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An Overview on Fibroadenosis of the Breast

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Abstract:

Fibroadenosis of the breast, also referred to as fibrocystic breast changes, is a benign proliferative condition characterized by stromal fibrosis, lobular hyperplasia, and the formation of cysts of varying sizes. It represents one of the most common benign breast disorders among women of reproductive age, often presenting with cyclical mastalgia, palpable nodularity, or incidental imaging findings. Although fibroadenosis is benign and non-cancerous, its overlapping clinical and radiological features with malignant lesions necessitate careful evaluation.

Keywords: Fibroadenosis; Fibrocystic breast changes; Benign breast disease; Mastalgia; Breast nodularity; Hormonal imbalance.

Introduction:

Fibroadenosis, also referred to as fibrocystic breast change, is a benign proliferative breast condition characterized by stromal fibrosis, lobular hyperplasia, and cyst formation of variable sizes. It is one of the most common benign breast disorders, predominantly affecting women of reproductive age, and is often associated with cyclical mastalgia and palpable nodularity (1).

The pathogenesis of fibroadenosis is strongly influenced by hormonal fluctuations, particularly the imbalance between estrogen and progesterone during the menstrual cycle. These hormonal changes stimulate ductal epithelial proliferation and stromal overgrowth, leading to the characteristic fibrocystic alterations (2).

Clinically, fibroadenosis may present with diffuse nodularity, breast tenderness, or focal lumps, although some cases are asymptomatic and detected incidentally during imaging. Ultrasound and mammography often reveal increased breast density and multiple small cysts, which may mimic malignant lesions, necessitating careful radiological interpretation (3).

Histopathological examination typically shows cystic ductal dilatation, apocrine metaplasia, epithelial hyperplasia, and varying degrees of stromal fibrosis. Although benign, certain proliferative variants with atypia are associated with a modestly increased risk of developing breast carcinoma (4).

Management is usually conservative, focusing on patient reassurance, lifestyle modifications, and symptomatic treatment with agents such as evening primrose oil, danazol, or selective hormonal therapy for persistent pain. Surgical intervention is rarely required unless malignancy cannot be excluded (5).

Benign breast conditions are non-cancerous disorders that affect the breast tissue. They are very common and can include a wide range of changes such as lumps, cysts, pain, infections, or changes in breast size and shape. Examples include fibroadenomas, fibrocystic changes, breast cysts, and mastitis. Breast fibroadenosis, more commonly referred to as fibrocystic breast disease or fibrocystic changes, is a benign (non-cancerous) condition of the breast. Fibrocystic breast disease is the most common benign type of breast disease, diagnosed in millions of women worldwide **(6)**.

Benign breast disease (BBD) is an umbrella term for various non-malignant breast lesions, such as cysts, tumors, trauma, mastalgia, and nipple discharge.1 Fibrocystic breast disease (FBD) is the most common type of benign breast disease and mastalgia is the most common symptom of FBD **(7)**. It's important to note that while fibrocystic breast disease is benign and common among women of reproductive age, any new or unusual breast changes should be evaluated by a healthcare professional to rule out other conditions **(8)**.

Multiple analogous terms are used for fibrocystic changes like Aberrations of Normal Development and Involution (ANDI): Bloodgood's disease, chronic cystic mastitis, cystic hyperplasia, cystic mastopathy, fibroadenosis, fibrocystic changes, hyperplastic cystic disease, Konig's disease, mammary dysplasia, mammary dystrophy, Reclus'disease, Schimmelbusch's disease, and sclerocystic disease **(9)**.

❖ **Epidemiology**

Benign breast diseases are more common causes of breast problems and 4 times more frequent than malignant ones and the lifetime risk of clinical benign breast disorder was calculated to be more than 50%1. Breast cancer is the most common malignancy in developed nations in women **(10)**. Benign breast diseases are mainly prevalent during the reproductive age as the incidence is common mainly in the second decade with realization on its peak at fourth and fifth life year's decade **(11)**.

Shashikala reported fibroadenosis accounting for 23 % of benign breast lesions.10 Amr et al reported maximum incidence of fibrocystic disease in 31-35 years **(12)**. Naveen,(2013) noted fibrocystic disease as the second commonbenign breast diseases(BBD) after fibroadenoma accounting for 36% **(12)**. Kapur concluded that fibrocystic changes (FCCs) constitute the most frequent benign disorder of the breast and suchchanges generally affect premenopausal womenbetween 20 and 50 years of age **(13)**.

❖ **Risk Factors**

Table 1: Factors with possible relation to the development of Fibrocystic Changes of the breast (14)

Factors possibly related to Fibrocystic Breast Changes	
1	Age
2	Hormones
3	Premenstrual syndrome
4	Duct ectasia
5	Stress
6	Smoking
7	Caffeine

➢ **Age**

Breast pain is most common amongst women aged 30–50 years **(15)**.

➢ **Hormones**

✓ **Hormonal associations**

The fact that mastalgia in patients with fibrocystic changes is related to hormonal events, such as the menstrual cycle, pregnancy, menopause and hormone therapy suggests a relationship between the two **(16)**.

✓ **Hormone therapy**

In one study 16% of women reported breast pain as a side effect of estrogen therapy and 32% reported the same in cases of combined hormonal therapies. Other researchers have also identified increased breast density during hormonal therapy. On the other hand, hormonal contraceptive was found to be associated with significantly less mastalgia and premenstrual syndrome (PMS) **(17)**.

✓ **Relationship to other premenstrual symptoms**

Most agree that CM and tenderness are part of the PMS. Luteal-phase symptoms, including water retention, negative affect, impaired concentration and behavior change were significantly greater in women with severe CM compared to women without breast symptoms. Also, women with severe CM experienced more breast symptoms and negative affects in the follicular phase of the menstrual cycle. In a study the most women whose symptoms met the criteria for CM had experienced other premenstrual and somatic symptoms. However, others have found that although premenstrual symptoms were common in women with CM, only 16% of women in one study, and 22.5% in another study had sufficient symptoms that met the criteria for both CM and PMS **(14)**.

➢ **Duct ectasia**

Ultrasonographic measurement of the maximum mean width of the milk ducts was 1.8 mm in asymptomatic women, 2.34 mm in women with CM, and 3.89 mm in women with non-CM ($P<0.001$). Ductal width correlated with pain intensity **(18)**.

➢ **Other Risk Factors and High-Risk Groups**

Stress appears to be a factor as women with severe breast pain seem to have had greater incidence of significant life events than women without severe breast pain. Smoking as well as caffeine intake also seems to be risk factors **(19)**.

❖ **Pathophysiology**

Mammary gland development, maturation, and differentiation act upon the hormonal and growth factor changes affecting the stromal and epithelial cells. During the late proliferative phase, glandular tissue evolves to hyperplastic stages such as sclerosing adenosis or lobular hyperplasia. This state of hyperplasia, if associated with a 2% prevalence of Ki67 cells, has a twofold increased incidence for the development of breast cancer. Various types of benign breast disease exist, such as hyperplasia, cysts, fibroadenomas, sclerosing adenosis, and mastitis **(20)**.

Fibro Cystic Change (FCC) of the breast is a benign alteration in the terminal ductal lobular unit of the breast and is a most common benign breast condition frequently observed in women aged 20–50 years, with a peak in the perimenopausal age group. Fibrocystic changes in breast is not a distinct entity, this term encompasses a spectrum of lesions ranging from various forms of cysts, fibrosis, apocrine metaplasia, adenosis, and hyperplasia (**Figure**) **(9)**.

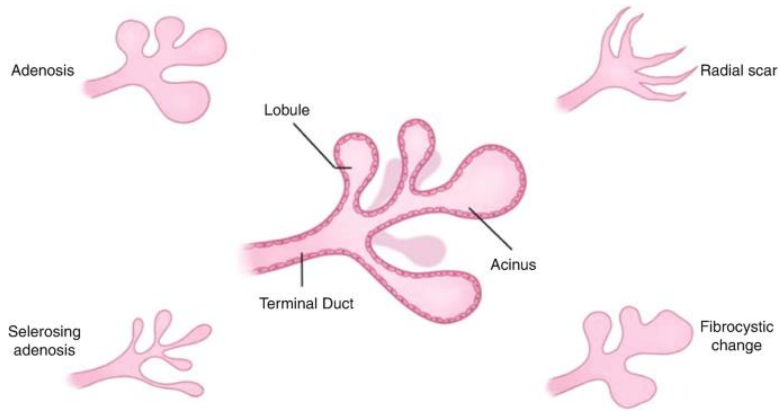

Figure 1: Schematic representation of findings seen in fibrocystic changes—the normal terminal ductal lobular unit, adenosis—enlargement and multiplication of TDLUs, sclerosing adenosis, and radial scar appearing as distorted TDLU (9)

The pathophysiology of these changes is determined by the response of the breast tissue to the monthly hormonal imbalances, particularly by estrogen predominance and progesterone deficiency, which results in

hyperproliferation of the connective tissue (fibrosis), which may or may not be preceded by epithelial proliferation **(21)**.

❖ **Clinical presentation**

Fibrocystic breasts are lumpy or nodular and although the breast changes categorized as "fibrocystic" are normal; they can cause breast pain and tenderness that is usually related to the period. This glandular texture may be finely granular, nodular, or even grossly lumpy. Breast pain and palpable mass are the symptoms most frequently described by women presenting to general practitioners or breast clinics.CM accounts for approximately 2/3 of breast pain in specialty clinics, whereas non- CM accounts for the remaining 1/3. CM typically presents during the third or the fourth decade of life and the symptoms tend to persist with a relapsing course. It usually starts during the luteal phase of the menstrual cycle and increases in intensity until the onset of menses, when it dissipates **(22)**.

❖ **Diagnosis**

On physical examination: Most breast cysts are nonpalpable, asymptomatic and are incidental findings on routine imaging Cysts that are apparent clinically, classically, present as lumps that are smooth, soft to firm, mobile, and sometimes tender. Cysts under tension can be firm to hard on examination and may be associated with significant tenderness. A cluster of cysts can present as a tender area of nodularity. Benign cysts are typically mobile within the glandular breast tissue, chest wall, and skin and rubbery in texture. Except for cysts with inflammatory changes, discomfort and tenderness are rarely experienced in fibrocystic changes **(23)**.

➢ **Imaging**

✓ **Mammography**

The term “fibrocystic disease” should be avoided in mammographic reports, and it is not included in the American College of Radiology (ACR) breast imaging reporting and data system (BI-RADS) lexicon. In fact, the ambiguous significance of this term, prolifically used in other times, has made it difficult to standardize mammographic reports. This term has been used to describe dense breasts, usually with multiple round to oval masses, with well-delimited or obscured margins. Dense breasts were initially described as dysplastic. However, this term should also not be used because it is confusing. Nowadays, these types of breasts are classified as ACR class 4 (**Figure**). The main problem of these breasts is the lower sensitivity to detect carcinoma compared with fatty breasts. Dense breast tissue reduces the sensitivity from 80% in fatty breasts (ACR class 1) to 30% (ACR class 4) **(24)**.

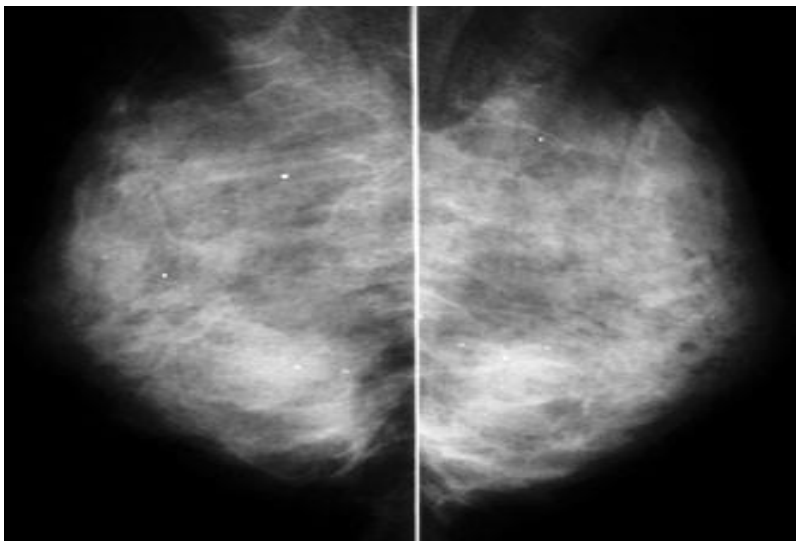

Figure 2: Dense breasts (American College of Radiology class 4). Mediolateral oblique views (25)

- **Ultrasound**

Ultrasound is the technique of choice to diagnose breast cysts, a usual component of dense breasts **(Figure**). It allows accurate characterization of a palpable mass, which is frequently found in these breasts, as cystic or solid. Moreover, ultrasonography may play a role in detecting breast cancers not seen on mammography. Nevertheless, supplemental use of ultrasonography in women with asymptomatic dense breasts is still not accepted as a standard indication **(26)**.

Figure 3: Ultrasonography of dense breasts. Multiple small cysts are seen (25)

- **Magnetic Resonance Imaging**

Magnetic resonance imaging should not be used to evaluate a breast lump in dense breasts. However, it plays an important role in determining the size of a breast cancer, especially in dense breasts, as well as determining possible multicentricity or bilaterality. Note that dense breasts may cause false positive results on magnetic resonance because the fibroglandular tissue may exhibit enhancement after paramagnetic contrast administration due to hormone stimulation (**Figure**) **(27)**.

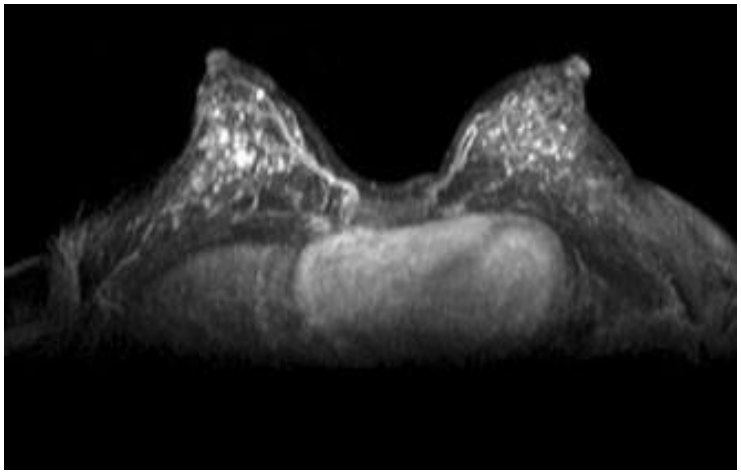

Figure 4: Contrast-enhanced magnetic resonance imaging (Flash3D, MIP) in normal dense breasts. Multiple foci due to spontaneous hormone-induced enhancement are seen (25)

Different Modalities Management of Breast Fibroadenosis

- **Breast Pain Assessment**

Quantifying breast pain may be difficult because of its variability. Before starting any therapy for breast pain, patients should be asked to document the frequency and severity of their pain on daily basis for at least one menstrual cycle using a visual analog scale. The pain scale is also helpful in assessing treatment response in

mastalgia, which is characterized by the waxing and waning of symptoms and a high spontaneous remission rate **(28)**.

❖ **Nonpharmacological Interventions**

➢ **Education and reassurance**

Education and reassurance are integral parts of the management of mastalgia and should be the first-line of treatment **(29)**.

✓ **Psychological Associations and Relaxation Training**

Integrating relaxation and stress-management techniques alongside medical treatment can substantially ease breast pain and reduce anxiety. Simple daily practices—such as guided breathing exercises, mindfulness meditation or listening to soothing, spoken-word relaxation recordings—have been shown to increase the number of pain-free days and improve overall well-being. For many women, setting aside even ten minutes each day for these exercises leads to noticeable relief, both in the intensity of discomfort and in the emotional distress that often accompanies it **(30)**.

✓ **Stop Smoking**

Patients with mastalgia should stop, or at least reduce the number of cigarettes taken daily, based on a study that identified smoking as being a factor associated with mastalgia **(31)**.

✓ **Wearing A Bra**

Wearing a well-fitted, supportive bra significantly reduces breast movement and mechanical strain, providing marked relief from mastalgia. Sports-style encapsulating bras offer superior control of vertical displacement and downward forces, minimizing discomfort during daily activities. Ensuring a professional fit and replacing bras regularly to maintain elasticity are crucial, as worn garments lose support and allow increased tissue movement. Integrating this mechanical support with warm compresses or gentle massage can further enhance pain relief and improve overall comfort **(32)**.

➢ **Nutritional Recommendations**

✓ **Dietary Fat Reduction**

Lowering total dietary fat to around 20% of daily calories may decrease breast pain by reducing circulating estrogen and prolactin bioactivity, which can alleviate mastalgia symptoms. However, maintaining such a low-fat intake can be challenging and may have limited impact on other fibrocystic changes beyond pain relief **(29)**.

✓ **Fruits, Vegetables, and Fiber**

Emphasizing a diet rich in fruits, vegetables, whole grains, and other fiber sources supports overall breast health through antioxidant and anti-inflammatory effects, though it has not been shown to alter the risk of benign proliferative breast disease. A daily fiber intake of 25–30 g aligns with general dietary guidelines and may help normalize hormone metabolism without imposing drastic dietary restrictions **(33)**.

✓ **Caffeine Reduction**

Many women report relief of breast tenderness when reducing intake of caffeine-containing products (coffee, tea, chocolate, cola), making short-term restriction a reasonable self-trial; however, clinical studies have yielded inconsistent results, so elimination is not universally mandated **(34)**.

✓ **Vitamin E Supplementation**

Daily supplementation with vitamin E (up to 1,000 mg or 1,500 IU) is widely used for cyclical breast pain due to its favorable safety profile, and many women experience meaningful reductions in mastalgia with minimal side effects **(35)**.

✓ **Soy Isoflavones**

Incorporating moderate amounts of soy foods, which contain isoflavones that bind estrogen receptors, may modestly reduce breast tenderness and fibrocystic changes in some women, although individual responses vary **(36)**.

✓ **Evening Primrose Oil and Other Essential Fatty Acids**

Supplementation with evening primrose oil (rich in γ-linolenic acid) or other essential fatty acids aims to rebalance breast tissue fatty-acid profiles and reduce hormone sensitivity; benefits tend to be modest and may require 3–6 months to become apparent **(37)**.

❖ **Pharmacological Interventions**

➢ **Simple Analgesics and Topical NSAIDs**

Over-the-counter pain relievers such as ibuprofen or acetaminophen are first-line for mild to moderate breast pain and provide effective symptom control in most women. Topical NSAID gels (e.g., diclofenac) applied directly to the breast can offer localized relief equivalent to systemic NSAIDs, with minimal systemic absorption and side effects. These topical preparations are safe, rapid in onset, and well tolerated, making them a practical adjunct or alternative to oral analgesics **(38)**.

➢ **Hormonal Therapies**

When pain persists despite analgesics, low-dose combined oral contraceptives stabilize fluctuating estrogen and progesterone levels and often reduce cyclical breast tenderness. Adjusting estrogen dosage or switching to a progestogen-only regimen can also alleviate hormone-related breast symptoms in susceptible individuals. These agents are generally reserved for women whose mastalgia significantly interferes with daily activities **(39)**.

➢ **Progestins and Dopamine Agonists**

For severe or refractory mastalgia of more than six months' duration, progestins (such as danazol analogues) suppress ovarian hormone production and can markedly reduce pain, but their androgenic side effects (weight gain, acne, voice changes) limit long-term use. Dopamine agonists (e.g., bromocriptine) lower prolactin levels and may benefit women with prolactin-mediated breast pain, though nausea and hypotension require cautious dosing under specialist supervision **(40)**.

➢ **Selective Estrogen Receptor Modulators (SERMs)**

Tamoxifen, a selective estrogen receptor modulator, can be effective in refractory mastalgia by blocking estrogen action in breast tissue. Its use is typically reserved for cases unresponsive to other therapies due to risks such as hot flashes and thromboembolism **(41)**.

➢ **Considerations and Monitoring**

Because stronger hormonal agents carry significant side effects, shared decision-making with a healthcare provider is essential, weighing pain relief against risks. Treatment response should be evaluated after several menstrual cycles, and any new or worsening symptoms prompt reassessment or referral to a breast specialist. Concurrent use of supportive measures—such as well-fitted bras, warm compresses, and stress-reduction techniques—enhances pharmacologic efficacy and overall comfort **(42)**.

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