgical excision & histopathological examination and 3 (4.3%) patients were diagnosed as fibroadenomas after biopsy & stationary course in their follow-up after 6 months. However, 10 patients (13.13%) were suspected to have malignant lesions by US features, 9 patients (12.9%) was invasive ductal carcinoma and one patient (1.4%) was mucinous carcinoma after surgical excision and histopathology.

Our results were supported by study of Son et al., [12] as they revealed that galactocele is the most commonly found breast lesion during lactation (24.19%).

In the study of Samad & Phatak, [13], twenty patients clinically suspected to have fibroadenoma came out to be the same in conventional ultrasound and elastographically. Clinically diagnosed galactoceles in 20 patients were found out to be galactocele in 14 patients and duct ectasia in 2 patients sonoelastographically. Out of 8 patients, clinically diagnosed to have mastitis, 4 found out to be non-suppurative mastitis and 4 patients diagnosed to have breast abscess using conventional ultrasound and 6 patients diagnosed to have non suppurative mastitis and 2 patients diagnosed to have breast abscess. Clinically, 11 patients suspected to have abscess, out of which by conventional ultrasound, diagnosed to have abscess in 9 patients and mastitis in 2 patients while sono-elastographically diagnosed to have breast abscess in 10 patients and abscess in 1 patient. In their study, only 1 lactating patient was diagnosed to have carcinoma breast and 61 patients were having benign conditions.

According to Robbins et al. [9], twenty-two (85%) of the 26 surgical or core biopsies were

benign, including lactational changes in eight (36%) cases, fibroadenoma in seven (32%) cases, fibrocystic changes in three (14%) cases, inflammation or infection in two (9%) cases, and other in two (9%) cases. Four (15%) of the 26 biopsy specimens were malignant.

Lactating breast parenchyma shows diffuse hyperechogenicity, dilated ducts, and increased vascularity on US scans. The sonographic appearance of cysts and fibroadenomas is similar to that seen in non-lactating patients, which is widely known. Galactoceles are the most common palpable masses in lactating patients. These are cystic masses with posterior acoustic shadowing and variable internal echogenicity depending on their fat, protein, and water content, but vascularity should never be present within a galactocele. Lactating adenomas are fibroadenoma-like masses on US scan; however, microlobulations are more frequent and hypervascularity is usually seen on Doppler US. Lactating adenomas may increase in size during lactation. Spontaneous regression of the mass after cessation of lactation can be another diagnostic criterion, although some lesions may not resolve and surgical excision may be necessary. Lactating adenomas also differ from fibroadenomas with their unique histologic features. US-guided biopsy is usually encouraged despite the benign US features [14].

Patients with puerperal mastitis usually present with edema and erythema of the breast with pain, tenderness, and fever. It is a clinical diagnosis, and US should be saved for patients with poor response to antibiotic therapy or if an abscess is suspected. US features of mastitis can be limited to skin thickening and parenchymal edema, but sometimes mass-like hypoechoic lesions with indistinct borders and peripheral hypervascularity can be seen. These lesions may appear stiff on elastography studies mimicking malignancy. Nevertheless, a mature abscess, which is usually seen as a thick-walled hypoechoic mass with posterior acoustic enhancement and some degree of internal echogenicity, would show a soft center and a stiff thick outer rim on elastography. As well as being a useful diagnostic tool for breast abscess, US also provides a practical guide for catheter drainage, which is a safe, well-tolerated, and cost-effective treatment procedure allowing patients to continue breastfeeding. Granulomatous mastitis is another challenging diagnosis occurring during or shortly after lactation. US features of granulomatous mastitis include an ill-defined, hypoechoic, heterogenous mass with internal tubular structures, which may extend outside the mass [15].

Pregnancy-associated breast cancer is defined as breast cancer diagnosed during pregnancy or in the first postpartum year. The average age of the patients is 32-38 years. It is a rare but important diagnosis, and US is highly sensitive in the detection of these malignant lesions. Patients with persisting palpable masses should undergo US imaging, and in the case of any suspicious finding, further evaluation with US-guided biopsy should be performed to avoid a delay in diagnosis. Pregnancy-associated breast cancer usually presents with a palpable mass that is larger and in a more advanced stage than those seen in non-pregnant or non-lactating patients. It has been reported that the frequency is approximately 1 in 3,000 pregnancies, but due to the increasing trend for women to delay motherhood, the frequency of this cancer will probably increase in the next years [16].

In the study in our hands, there was significant difference between benign and malignant groups of as regard age.

Our results were in agreement with study of Tirada et al., [17] as they reported that who have reported significantly older age among the malignant breast lesions compared with the benign group.

Also, in the study of Deepak et al. [18], 19 patients were breast lesions occurred in the age group of 40-60 years, 6 were younger than 40 years and 14 were between 61-70 years. Most of the patients with benign (37.31%) according to BI-RADS assessment were within the age range of 40-49 years. This finding is in agreement with the results of Baker et al., [19] where they found patients with malignancy to be from the 4th decade of life.

Also, Saunders et al., [20] demonstrated that in the young age group 73% had fibroadenoma. These results may be explained by differences in ethnicity in these studies. In Deepak et al., [18] study 9 patients of benign lesions were fibrocystic changes which was comparable to the result of Litton et al., [21] who reported 14%. Four patients had mastitis and most of them were above 30 years old. This incidence was lower compared to the other studies except for Kang et al., [22] who noted mastitis in only 2.5% of their patients.

The present study showed that regarding validity of US in the diagnosis of benign and malignant lesions; the sensitivity was 100%. The specificity was 98.3%. PPV was 90.9% and NPV was 100%. AUC was 0.99 or 99%.

Our results were in line with study of Haliloglu et al., [10] as they reported that the sensitivity of

US in the diagnosis of pregnancy-associated breast cancer is reported to be between 93 and 100% with a negative predictive value of 100%.

Similarly, Chung et al., [23] demonstrated that targeted US demonstrated a sensitivity and specificity of five of five (100%; 95% confidence interval [CI]: 48%, 100%) and 114 of 162 (70%; 95% CI: 63%, 77%), respectively.

Conclusion:

Substantial physiological changes during pregnancy and lactation make it challenging to evaluate patients presenting with a breast problem. Most findings in pregnant and lactating patients are benign. Ultrasound is the first-line imaging modality for all pregnant women and for lactating women less than 30 years of age and for guiding interventional breast procedures.

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دور الأشعة الفوق صوتية أثناء الحمل والرضاعة في تشخيص أمراض الثدي

المقدمة: أثناء الحمل والرضاعة، يتغير الثدي بسبب التأثيرات الهرمونية المختلفة. هذه التغيرات هي متنى وو عانى مما يؤثر على التقييم الإشعاعى الدقيق لأفات الثدي. معظم آفات الثدي أثناء الحمل والرضاعة تكون ذات طبيعة حميدة. ومع ذلك، لا يمكن استبعاد الورم الخبيث.

الهدف من الدراسة: كان هدفنا مراجعة نتائج الموجات فوق الصوتية للأفات الحميدة والخبيثة الشائعة أثناء الحمل والرضاعة والتفريق بينها بالموجات فوق الصوتية والخزعة فى الحالات المشتبه بها.

المرضى وطرق البحث: كانت هذه دراسة استطلاعية شملت ٧٠ امرأة حامل ومرضع مع نتائج الثدي على الموجات فوق الصوتية. تخضع جميع النساء لأخذ التاريخ الكامل والفحص السريرى والتصوير بالموجات فوق الصوتية ونتائج الفحص المرضى لبعض الحالات. تم تقييم الآفات وفقاً لنظام BIRADS بالموجات فوق الصوتية على النحو التالى: (١) اعتبرت آفات BIRADS 2 حميدة وتم استئشاق كيس مؤلم كبير. (٢) تمت متابعة آفات BIRADS 3 لمدة ٦ أشهر: إذا كانت ثابتة أو تم حلها، فقد تم اعتبارها آفات حميدة، إذا ظهرت زيادة فى الحجم أو تغير فى المظهر، فقد تم أخذ خزعة منها. (٣) تم أخذ خزعة من آفات الطيور ٤ و ٥.

النتائج: كشفت نتائج دراستنا أن مريضة واحدة (١.٤٪) لديها ثدى إضافى. ٩ مرضى (١٢.٩٪) أكدوا إصابتهم بالقبيلة اللبنة عن طريق الشفط من آفات كيسية تحتوى على إفرازات حليبية. أكدت اثنتان من النساء المرضعات إصابتهم بورم غدى رضاعة من خلال التشريح المرضى. ٣٠ مريضاً (٤٢.٨٪) تم تشخيص إصابتهم بالتهاب الضرع إكلينيكياً وأشعاعياً، ١٤ مريضاً (٢٠٪) تم علاجهم بعد العلاج الطبى، ١٥ مريضاً (٢١.٤٪) معقدون بسبب تكوين خراج وعولجوا بالتصريف الجراحى والعلاج الطبى، مريض واحد (١.٤٪) تم تشخيص التهاب الضرع الحبيبي عن طريق التشريح المرضى وتم علاجه بعد العلاج بالكورتيكوستيرويدات. تم تشخيص إصابة مريضين (٢.٩٪) بنخر دهنى قل حجمه فى متابعتهن. أيضاً، كان هناك ١٦ مريضاً (٢١.٥٪) يشتبه فى إصابتهم بأفات حميدة حسب السمات الأمريكية، وتم تشخيص ٦ مرضى (٨.٦٪) على أنهم مرض ليفى كيسى، و٦ مرضى (٨.٥٪) لديهم عدد قليل من الآفات الكيسية وتم تشخيصهم على أنهم أكياس بسيطة، و مريض واحد (١.٤٪) تم تشخيصهم على أنهم ورم ليفى بعد الاستئصال الجراحى والفحص النسيجى المرضى ٣ (٤.٣٪) من المرضى تم تشخيصهم على أنهم ورم ليفى بعد أخذ عينة ودورة ثابتة فى متابعتهن بعد ٦ أشهر. ومع ذلك، اشتبه ١٠ مرضى (١٣.١٣٪) فى إصابتهم بأفات خبيثة حسب السمات الأمريكية، وكان ٩ مرضى (١٢.٩٪) من سرطان الأقنية الغازية ومريض واحد (١.٤٪) كان سرطاناً مخاطياً بعد الاستئصال الجراحى والتشريح المرضى. أظهرت الدراسة الحالية أنه فيما يتعلق بصلاحية الولايات المتحدة فى تشخيص الآفات الحميدة والخبيثة، كانت الحساسية ١٠٠٪. كانت الخصوصية ٩٨.٣٪. كان PPV ٩٠.٩٪ و NPV ١٠٠٪ كانت الجامعة الأمريكية بالقاهرة ٠.٩٩ أو ٠.٩٩٪.

استنتاج: التغيرات الفسيولوجية الجوهرية أثناء الحمل والرضاعة تجعل من الصعب تقييم المرضى الذين يعانون من مشكلة فى الثدي. معظم النتائج فى المرضى الحوامل والمرضعات حميدة. الموجات فوق الصوتية هي طريقة تصوير الخط الأول لجميع النساء الحوامل والمرضعات أقل من ٣٠ عاماً وتوجيه إجراءات الثدي التداخلية.