RESEARCH ARTICLE

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Is There a Correlation Between the Breast Fibroglandular Tissue Thickness Ratio and Mastalgia Severity in Patients with Cyclic Mastalgia?*

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Objective: The purpose of this study is to evaluate correlation between the breast fibroglandular tissue thickness ratio and mastalgia severity in patients with cyclic mastalgia.

Materials and Methods: Ninety-six women with mastalgia in premenopausal reproductive age were prospectively evaluated. All patients were evaluated by the same general surgeon and severity of mastalgia was assessed by using visual analogue scale (VAS). Breast fibroglandular tissue thickness ratio was defined as the ratio of fibroglandular tissue thickness to distance between skin and anterior chest wall muscles. These measurements were made in the periareolar areas in the upper-outer quadrants of both breasts with ultrasound. Pearson correlation coefficient test was used for statistical analysis.

Results: The patients' ages were between 18 and 39 with a mean age of 30.1. The mean fibroglandular tissue thickness ratio of the whole group was 0.618 mm. The Pearson's coefficient *r value* for the correlation between the mean breast fibroglandular tissue ratio and VAS scores was 0.791, which means that there is strong correlation. While we categorized patients in 3 groups as having mild, moderate and severe mastalgia The Pearson's coefficient *r value* for correlation between the mean breast fibroglandular tissue ratio and severity groups is 0.737.

Conclusion: In our study we found that the mean breast fibroglandular tissue ratio is strongly correlated with mastalgia severity in patients with cyclic mastalgia. A more effective analgesic treatment approach and a more careful follow-up in terms of cancer should be applied to patients with high breast density.

Key Words: *Breast pain, breast density, fibroglandular tissue ratio*

Siklik Mastaljili Hastalarda Meme Fibroglandüler Doku Kalınlığı Oranı ile Mastalji Şiddeti Arasında Bir Korelasyon Var mı?

Amaç: Bu çalışmanın amacı siklik mastaljili hastalarda meme fibroglandüler doku kalınlığı oranı ile mastalji şiddeti arasındaki ilişkiyi değerlendirmektir.

Gereç ve Yöntem: Mastalji şikayeti premenepozal üreme çağındaki 96 kadın prospektif olarak değerlendirildi. Hastalar aynı genel cerrah tarafından muayene edildi ve mastalji şiddeti görsel analog skala (VAS) ile değerlendirildi. Meme fibroglandüler doku kalınlığı oranı, fibroglandüler doku kalınlığının deri ve ön göğüs duvarı kasları arasındaki mesafeye oranı olarak tanımlandı. Bu ölçümler, her iki memenin üst-dış kadranındaki periareolar alanlarda ultrasound ile yapıldı. İstatistiksel analizde Pearson korelasyon katsayısı testi kullanıldı.

Bulgular: Hastaların yaşları 18 ile 39 arasındaydı ve ortalama yaş 30.1 idi. Tüm grubun ortalama fibroglandüler doku kalınlığı oranı 0.618 mm idi. Ortalama meme fibroglandüler doku oranı ile VAS skorları arasındaki korelasyon için Pearson'ın katsayısı r değeri 0.791 idi, bu da güçlü bir korelasyon olduğu anlamına gelir. Hastaları hafif, orta ve şiddetli olarak 3 grupta kategorize ederken ortalama meme fibroglandüler doku oranı ve şiddet grupları arasındaki korelasyon için Pearson'ın katsayısı r değeri 0.737'dir.

Sonuç: Çalışmamızda, siklik mastaljili hastalarda ortalama meme fibroglandüler doku oranının mastalji şiddeti ile güçlü bir şekilde ilişkili olduğunu bulduk. Meme yoğunluğu yüksek olan hastalara daha etkili bir analjezik tedavi yaklaşımı ve kanser açısından daha dikkatli bir takip uygulanmalıdır.

Anahtar Kelimeler: *Mastalji, meme yoğunluğu, fibroglandüler doku oranı*

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Introduction

Mastalgia, or breast pain, is one of the most common breast symptoms in women presenting to general practitioners, general surgery, obstetrics and gynecology out-patient clinics or breast clinics. The prevalence of mastalgia is reported up 70% to 80% of women. Mastalgia is mostly considered as a benign condition in about 90% of cases. In few cases there is an obvious certain cause such as infection, cysts, malignancy or extramammary causes. In the majority of the patients nodistinctive pathology isfound on clinical examinations and following various radiologic or cytological investigations (1).

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The mastalgia is classified in three main category such as cyclic mastalgia, noncyclic mastalgia pain (2-5). Noncyclic mastalgia usually occurs in postmenopausal women constantly or intermittently and is not associated with the menstrual cycle. Cyclic mastalgia occurs in premenopausal women and is defined as breast pain related to the menstrual cycle. Cyclic mastalgia usually starts within 2 weeks before menses and resolves or diminishes with the onset of menses. The pain typically involves the upper outer breast area and radiates to the upper arm and axilla. Most cyclic mastalgias are diffuse and bilateral but may be more severe in one breast. Mastalgia can be severe enough to interfere with usual daily activities, diminishes quality of life and result in depression (6, 7).

Until today even though many factors including hormonal, nutritional, psychological factors are discussed in the etiopathogenesis and the etiology of cyclic mastalgia is still unknown (7). So the optimal treatment is still undefined.

In this study we aimed to evaluate correlation between the mastalgia severity and the breast fibroglandular tissue thickness ratio to whole breast thickness which is primary responsible for the hormonal responses in patients with cyclic mastalgia.

Materials and Methods

Research and Publication Ethics: For this study, permission was obtained from the Firat University Non-Invasive Research Ethics Committee and informed consent from the patients (Day: 31.12.2013 No: 04).

Ninety-six women in premenopausal reproductive ages who were admitted or referred to the general surgery out-patient clinic with complaints of premenstrual breast pain and tenderness or tender lumpiness for at least 3 months and diagnosed with cyclic mastalgia, were prospectively evaluated from December 2013 to June 2014 at our institute. The patients with mastitis, abscess, cysts or fibrocysts, breast cancer or positive family history for breast cancer, breast surgery history, pregnancy, lactation, irregular menses and who undergone any hormonal treatment for the last 3 months were excluded from study.

All patients were evaluated with detailed medical and familial history and breast physical examinations performed by the same general surgeon. No palpable lesion were identified in their physical examinations. Severity of mastalgia was assessed by using visual analogue scale (VAS) because of the high-patient volume in the general surgery out-patient clinic. In VAS scoring, the severity of mastalgia was classified into three groups. The degree of mastalgia was defined as mild in Group 1 (1–3 points), moderate in Group 2 (4–6 points), and severe in Group 3 (7–10 points).

All patients were referred to radiology department for breast ultrasonography (US) examinations. Breast US examinations were performed by two radiologists who were experienced approximately 6 years in breast radiology and sonography. After the breast US examinations were performed, if the patients were included into the study, the measurements were made by the two radiologists together with consensus. The breast US examinations were performed the by a sonographic system (HI VISION Preirus, Hitachi Medical Systems, UK) with a VF 13-5 MHz transducer. The sonographies were performed within 7 days prior to the expected onset of menses.

Breast fibroglandular tissue thickness ratio was defined as the ratio of the fibroglandular tissue thickness to distance between the skin and the anterior chest wall muscles (Figure 1). The measurements are made in the periareolar area in the upper-outer quadrants of both breasts and the mean ratio were calculated in each patient.

All data were recorded by using excel spreadsheet and statistical analysis were obtained by using SPSS software package (version 21 for Microsoft Windows, SPSS). Pearson's correlation coefficient test was used to evaluate the correlation between the mean breast fibroglandular tissue ratio and VAS score for mastalgia severity.

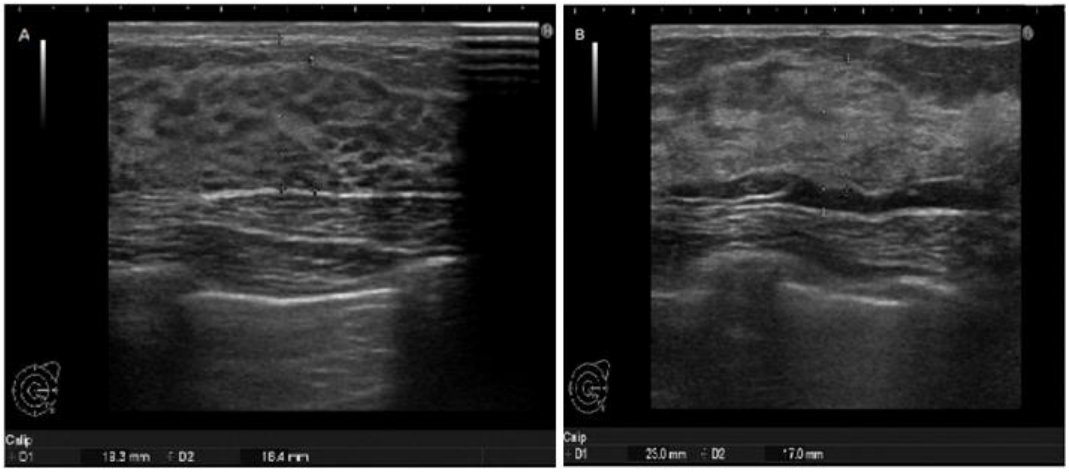


Figure 1. US images of patient 1 (a) and patient 2 (b) show measurements of the breast fibroglandular tissue thickness ratios

Results

The patients' ages were between 18 and 39 (reproductive ages) with a mean age of 30.1. The VAS scores of the patients are given in table (Table 1). Three patients were classified as having mild mastalgia (Group 1), 29 patients were classified as having moderate mastalgia (Group 2) and 64 patients were classified as having severe mastalgia (Group 3).

Table 1. VAS score characteristics of patients

VAS score (Points)	Number of patients
3	3
4	3
5	10
6	16
7	26
8	29
9	6
10	3

VAS: Visual analogue scale.

The mean breast fibroglandular tissue thickness ratio of the left breasts in our study group was calculated as 0.615 mm and the mean fibroglandular tissue thickness ratio of the right breasts was 0.621 mm. Although the difference between the fibroglandular tissue thickness ratios of right and left breasts of each patient was very small, a mean fibroglandular tissue thickness ratio was calculated for each patient. In addition, from the mean fibroglandular thickness ratios we calculated the mean fibroglandular tissue thickness ratio of the whole group which is 0.618 mm.

The Pearson's coefficient *r value* for the correlation between the mean breast fibroglandular tissue ratio and VAS scores was 0.791, which means that there is strong correlation. While we categorized patients in 3 groups as mild, moderate and severe, The Pearson's coefficient *r value* for correlation between the mean breast fibroglandular tissue ratio and severity groups is 0.737, strongly correlated. According to our results, VAS scoring system correlated with the mean breast fibroglandular tissue ratio better than group scoring system.

The mean breast fibroglandular tissue thickness of the patients were between 5.5 mm and 30 mm with a mean thickness of 14.2 mm. The mean distance between the skin and the anterior chest wall muscles of the patients were between12 mm and 45 mm with a mean thickness of 24.3 mm.

The Pearson's coefficient *r value* for the correlation between the mean breast fibroglandular tissue thickness and VAS scores was 0.649, which means that there is strong correlation. While we compare The Pearson's coefficient *r values* of breast fibroglandular thickness and thickness ratio, ratio is more correlated with VAS scoring and more sensitive to evaluate mastalgia severity.

As a result in our study we found that the mean breast fibroglandular tissue ratio is strongly correlated with mastalgia severity in patients with cyclic mastalgia.

Discussion

Mastalgia is a very common breast symptom in women attending the breast clinics. It varies within the two broad classifications of cyclic mastalgia and noncyclic mastalgia, cyclic mastalgia accounts for approximately two thirds of patients with mastalgia (8).

Even though many studies done to identify causative histopathological, hormonal, nutritional, or psychiatric abnormalities, few consistent findings have been uncovered, and the etiology of cyclic mastalgia is still unknown.

Increased estrogen, increased prolactin, decreased progesterone levels, or alterations in the estrogen/progesterone ratio are theories regarding the pathophysiology of mastalgia. Menstrual irregularity, oral contraceptives, hormone therapy, psychotropic drugs, some cardiovascular agents (i.e. spironolactone, digoxin), psychosocial factors, and emotional stress are related with breast pain. Caffeine and nicotine consumption are also considered to be related with mastalgia (9, 10).

Most women use simple analgesics or get no treatment at all. In rare cases, women with severe pain, persistent pain are treated with drugs; such as danazol and tamoxifen (11). Outcome can be successful in most patients with reassurance, nonpharmacological measures, and in some instances, one of several effective medications (3, 12-14).

According to recent studies in the literature, evaluating the psychological associations of cyclic mastalgia, increased anxiety and depression were found among women with breast pain compared to asymptomatic women (6, 7, 15). As a result of facilitation of access to information by internet, increased awareness, overestimation of breast cancer risk and concerns about cancer prompt more women to seek medical attention and apply clinics more than once for breast pain similar to our patient group.

Our patient group was mostly composed of women with complaints of premenstrual breast pain, tenderness or tender lumpiness and who had increased anxiety and fear about breast cancer. Thus in our study we aimed to evaluate correlation between mastalgia severity and the breast fibroglandular tissue thickness ratio which is primary responsible for the hormonal responses in patients with cyclic mastalgia and to reduce concerns about breast cancer risk by reassurance, as the breast tissue thickness ratio is correlated with mastalgia severity.

While we reviewed the literature we could not find any study evaluating primarily the relationship between with mastalgia and breast tissue thickness. There are few studies identifying a potential association between cyclic mastalgia and breast cancer risk.

Goodwin et al. (16) identified an association of cyclical breast tenderness with breast cancer risk in premenopausal women. They hypothesized that increased tissue sensitivity to estrogen, related to dietary fat intake and fatty acid levels, has an etiologic role in both cyclic breast pain and breast cancer risk and could account for the relationship. Consistent with Goodwin et al. (16) and Plu-Bureau et al. (17) evaluated cyclical mastalgia as a marker of breast cancer susceptibility symptoms in premenopausal women with and without a history of breast cancer and, demonstrated that cyclic mastalgia was significantly associated with breast cancer risk.

Duijim et al. (18) demonstrated prevalence of breast cancer is similar in symptomatic and screening group in their observational 2 year follow up study.

Breast mammographic density, a measure of the extent of radiodense fibroglandular tissue in the breast, can be used as a predictor of breast cancer risk. Breast cancer risk is strongly elevated in women with a high percent mammographic density (19, 20). Women with more than 75% of the total area on a mammogram occupied by dense area have a two to sixfold greater risk of breast cancer compared to women with little or no dense area on a mammogram (21, 22).

We know that the present study had some limitations. We used VAS scoring system because of high-patient volume in general surgery out-patient clinic instead of any questionnaire specific to breast complaints. In addition we could not follow up of patients for long term.

As a conclusion, in the literature there is no proven obvious association between cyclic mastalgia and breast cancer risk. Thus the primary advantage of breast ultrasonography in women with cyclic mastalgia who do not have a pronounced pathology in their breast sonographies, we can explain it as reducing the pain by relieving the patient psychologically. A more effective analgesic treatment approach and a more careful follow-up in terms of cancer should be applied to patients with high breast density.

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