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Imaging and Clinical Features of an Unusual Unilateral Breast Enlargement Diagnosed as Fibrocystic Change: A Case Report

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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Conflict of interest: None declared

Patient: Female, 38
Final Diagnosis: Fibrocystic change
Symptoms: Breast swelling
Medication: —
Clinical Procedure: Breast biopsy
Specialty: Radiology

Objective: Rare disease





Background: Breasts are assumed to be symmetrical bilaterally, and abnormal findings on breast imaging are largely based on such an assumption. Clinically noticeable breast asymmetry beyond that of normal range is rarely encountered.

Case Report: A 38-year-old female presented with unilateral enlargement of her left breast for 3 months and complained of polymenorrhea twice a month. Mammography and ultrasonography revealed that the left breast had a larger volume of fibroglandular tissue than the right breast, without accompanying signs of malignancy or abnormality. Magnetic resonance imaging demonstrated unilateral, diffuse, stippled enhancement in the left breast, which was located peripherally in the early phase and propagated centrally in the delayed phase with a persistent kinetic pattern. Ultrasonography-guided core needle biopsy was performed for the left breast, leading to a pathological diagnosis of fibrocystic change. The condition could be presumably due to a different response of the breasts to imbalance in endogenous hormones.

Conclusions: Based on our findings, we believe that radiologists should consider that the breast has a unique dynamic physiology and that features on breast imaging can be affected by hormonal alteration.

MeSH Keywords: Breast • Fibrocystic Breast Disease • Magnetic Resonance Imaging • Mammography • Ultrasonography

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Background

The causes of breast asymmetry include disparate mammary growth during early breast development which is mostly idiopathic and less commonly part of congenital syndromes, as well as various acquired conditions, such as both benign and malignant tumors, trauma, surgery, burns, and infection [1]. Particularly, size disparity between the breasts may be due to a disparate absolute volume of primordial breast cells or a different response to normal hormonal stimulation [1]. Women with bilaterally symmetrical breasts can develop a disparity in breast size during pregnancy and lactation, when hormonal status is greatly altered [1]. This report demonstrates an unusual case of unilateral breast enlargement in a woman in her late 30s without explainable underlying etiology, which was pathologically diagnosed as fibrocystic change by a 14-gauge core needle biopsy. Manifestations on the mammogram, sonogram, and magnetic resonance imaging (MRI) are described.

Case Report

A 38-year-old female presented with a complaint of progressive unilateral enlargement of her left breast over 3 months. Assessment revealed focal palpability at the upper inner portion of the left breast. Simultaneously, she had also developed

polymenorrhea with a frequency of twice a month. She had no past medical history or family history of breast cancer. On mammography, the left breast showed a larger volume of fibroglandular tissue than the right breast with no accompanying sign of malignancy (Figure 1). Both breasts had symmetrical overall densities and were extremely dense (Figure 1). Ultrasonography also showed a larger amount of fibroglandular tissue in the left breast than the right breast without discernable abnormality. Background echotextures of both breasts were symmetrical and homogeneously fibroglandular (Figure 2). MRI demonstrated unilateral, diffuse, stippled enhancement at the left breast that began at the periphery of breast tissue during the early phase and gradually propagated centrally in the delayed phase with a persistent kinetic pattern (Figure 3). Ultrasonography-guided 14-gauge core needle biopsy was performed at the upper inner quadrant of the left breast, and 8 fragments of biopsy specimens were acquired at multiple sites in the quadrant. This led to a pathological diagnosis of fibrocystic change. Microscopic findings of the biopsied breast lesion showed multiple cystically dilated breast ducts located in the terminal duct lobular units in fibrosclerotic background (Figure 4). Serum level of estradiol or total estrogen was not checked at that time. Although she did not undergo follow-up breast imaging, 3 years after the biopsy she did not complain of further progression of breast symptoms or present with clinical evidence of breast cancer.

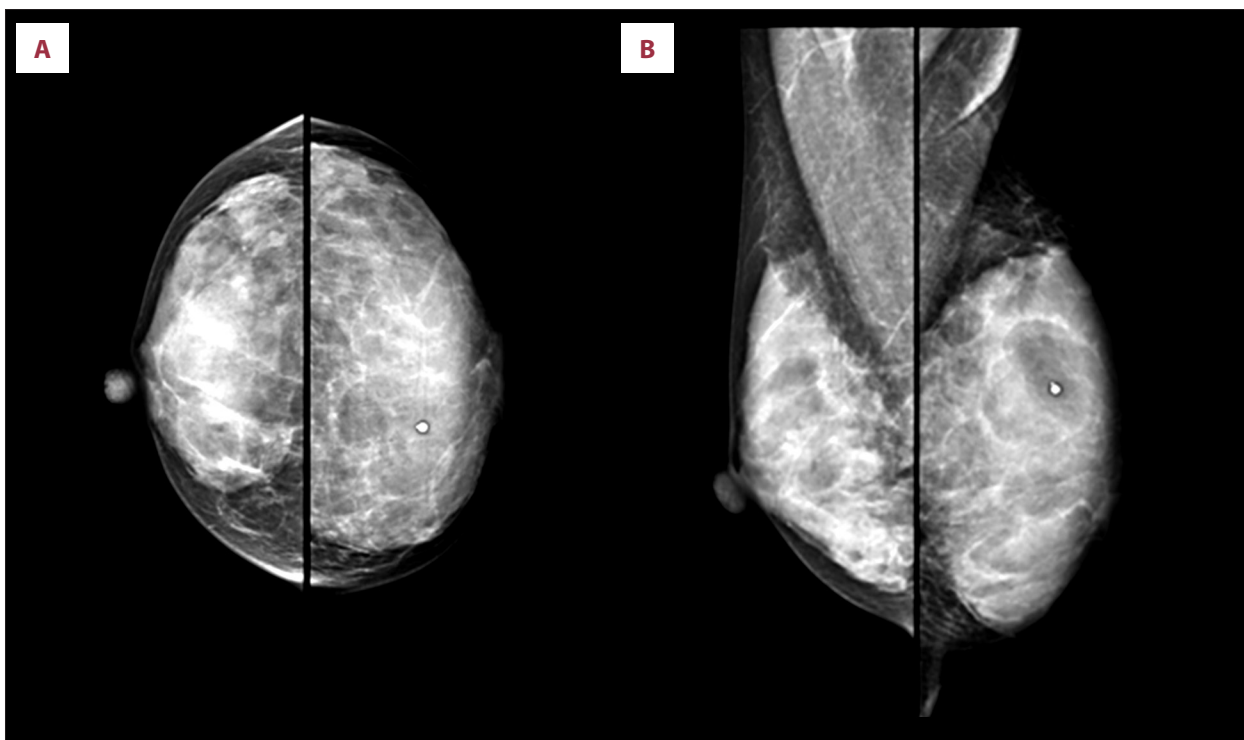


Figure 1. Mammography craniocaudal (A) and mediolateral (B) views show global asymmetry (a larger volume of dense fibroglandular tissue at the left breast than at the right breast). There is no associated mass, architectural distortion, or calcifications in the left breast. A metallic marker is in place to indicate a palpable area in the upper inner quadrant of the left breast.

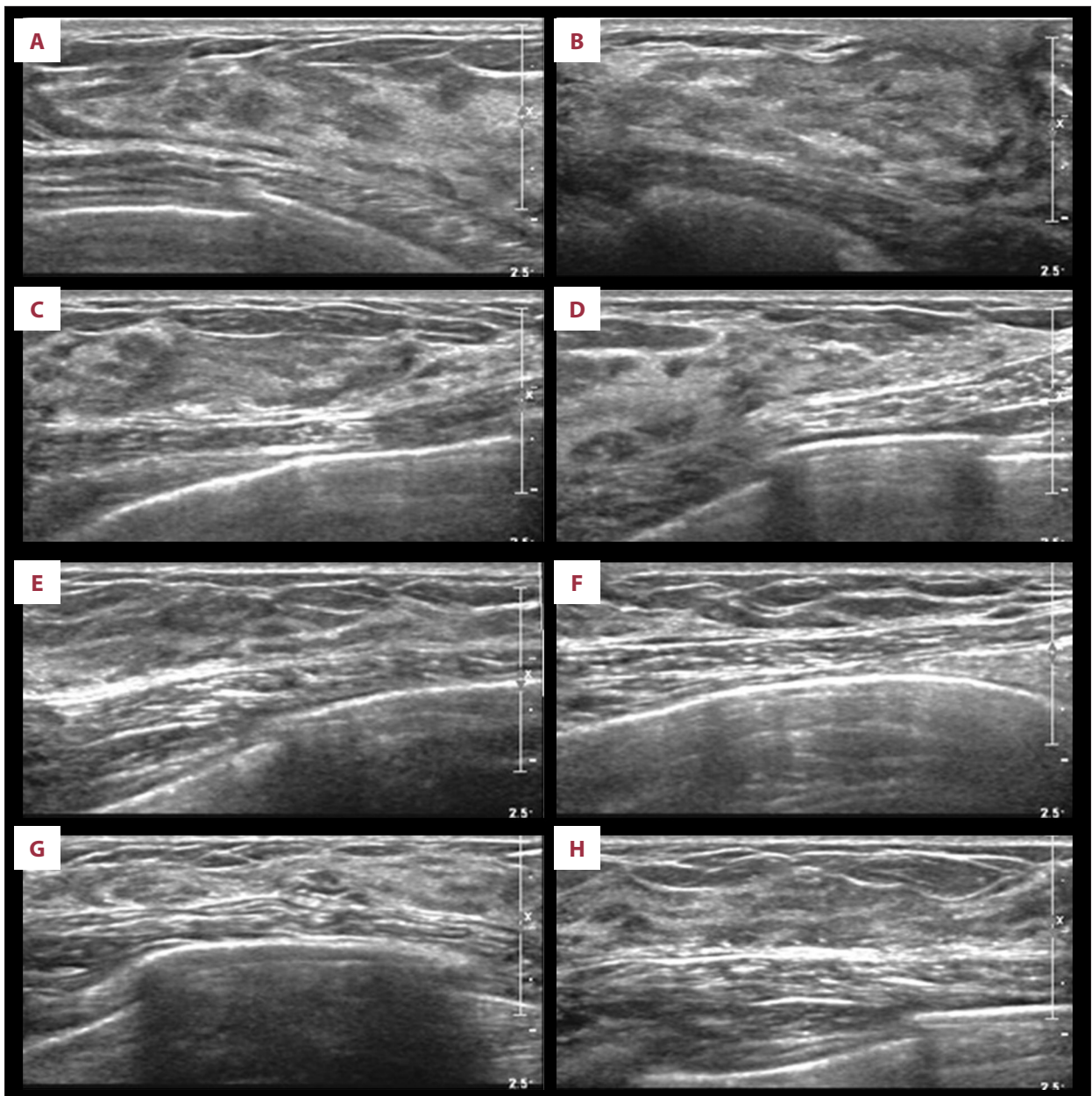


Figure 2. Transverse grayscale ultrasonograms of the left breast taken at the upper inner (A), lower inner (B), lower outer (C), and upper outer quadrants (D) show a larger volume of fibroglandular tissue than those of the right breast taken at the upper inner (E), lower inner (F), lower outer (G), and upper outer quadrants (H). Background echotextures of both breasts are symmetrical and homogeneously fibroglandular. There is no associated abnormality in the left breast.

Discussion

Breast tissue is quite a unique hormonally sensitive organ, which continuously varies throughout a person's lifetime from pubertal development to menopausal involution under the control of hormonal regulation [2]. Besides this long-term modification, breast tissue also varies cyclically within a menstrual cycle in response to endogenous hormonal alteration [3,4]. The histological characteristics of breast tissue at cellular level

differ between the follicular phase and luteal phase [4]. Toward the luteal phase, histological characteristics such as distinction between epithelial and myoepithelial layers of the acini, basal-layer vacuolation of the acini, stromal edema, and infiltration, apoptosis, and mitosis progressively appear and become more intensified than at the follicular phase [4]. Enlargement of the ductal lumens with glandular secretion and vascular congestions also occur at the luteal phase [5]. Such histological changes in breast tissue at a cellular level, according to the

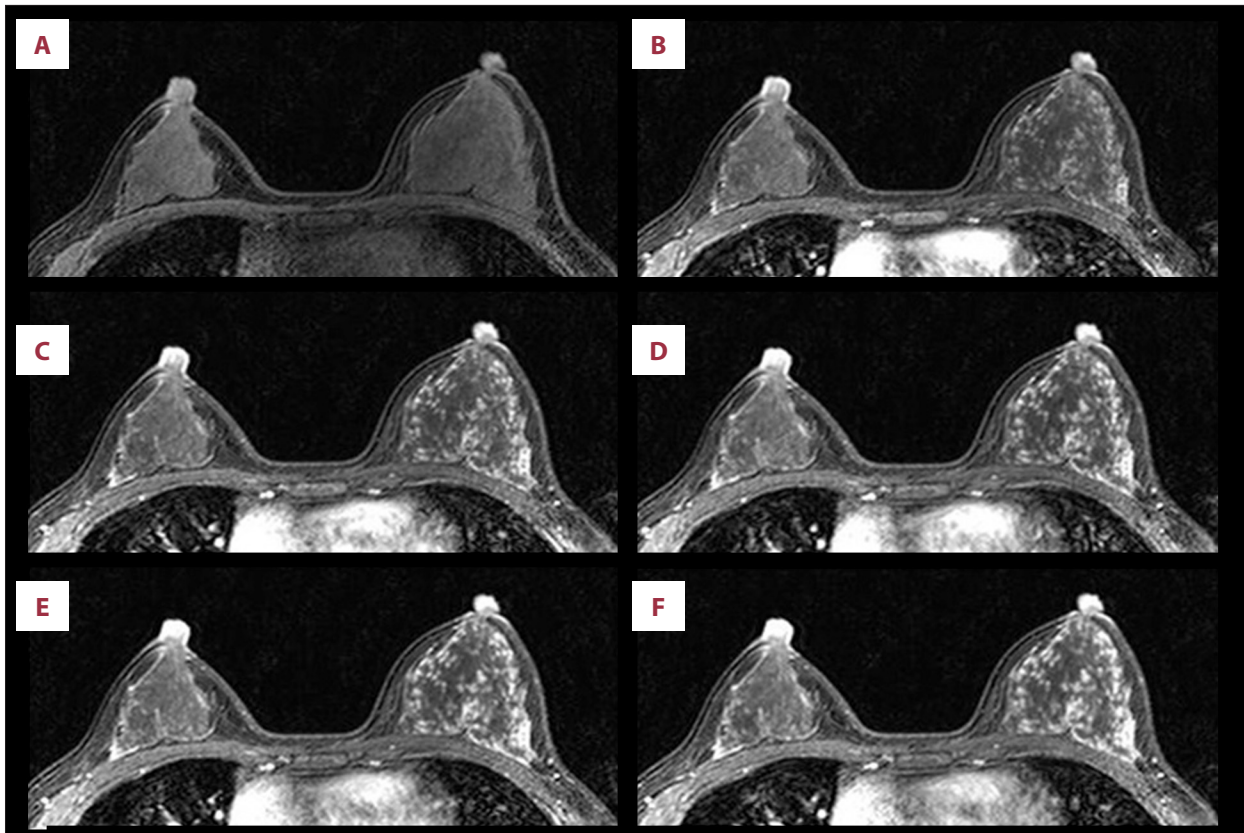


Figure 3. Pre-contrast (A) and first (B), second (C), third (D), fourth (E), and fifth (F) post-contrast images of axial dynamic T1-weighted magnetic resonance imaging of the breast show asymmetric, diffuse, stippled non-mass enhancement in the left breast, which began in the periphery of breast tissue at the initial phase, then gradually involved the central breast tissue and became confluent during the delayed phase.

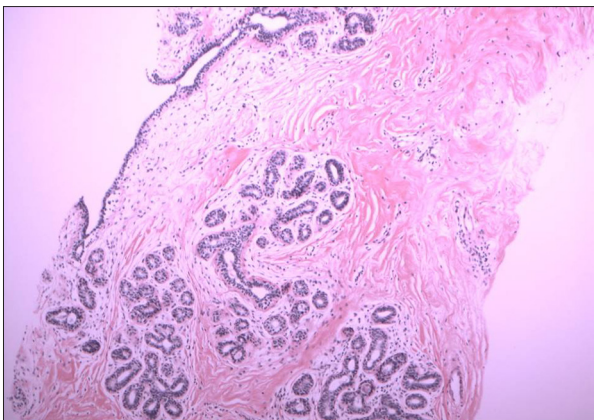


Figure 4. Microscopic finding of the breast lesion showed dilated breast ducts in the terminal duct lobular unit with fibrotic background (hematoxylin and eosin staining, 100×).

different phases of the menstrual cycle, can be reflected in imaging studies. Breast density on mammography and fibroglandular tissue volume and background parenchymal enhancement on MRI vary according to the phases of the menstrual

cycle, all of which are more increased at the luteal phase than the follicular phase [6–8]. Meanwhile, serum or salivary levels of endogenous hormones are not directly linked to changes in breast density, volume, and enhancement on mammography and MRI during the menstrual cycle; rather, cell proliferation observed in the luteal phase may be responsible for these cyclic changes [6,9]. Besides menstrual hormonal change, other endogenous or exogenous hormonal stimuli, such as pregnancy, lactation, hormone replacement therapy in postmenopausal women, and hormone therapy in the treatment or prophylaxis of breast cancer, can also affect breast density, fibroglandular tissue volume, and background enhancement on breast imaging [10]. Sensitivity of the breast to hormonal fluctuation can differ individually [7] and can be disproportionate between both breasts within each individual [11].

This report demonstrated a unique case in which both breasts were presumed to respond much differently to hormonal variation. In this case, the accompanying symptom of polymenorrhea supports the fluctuating endogenous hormonal status, although the serum level of estrogen was not checked at the time. Whether a disproportional response of both breasts to

hormonal variation contributes to disproportional development of future breast cancer between both breasts remains unclear. However, studies have shown that breast asymmetry was greater in women who later developed breast cancer than in women who did not [9,12].

Regarding breast enlargement, it is important to assess whether it is of breast origin or not and whether there is an underlying mass or not. Various conditions can cause unilateral breast enlargement, including those of both benign and malignant tumorous etiology or non-tumorous etiology. Benign conditions include breast edema of benign etiology (intramammary such as mastitis, fat necrosis, trauma, post-irradiation changes, or granulomatous disease; extramammary such as lymphatic obstruction, nephrotic syndrome, progressive systemic sclerosis, pemphigus and other skin conditions, subclavian or innominate vein occlusion, or congestive heart failure) [13], pubertal macromastia (juvenile or virginal hypertrophy) [14–16], gravid macromastia [17], breast hypertrophy secondary to endocrine disorders (hypothalamic lesions, polyostotic fibrous dysplasia, ovarian granulosa cell tumor, follicular cyst, or adrenocortical tumors) [16], lymphangiomatosis [18], pseudoangiomatous stromal hyperplasia [19–21], giant fibroadenoma of adult or juvenile type [22], giant phyllodes tumor [23], giant lipoma [24,25], and giant hamartoma [26]. Malignant conditions include edema of malignant etiology (intramammary such as inflammatory breast carcinoma; extramammary such as lymphoma or leukemia) [13], giant malignant phyllodes tumor [27], and various types of carcinoma such as medullary, mucinous, and lymphoma [28]. Various benign and malignant chest wall lesions can also clinically mimic unilateral breast enlargement when involving the anterior chest wall [29].

Fibrocystic change in the breasts is the most common benign breast condition, and more than half of women experience some form of fibrocystic change during their lifetime [30,31]. The causative factors of fibrocystic change are not completely known; however, estrogen supplements and the menstrual phase have been reported to be related [30]. The most common clinical manifestation of fibrocystic change is pain

and tenderness, followed by a palpable lump and nipple discharge [32]. Fibrocystic change is sometimes accompanied by irregular menstrual period [32]. Pain starts 7 to 14 days before the onset of menstruation and lasts until menstruation begins. Pain is related to nerve root irritation in edematous breast stroma, with increase in breast volume up to 15% [32]. Fibrocystic change encompasses a wide variety of histology, including stromal fibrosis, cysts, adenosis, apocrine metaplasia, and epithelial proliferation of varying degrees [3,30,33]. This histologic divergence is responsible for the diverse clinical and imaging manifestations [3]. Mammographic findings of fibrocystic change include a focal mass, focal asymmetry, microcalcifications, architectural distortion, areolar skin thickening, and no abnormality [30,31], whereas sonographic findings include a solid mass, cyst, heterogeneous echogenic tissue (non-mass-like lesion), and no visible abnormality [31]. MRI features of fibrocystic change are also diverse, but the most common are regional stippled non-mass enhancements with benign kinetic patterns [30]. The degree of enhancement in fibrocystic change can change depending on the menstrual cycle; it is greater at the luteal phase than at the follicular phase [33]. A large proportion of enhancements in fibrocystic change on MRI are transient findings only lasting during half of the menstrual cycle [33].

Conclusions

This report demonstrated a unique case of unilateral breast enlargement diagnosed as fibrocystic change, which was presumably due to a different response of the breasts to an imbalance in endogenous hormones. Such unusual manifestations can remind a radiologist that the breast is not a static organ and that it can have a unique dynamic physiology in response to hormones. Thus, a radiologist should keep in mind that features on breast imaging can be affected by hormonal alteration.

Declarations of interest

None.

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