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## Investigation of the Relationship Between Mastalgia and Musculoskeletal Pain

**Objective:** Mastalgia originated from the breast itself, as well as diseases occurring in the muscles, joints and bones around the breast. The objective of current study is to investigate the frequency of chronic pain syndromes, thoracic wall and vertebral pathologies in patients with mastalgia.

**Materials and Methods:** Women aged 18-60 years, who presented to the outpatient clinic with non-cyclical breast pain and had normal breast examination, breast ultrasound and/or mammography were included in the study. Patients were evaluated for Fibromyalgia Syndrome (FMS), Myofascial Pain Syndrome (MFPS), pain related vertebral pathologies, thoracic wall pathologies. Cervical and thoracic vertebrae were evaluated with magnetic resonance imaging (MRI).

**Results:** The study included 54 female and mean age was 44.2±10.5 years. Forty-five (75%) patients were diagnosed with FMS, 22 (40.7%) with MFPS. Frequency of vertebral disc pathology was 31 (59.3%), thoracic disc pathology was 14 (23.3%). Only 6 (11%) patients had costochondritis. MRI evaluation revealed cervical syrinx, thoracic spondylosis and hemangioma in T4 vertebra in 1 (2%) patients. Only 5 (9.3%) of these patients had no musculoskeletal pathology. There was a significant difference between the ages of patients with MFPS and the ages of patients without MFPS, and patients with MFPS formed the younger group (P<0.001). Mean age was significantly higher patients with cervical disc hernias compared to those without (P=0.037).

**Conclusion:** Pain which originated from adjacent musculoskeletal structures is frequent in patients with mastalgia. We consider that young patients with mastalgia should be investigated for FMS and MFPS, and older patients should be investigated for vertebral disc pathologies.

**Key Words:** Mastalgia, pain, musculoskeletal

### Mastalji ile Kas İskelet Ağrıları Arasındaki İlişkinin İncelenmesi

**Amaç:** Mastalji, memenin kendisinden, meme çevresindeki kaslarda, eklemlerde ve kemiklerde meydana gelen hastalıklardan kaynaklanmaktadır. Bu çalışmanın amacı, mastaljili hastalarda kronik ağrı sendromları, göğüs duvarı ve vertebral patolojilerin sıklığını araştırmaktır.

**Gereç ve Yöntemler:** Polikliniğe sıklık olmayan meme ağrısı ile başvuran, meme muayenesi, meme ultrasonu ve / veya mamografisi normal olan 18-60 yaş arası kadınlar çalışmaya dahil edildi. Hastalar Fibromiyalji Sendromu (FMS), Miyofasiyal Ağrı Sendromu (MFPS), ağrıya bağlı vertebral patolojiler, torasik duvar patolojileri açısından değerlendirildi. Servikal ve torasik omurlar manyetik rezonans görüntüleme (MRI) ile incelendi.

**Bulgular:** Çalışmaya 54 kadın dahil edilmiş olup ortalama yaşları 44.2±10.5 yıl bulundu. Kırk beş hastaya FMS (%75), 22'sine MFPS (%40.7) tanısı konuldu. Vertebral disk patolojisi sıklığı 31 (%59.3), torasik disk patolojisi 14 (%23.3) idi. Sadece 6 (%11) hastada Costochondritis vardı. MR incelemesinde 1 (%2) hastada T4 vertebrada servikal sirinks, torasik spondiloz ve hemanjiyom saptandı. Bu hastaların sadece 5'inde (%9,3) kas-iskelet patolojisi bulunmadı. MFPS'li hastaların yaşları ile MFPS'siz hastaların yaşları arasında anlamlı bir fark bulunmuş olup, MFPS'li hastalar genç grubu oluşturmuştur (P<0.001).

**Sonuç:** Komşu kas iskelet sistemi yapılarından kaynaklanan ağrı, mastaljili hastalarda siktir. Mastaljili genç hastaların daha çok FMS ve MFPS için araştırılması, daha yaşlı hastaların ise vertebral disk patolojileri açısından incelenmesi gerektiğini düşünmekteyiz.

**Anahtar Kelimeler:** Mastalji, ağrı, kas iskelet

#### Introduction

Mastalgia is the most common cause of admittance to the breast clinic. Sixty to seventy percent of women experience some degree of breast pain at any period in their lives. The most common concerns of patients presenting with mastalgia are fear of breast cancer and severe pain affecting the quality of life (1).

The cause of pain in the breast may be considered as the pathologies originating from the breast itself, as well as diseases occurring in the muscles, joints and bones around the breast. Pain in nerve roots due to fibromyalgia, surgery, degenerative spinal changes, pain arising from the musculoskeletal system, heart diseases, pain of biliary origin, and peptic ulcer pain are listed in this group (2). Musculoskeletal problems of the chest wall can occur in ribs, sternum, joints, or myofascial structures. Stress fractures of the sternum, sliding costa syndrome, painful xiphoid syndrome, costochondritis, tietze syndrome, intercostal muscle injuries, epidemic myalgia, and pain radiating from the

thoracic spine are among the causes (3). Pains in diseases occurring in the shoulders, arms or muscles, myalgia, shingles holding the thoracic nerve roots, and pain caused by rheumatic diseases in the shoulder joint can also be felt in the breast (2-4). Pain originated from vertebrae localized in the anterior thorax may mimic anginal pain (pseudoangina pectoris). The most common causes of chest pain due to vertebrae are degenerative changes and segmental dysfunction in the lower cervical, upper-middle thoracic spine level (5). There is a limited number of studies in the literature investigating the relationship between breast pain and chronic pain syndrome. Two of these chronic pain syndromes commonly seen are FMS and MFPS (6). FMS is a health problem that is defined as widespread pain that has been going on for at least 3 months, accompanied by fatigue, sleep problems and various somatic symptoms (7). Myofascial pain syndrome is defined as pain concentrated on a specific area through tension and stimulation of the trigger point in the palpated muscle band (8).

The aim of this study is to investigate the frequency of FMS, MFPS, costochondritis, and cervical and thoracic vertebral pathologies in patients presenting with mastalgia.

## Materials and Methods

**Research and Publication Ethics:** Firat University non-interventional ethics committee meeting nr. 09 dated 10.05.2016 decision nr. 01.

The study was conducted in our training and research hospital general surgery, physical therapy and rehabilitation (PTR) and radiology clinics between 2016 and 2018 after obtaining the necessary ethics committee approval. (10.05.2016/09/01.) Informed consent was obtained from all patients. The study was carried out in accordance with the principles of the Helsinki Declaration. Women aged 18-60 years admitted to the general surgery outpatient clinic due to mastalgia and who had normal breast and axilla examination, non-cyclical pain, and whose breast US and/or mammography results evaluated according to Breast Imaging Reporting and Data Systems were normal (BIRADS 1), were included in the present study. Breast US examination was performed with Toshiba-Aplio TUS-A500 10-14 MHz probe USG system (Toshiba Medical Systems Corporation, Tokyo, Japan). Patients with previous breast disease or breast interventions, pregnant or breastfeeding patients, patients treated for hormonal disorder, patients using any hormone medication, using oral contraceptives, having structural anomalies in the musculoskeletal system, and patients diagnosed with rheumatic disease were excluded from the study. Breast examination was performed by the same surgeons, and evaluation of breast pain was performed by questioning the patients. Pain severity was rated between 0 (no pain) and 10 (unbearable pain) using the visual analog scale (VAS). VAS is a practical rating scale used in pain assessment and pain is given a value between 0 and 10. "0" indicates "no pain", whereas a score of "1-4" indicates "mild pain", a score of "5-6"

indicates "moderate pain", and a score of "7-10" indicates "severe pain" (9). Patients who reported a VAS score of 5-6 for breast pain were included in the study. Breast imaging of women under the age of forty was done with breast US and those over 40 were mammographed. If necessary, another imaging method was performed on patients who were evaluated as BIRADS 0 in one of these two imaging modalities (due to dense breast or lipomatous breast). Evaluation of breast imaging was performed by the same radiologists. Patients volunteering to participate in the study were consulted by the PTR specialist. All patients were evaluated for FMS, MFPS, vertebrogenic pain, costochondritis (Tietze syndrome), and thoracic wall pathologies. American College of Rheumatology (ACR criteria) 1990 diagnostic criteria were used for the diagnosis of FMS (10). Major and minor criteria defined by Travell and Simons were used for the diagnosis of MFPS (11). In addition, patients were examined for costochondritis.

For evaluation of cervical and thoracic vertebrae, a magnetic resonance imaging (MRI) examination was performed after examination by the PTR specialist. MRI evaluation was done by the same physicians. Using a GE SignaHDxt 1.5 Tesla MR device, the images of the posterior fossa and medulla spinalis and the spinal cord, cerebrospinal fluid, meninges, and bone structures in the cervical and thoracic region were taken in the sagittal and axial planes. The MR images were taken using a fast spin-echo technique with the following sequences: T1-weighted sagittal images, T2-weighted sagittal images, and T1-and T2-weighted axial images. Terminology developed by the International Society for the Study of the Lumbar Spine is used in intervertebral disc pathologies. The following definitions are made accordingly: 1-Disk bulging: Enlargement of the disk to exceed its normal limits while the annulus fibrosus is intact; 2-Protrusion: Focal enlargement of the disc due to rupture of the inner layers of the annulus fibrosus, posterior longitudinal ligament is intact; 3-Extrusion: Rupture of all layers of annulus fibrosus and herniation of the nucleus pulposus under the posterior longitudinal ligament; 4-Sequestration: Release of the extruded nucleus pulposus in the canal by tearing the posterior longitudinal ligament (12, 13). In the study, the MRIs of patients for cervical and thoracic vertebrae were evaluated considering these criteria, but patients with any degeneration at any level were recorded and no classification was made. Degenerative findings of the intervertebral disc were examined in MRI and decreased signal intensity of the intervertebral disc was evaluated in terms of pathologies such as frontal compression of the dura and spinal cord, posterior disc protrusion, narrowing of the disc space, foraminal stenosis, as well as intra and extradural masses, vascular malformations, infectious pathologies, and soft tissue and bone tumors.

**Statistical Analysis:** Statistical Package for the Social Sciences (SPSS 21, Chicago, IL, US) statistics program was used in the data analysis. Distribution of the continuous variables was evaluated by Kolmogorov-

Simirnov and Shapiro-Wilk normality test. Parametric data were presented as mean±standard deviation, nonparametric data were represented as median (minimum-maximum), and categorical data were presented as percentages. Mann-Whitney-U test was used for intergroup comparisons.  $P<0.05$  was accepted as significant in all analyses.

## Results

A total of 54 female patients who met the inclusion criteria were included in the study. The mean age of the patients was  $44.2\pm 10.5$  years and the majority was in the 35-55 age group. There was no statistically significant difference in terms of frequency of right and left breast pain. Based on patient examination, 45 (75%) patients were diagnosed with FMS. The number of patients diagnosed with MFPS was 22 (40.7%). The number of patients with cervical disc hernia was 31 (59.3%). The number of patients with thoracic disc hernia was 14 (23.3%) (Figure 1). Only 6 (11%) patients had costochondritis. MRI evaluation revealed cystic neoplasia in cervical syrinx in 1 (2%) patient, thoracic spondylosis in 1 (2%) patient, and hemangioma in T4 vertebra in 1 (2%) patient (Figure 2). While only 5 (9.3%) of the patients had no pathology, at least one pathology was found in 25 patients (46.3%), 3 pathologies were found in 18 patients (33.3%), 4 pathologies were found in 1 patient (1.9%). and all pathologies were present in 1 patient (Table 1). Only 5 (9.3%) of these patients had no pain syndrome and thoracic-vertebral pathology.



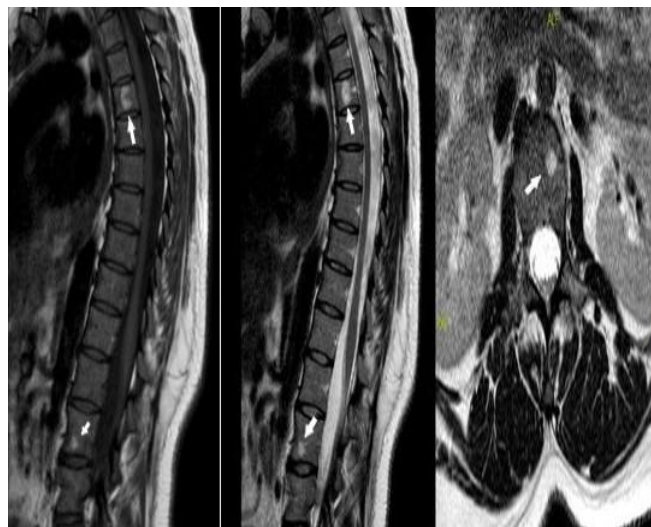
**Figure 1.** a) Axial and b) Left parasagittal disc hernia at T8-9 level in Sagittal T2-weighted MRI

There was a significant difference between the ages of patients with MFPS and the ages of patients without MFPS, and patients with MFPS formed the younger group ( $P<0.001$ ). Although the difference was not statistically significant, mean age of patients with FMS was lower compared to those without FMS ( $P=0.086$ ). Mean age was  $40\pm 11$  years in patients with FMS and  $45\pm 10$  in those without FMS.

Mean age was significantly higher patients with cervical disc hernias compared to those without ( $P=0.037$ ).

There was no significant difference between mean age of patients with thoracic disc hernias and those without ( $P=1$ ).

There was no age difference in patients with costochondritis compared to those without ( $P>0.05$ ).



**Figure 2.** a) Sagittal T1, b) Sagittal T2 and c) Hyperintense smoothly limited hemangioma at T5 level in Axial T2-weighted MRI

**Table 1.** Number and distribution of pathology detected in patients.

Number of pathology	Patients, (%)
-	5 (9.3%)
1	25 (46.3%)
2	18 (33.3%)
3	4 (7.4%)
4	1 (1.9%)
5	1 (1.9%)
Total	54 (100%)

## Discussion

In this study, it was observed that musculoskeletal system pathologies were quite common in patients who applied to the surgery outpatient clinic with the complaint of breast pain and did not have breast pathology. Pain caused by adjacent musculoskeletal structures was frequently detected in patients with mastalgia. We think that younger patients with mastalgia should be investigated for FMS and MFPS, and older patients for vertebral disc pathologies.

One of the chronic pain syndromes, FMS is considered as a rheumatological disease that negatively affects quality of life and causes social problems especially in women, and it is one of the central sensitivity syndromes (7). In a survey study investigating the comorbidity of mastalgia and chronic pain syndromes, patients with mastalgia were questioned for fibromyalgia, irritable bowel syndrome and chronic pelvic pain in the last 1 year, and a strong correlation was

found between mastalgia frequency and FMS, chronic pelvic pain and irritable bowel syndrome (14).

Sen et al. showed that the comorbidity of FMS and mastalgia was more frequent than expected, furthermore mastalgia was detected in approximately half of the patients (47.2%) with FMS at the time of admission. On the other hand, 37.7% of patients with mastalgia met the diagnostic criteria for fibromyalgia syndrome (7). The authors stated that mastalgia may also be a part of central sensitivity syndromes and may even be included in FMS criteria (7).

In Turkey, Genc et al. (15) investigated the comorbidity of fibromyalgia and mastalgia by evaluating mastalgia prevalence in patients with fibromyalgia and vice versa in their study that included 50 patients with mastalgia and 50 patients with fibromyalgia. While 36% of patients with mastalgia met the criteria of fibromyalgia, mastalgia was detected in 42% of the patients in the fibromyalgia group. In the present study, FMS was diagnosed in 75% of patients with mastalgia, and this rate was higher than other studies. The reasons for this can be the inclusion of patients with moderate pain (VAS 5-6) into the study and the limited number of cases. FMS is mostly seen in women between the ages of 30-60. Although not statistically significant, patients with FMS in this study constituted the younger patient group, which is consistent with the literature data (16).

MFPS is a musculoskeletal system disease that presents with symptoms and signs such as pain, muscle spasm, sensitivity, mobility restriction, weakness and rarely autonomic dysfunction in one or more muscles and/or connective tissue and characterized with hypersensitive points called trigger points. Symptoms are usually felt in areas away from the trigger point (16, 17). The distribution of the trigger points varies among individuals. In one study, 214 women and 103 men with MFPS were examined and it was shown that more trigger points were present in the head, neck, shoulder girdle, and waist compared to other parts of the body. Pain reflected from the trigger point is felt more severely in the neck and shoulder girdle compared to other regions (16, 18). Specific myofascial pain syndromes cause subacute and chronic pain like FMS. Tenderness, trigger points, and symptoms such as muscle spasm develop gradually. With respect to the thorax, pectoralis major syndrome, serratus anterior syndrome, sternalis syndrome, and precordial catch syndrome are among the pains in this group. According to the literature, MFPS is seen between the ages of 30-49 (19-21). There are no studies in the literature investigating myofascial pain in patients with mastalgia, but there are studies on MFS in patients who have undergone surgery due to breast cancer. In a study on 116 patients conducted by Lacombe et al., MFS was identified as a potential and frequent cause of chronic pain in patients who completed 1 year follow-up after breast surgery and axillary lymph node dissection. The rate of MFS was 44.8% in this patient group (22). In the present study, the number of patients with mastalgia also diagnosed with MFPS was 22 (40.7%). This has been defined for the first time in the literature and the current study also

demonstrates that MFAS can show high level of comorbidity with mastalgia, especially in younger patients.

Among the pathologies originating from the thoracic wall, costochondritis (Tietze syndrome) is closely associated with mastalgia. In a 1976 study, Preece et al. examined 232 patients presenting with breast pain and diagnosed Tietze syndrome in 25 (10.8%) of these patients. These patients were 13-62 years old and the mean age was 35. The patients reported that their pain was localized in the chest wall rather than the breast and to the medial side. In another study, Tietze syndrome was diagnosed in 17 (6.7%) of 258 mastalgia patients (23,24) In accordance with the literature, 6 (11%) patients were diagnosed with costochondritis in the present study. The relationship between mastalgia and Tietze syndrome has not been reassessed for many years in the literature. Despite the rapid developments in technology and accordingly, in treatment modalities, the diagnosis of costochondritis can still be made by examination and the present study has shown that the rate of detection of costochondritis in patients with mastalgia has not changed.

Pain complaints due to vertebral degeneration are common in the overall population and this rate increases with age. In MRI, the decrease in intervertebral disc signal intensity is observed in 17% of males and 12% of females between the ages of 20-29 and 86% of males and 89% of females between the ages of 60-69 (25). Pirti et al. (26) performed MRI examination on 100 patients with mastalgia and detected no pathology in only 4 (4%) patients, diffuse annular bulging in 49 (49%) patients, cervical vertebrae and cervical disc protrusion in 47 (47%) patients, and thoracic disc protrusion in 12 (12%) patients. Among these 12 patients, 7 had cervical diffuse annular bulging and 5 had cervical disc protrusion. In the present study, the number of patients with degenerative disease in any of the cervical discs revealed by MRI was 31 (59.3%). The number of patients with degenerative disease associated with thoracic discs was 14 (23.3%). MRI evaluation revealed cystic neoplasia in cervical syrinx in 1 (2%) patient, thoracic spondylosis in 1 (2%) patient, and T4 hemangioma in 1 (2%) patient. These rates show that coexistence of vertebral pathologies is quite high in patients with mastalgia. The fact that patients without cervical disc hernias were younger is also consistent with the literature, and it is stated in the literature that the prevalence of disc degeneration increases with age (25). On the other hand, frequency of thoracic degenerative disorder was found to be slightly higher compared to Pirti et al.'s results. This may have been due to the low number of patients, furthermore, the detection of other mass lesions suggests that there is a strong association between vertebral pathologies and mastalgia. We confirm the results of previous studies and recommend evaluation of cervical and thoracic vertebral pathologies in mastalgia patients.

In conclusion, pain which originated from adjacent musculoskeletal structures is frequent in patients with mastalgia. We consider that young patients with

mastalgia should be investigated for fibromyalgia syndrome and myofascial pain syndrome, and older patients should be investigated for vertebral disc pathologies. For this reason, we believe that collaboration with PTR specialists will be beneficial for providing appropriate diagnosis-treatment options for patients.

#### Declaration of conflicting interests

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

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#### Key Points

- 1- No other source of pain was found in 9.3% of patients with mastalgia.
- 2- Mastalgia and Myofascial Pain Syndrome accompaniment was observed in high rates especially in younger women.
- 3- Mean age was significantly higher patients with cervical disc hernias compared to those without.

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