

ORIGINAL PAPERS

Adv Clin Exp Med 2016, 25, 5, 895–900
DOI: 10.17219/acem/28820

© Copyright by Wroclaw Medical University
ISSN 1899–5276

OKAY PIRTI^{A, B}, AZIZ M. BARLAS^A, SERDAR KURU^C, SELIM TEMEL^A, MUSTAFA K. URHAN^B,
KEMAL KISMET^D, ADNAN HASANOGLU^E, OSMAN GULER^F

Mastalgia Due to Degenerative Changes of the Spine

Department of General Surgery, Ankara Education and Research Hospital, Ankara, Turkey

A – research concept and design; B – collection and/or assembly of data; C – data analysis and interpretation;
D – writing the article; E – critical revision of the article; F – final approval of article

Abstract

Background. Mastalgia is a common and enigmatic condition; the cause and optimal treatment are still inadequately defined. Cervical radiculopathy, which is the result of cervical nerve root pathology often caused by space-occupying lesions such as cervical disc herniation, spondylosis, or osteophytosis, is frequently encountered in physical therapy.

Objectives. The aim of the study was to evaluate the incidence of vertebral pathologies in patients with non-cyclic mastalgia and the efficacy of conservative treatment of these pathologies on relieving breast pain.

Material and Methods. One hundred patients were included in the study, all with breast pain continuing throughout the day and lasting at least three months. Breast and axillary physical examinations, mammographic and/or ultrasonographic evaluations were normal in all the patients. The patients' pain levels were scored using a visual analog scale (VAS). Cervical and thoracic spine magnetic resonance imaging (MRI) was performed on all the participants.

Results. Among 96 patients that had pathological findings on magnetic resonance imaging (96%), 49 women had diffuse annular bulging of the cervical spine, and 47 had cervical disc protrusion. Additionally, 12 patients had thoracic disc protrusion. At the end of the three-month period, the patients who were given only conservative treatment returned for follow-up evaluations. According to the VAS scores, five patients had mild to moderate improvement, 55 showed significant improvement, and 29 achieved complete remission.

Conclusions. The authors concluded that if none of the known causes of breast pain are found in a patient, the patient should be evaluated for vertebral pathologies (Adv Clin Exp Med 2016, 25, 5, 895–900).

Key words: breast, mastalgia, vertebral pathology.

Mastalgia, which is the reason for 50% of all referrals to breast clinics, affects up to 75% of women during their lives. It is a common and enigmatic condition, the cause and optimal treatment of which are still inadequately defined. It may be severe enough to affect the patient's usual daily activities, and its effect on quality of life is often underestimated. Evaluations of breast pain vary depending on whether it is classified as cyclic mastalgia, non-cyclic mastalgia or extramammary pain. This distinction is important because the evaluation and the response to interventions vary among the different types of breast pain [1, 2].

Cervical radiculopathy is frequently encountered, with an annual incidence of 83.2 per 100,000

people, and the prevalence increases in the fifth decade of life. Cervical radiculopathy is the result of cervical nerve root pathology, often caused by space-occupying lesions such as cervical disc herniation, spondylosis, or osteophytosis. These space-occupying lesions produce upper extremity radicular symptoms such as pain, numbness, weakness and paresthesia. The C6 and C7 nerve roots are most commonly involved in cervical radiculopathy [3].

The aim of the present study was to define the incidence of vertebral pathologies in patients with non-cyclic mastalgia and the efficacy of conservative treatment of these pathologies on relieving breast pain.

Material and Methods

One hundred and thirty-nine consecutive women who came to the Ankara Education and Research Hospital General Surgery outpatient clinic with non-cyclic breast pain complaints were included in this study. A questionnaire was filled out and the patients' breast pain was scored using a visual analog scale (VAS). After a routine physical examination of the breast and axillary region, ultrasonographs (Toshiba®-Xario SSA-660A USG system, Toshiba Medical Systems Europe B.V., Zoetermeer, the Netherlands) were performed on all the patients, and for the women over 40 mammographs (Lorad M-IV Mammography system, Hologic Inc., Marlborough, USA) were also performed. The women with normal mammography and/or USG results were included in the study; those with pathological signs in the physical examination and/or benign or malignant USG and/or mammography findings were excluded.

Cervical and thoracic spine magnetic resonance imaging (MRI) was performed on 100 women that had no pathological USG and/or mammography findings. Among these, 96 had pathological MRI findings and were referred to the Physical Therapy and Rehabilitation (PTR) outpatient clinic for physical therapy. The remaining 4 patients were excluded from the study, but continued to be followed at the General Surgery Department. The 96 women who were referred to the PTR were given conservative treatment by a specialist, and were asked to return for follow-up three months later. The final study group comprised 89 patients who completed the treatment and follow-up. The ages of these patients were between 21 and 74 (mean age 41.44).

At the end of the three-month period, the patients returned to the General Surgery outpatient clinic for follow-up evaluations. Physical examinations and follow-up USGs were performed. The pain scores of the patients were reevaluated using the VAS. A VAS score of 0 was accepted as complete remission; a reduction of 50% or more in the VAS score was regarded as significant improvement; a reduction of less than 50% was defined as mild to moderate improvement; and no reduction in the VAS score was taken as a lack of improvement.

A VAS is a pain evaluation test which translates non-numeric values into numeric values. Two extremes of each parameter are written at both ends of a 100 mm line, and the patients assess their status by drawing a line, putting a dot, or pointing to the appropriate place on the line. The most important advantages of this test are ease of implementation and no need for language. When repeated

after short time intervals, no significant differences are found between the answers given by the patients, which indicates that it is a reliable test. This scale has been used for a very long time with success, and is widely accepted in the literature. Due to these properties, this scale was used in the present study to assess the patients' pain [4].

Results

Out of the original group of 139 women who came to the General Surgery outpatient clinic with non-cyclic breast pain, 100 (71.94%) had normal breast and axillary physical examinations, mammography and/or USG results. Among the other 39 patients, who were excluded from the study, 37 (26.61%) had simple or complicated cysts of various dimensions or benign pathologies such as fibrocystic disease, and 2 (1.43%) had masses of a malignant nature.

The 100 patients that were initially included in the study filled out the questionnaire. All of them had breast pain continuing throughout the day and lasting at least three months. None of the patients had a history of risk factors such as early menarche, late menopause, a family history of breast cancer, oral contraceptive use or hormone replacement therapy. None of them had menstrual irregularities.

The pain levels of the patients were scored using a VAS; the mean VAS score of the patients at the first assessment was 7.06.

Cervical and thoracic spine MRIs were performed on all 100 women. No pathological findings were observed in four patients (4%). Among the 96 patients (96%) that had pathological MRI findings, 49 had diffuse annular bulging at different levels of the cervical spine and 47 had cervical disc protrusion. Additionally, 12 patients had thoracic disc protrusion. Seven of these 12 patients also had cervical diffuse annular bulging; five of them also had cervical disc protrusion.

The 96 patients with various pathological MRI findings were asked again about their breast pain and it was found that in 78 patients mastalgia was accompanied by neck and/or back pain. All 96 were told that the source of their pain might be the vertebral pathologies found on their MRIs. It was emphasized that the source of the pain was not in the breast.

These 96 patients were referred to the Physical Therapy and Rehabilitation outpatient clinic, where conservative treatment was given. A total of 11 patients were excluded from the study: seven due to noncompliance with the treatment and four for having no spinal pathologies in their MRI

findings. After three months, the remaining 89 patients returned for follow-up evaluations. Physical reexaminations and USGs were again performed; the findings were similar to the previous examinations. The patients' current pain scores were reassessed using the VAS and were compared with their previous pain scores.

According to the VAS scores, five patients (5.6%) had mild to moderate improvement, 55 patients (61.7%) showed significant improvement, and 29 patients (32.5%) achieved complete remission. While the average VAS value of the first examination was 7.06, it decreased to 1.11 at the follow-up assessment. Among the 29 patients with complete recovery, 14 had diffuse annular bulging, 14 had cervical disc protrusion, and one had cervical diffuse annular bulging plus thoracic disc protrusion.

Discussion

Mastalgia is a common complaint that may affect up to 70% of women in their lifetimes. Interestingly, it is less common in Asian cultures, affecting as few as 5%. It is not unusual for women to have two to three days of mild breast pain premenstrually, but 8–30% of women report moderate to severe breast pain lasting five or more days each month. It can be severe enough to adversely affect the sufferer's quality of life [5].

Mastalgia is divided into three categories: cyclical mastalgia, non-cyclical mastalgia and extramammary causes of breast pain. For patients without a mass, the evaluation should be guided by whether the pain is non-cyclical or cyclical. Cyclical breast pain is dull, diffuse and commonly bilaterally symmetrical in the upper outer quadrants. Normal ovarian hormonal influences on the breast glandular elements frequently produce cyclical mastalgia. It presents predominantly in the luteal stage of the menstrual cycle and abates with menstruation. It is most common in women in their mid-30s [2, 6].

The non-cyclical form accounts for one-third of all patients with mastalgia. Non-cyclical mastalgia is more common in postmenopausal women. Most patients are in the fourth or fifth decade of life at the time of the diagnosis. In the present study, the average age of the patients was 41.44, which was consistent with the literature. Non-cyclic mastalgia is generally unilateral; it may also radiate to the axilla. Patients describe the pain as "gnawing", "burning", "achy" and "sore". Non-cyclical mastalgia is more likely to be the result of a specific significant breast condition or of a non-breast etiology. It may result from pregnancy, macrocysts,

mastitis, thrombophlebitis, trauma, benign pathologies or cancer. However, only a minority of mastalgia cases can be explained by these conditions; most non-cyclic breast pain arises from unknown reasons. It is believed to have an anatomical cause, rather than a hormonal one. One exception may be the mastalgia that is associated with drug use [1, 2].

Clinical evaluation of a patient with mastalgia includes a detailed history to determine the duration, nature and severity of the pain. The relationship between the breast pain and the menstrual cycle, as well as the impact of the pain on the patient's work and social activities are very important. After that, a careful examination of the breasts and axilla must be carried out. Extramammary causes of breast pain, and specifically the possibility of costochondral pain, should be kept in mind during the evaluation of patients with non-cyclic mastalgia. Patients with mastalgia should be evaluated by radiological screening for breast cancer, except for young women with a normal breast examination and no risk factors presenting with cyclical breast pain. Mammographies are recommended for patients with non-cyclical mastalgia over 35 years old, and those with a family history of breast cancer. The exception to this is when the clinical breast examination reveals focal tenderness or a mass, and breast ultrasound detects a simple cyst. In this instance the work-up can be terminated with a reassurance and without a mammogram. If the physical examination or radiological screening identifies an abnormality such as a breast lump, this mass must be fully investigated in accordance with the standard protocols. Breast cancer may be diagnosed incidentally during the investigation of a woman presenting with mastalgia [2, 6].

Duijm et al. [7] carried out radiological examinations of 987 women with painful breasts, and reported the following findings: The results were normal in 854 women (86.5%); benign abnormalities were found in 85 women (8.6%; mainly small cysts); abnormalities that were probably benign were found in 36 women (3.6%); suspicious findings were found in 8 (0.8%), and malignancy in 4 (0.4%). In the present study, out of 139 women with non-cyclic breast pain, 100 women (71.94%) had normal mammography and/or USG results. Among the 39 patients that had pathological findings, 37 (26.61%) had simple or complicated cysts of various dimensions or benign pathologies such as fibrocystic disease, and two patients (1.43%) had malignant masses. It was consistent with the literature that the majority of the patients with non-cyclic mastalgia had normal physical examinations and radiological findings. Accordingly, the authors predicted that these patients' pain originated from

a source other than the breast. The patients were evaluated by cervical and thoracic MRI to investigate vertebral pathologies as a possible cause of the mastalgia-like pain.

A careful history and physical examination should eliminate extramammary causes such as musculoskeletal causes, cervical radiculopathy, costochondritis or intercostal muscle strain. Trietze's syndrome is pain at the costochondral junctions and commonly presents as mastalgia. The chest walls of all patients with non-cyclical mastalgia should be examined carefully for local tenderness at the joint sites. Gastroesophageal reflux disorder, symptomatic gallstones, cardiovascular disease and pulmonary pathology are fairly obvious after a brief patient interview. Other, less frequent causes of extramammary pain should also be considered during the evaluation of the patients presenting with breast pain [1, 2, 6].

Cervical radiculopathy is a neurologic status characterized by dysfunction of a cervical spinal nerve or the roots of the nerve, or both. The annual incidence of cervical radiculopathy is 83.2 in every 100,000 people, while the prevalence is 3.5/1000. Patients are most commonly affected in the 5th and 6th decades of life. It usually presents with pain in the neck and one arm, with a combination of sensory and motor function loss, or reflex changes in the affected nerve-root distribution. The most common cause of cervical radiculopathy (in 70–75% percent of cases) is foraminal encroachment of spinal nerves due to a combination of factors, including decreased disc height and degenerative changes in vertebral joints. Herniation of the nucleus pulposus is responsible for only 20–25% percent of cases of cervical radiculopathy. Other causes, such as tumors of the spine and spinal infections, are infrequent [8, 9].

Patients presenting with cervical radiculopathy most frequently complain of neck pain, paresthesia and radicular pain. Dermatomal pain is more frequent at the C4 level (60% of cases) than at the C7 (34.2%) and C6 levels (35%); scapular pain is encountered in 51.6% of cases. Physical examination typically reveals painful motion and decreased deep tendon reflexes. Upper limb weakness is seen in only 15% of cases. Decreased sensation is found in 1/3 of cases; however, muscle atrophy is present in less than 2% of cases. The most commonly involved levels are C7 (39.3–46.3%) and C6 (17.6–42.6%) nerve roots. Bilateral involvement is reported in 5–36% of cases [9].

Several conditions can mimic cervical radiculopathy and should be ruled out by history, physical examination, radiological imaging and/or electrophysiological studies. Conventional radiographs are often obtained, but their benefit is lim-

ited. Magnetic resonance imaging is another approach of choice, but there are currently no clear guidelines regarding when such imaging is warranted. Reasonable indications include the presence of symptoms or signs of myelopathy, findings of a tumor or infection, or the presence of progressive neurologic deficits. Computed tomography (CT) alone has limited value in assessing cervical radiculopathy, but it can be useful in distinguishing the extent of bony spurs, the presence of ossification of the posterior longitudinal ligament or foraminal encroachment [8].

Thoracic disc herniation is not a commonly seen condition. As Arce and Dohrrman wrote: "The incidence of thoracic disc prolapse is reported to be between 0.15% and 4% of all intervertebral disc prolapses (...) Peak incidence is noted in the fourth decade (...) Pain is the most common initial symptom, present in 57% of the cases, followed by sensory disturbances and motor involvement" [10]. As Papadakos et al. noted: "Due to the rarity of this condition, the presenting symptoms are often attributed to pulmonary, cardiac, gastrointestinal or genito-urinary causes. This can lead to unnecessary investigations and procedures" [11]. The upper thoracic spine is vulnerable to mechanical dysfunction secondary to degenerative changes, prolonged faulty posture and muscle weakness. Thoracic radiculopathy may be a potential source of upper extremity radicular pain [12–15].

The main objectives for treatment of cervical or thoracic radiculopathies are to improve neurologic function, relieve pain and prevent recurrences. None of the commonly recommended non-surgical therapies, such as the use of analgesic agents, translaminal and transforaminal epidural injections of corticosteroids, or short-term immobilization with a collar has been tested in randomized and placebo-controlled trials. Thus, recommendations derive largely from some case series and personal experiences [8].

Gore et al. [16] determined the severity and incidence of degenerative changes seen in lateral X-rays in 200 asymptomatic men and women. By the age of 60–65, at least one degenerative change was found on the X-ray images of 95% of the men and 70% of the women. Those researchers concluded that: "Although the abnormalities identified in the X-rays represented structural changes in the spine, these changes did not necessarily cause symptoms" [16]. In the present study, the mean age of the women was 41.44, and vertebral pathologies were detected in 96% of them. The ratio of vertebral pathologies was significantly higher than the ratios found by Gore et al. [16]. Since no data was available about the incidence of vertebral pathologies in asymptomatic Turkish peo-

ple, the present authors could not compare the ratio found in this study with the ratio in the general Turkish population.

Asymptomatic discopathies or other vertebral pathologies might be encountered in a high proportion of the population. The present study therefore evaluated the incidence of these pathologies in patients suffering from mastalgia with no pathological mammographic and/or USG findings, in order to investigate vertebral pathologies as an extramammary cause of breast pain in women with normal USG and/or mammography results. As noted above, no pathological findings were observed in the cervical and thoracic MRIs of four patients (4%). Among the 96 patients that had pathological MRI findings, 49 had diffuse annular bulging at various levels of the cervical spine, and 47 had cervical disc protrusion; additionally, 12 patients also had thoracic disc protrusion. Seven of these 12 patients also had cervical diffuse annular bulging and five of them also had cervical disc protrusion.

In a review, Olawaiye et al. emphasized that “Mastalgia affected up to two-thirds of women at some time during their reproductive lives; that after a clinical evaluation the majority of women could be reassured that the problem was not serious; and only 15% of the patients required pain-relieving therapy” [17]. They also mentioned that “Non-cyclic mastalgia responded poorly to treat-

ment but resolved spontaneously in up to 50% of the cases”. In another study Davies et al. [18] investigated the long-term course in patients with severe mastalgia by distributing a postal questionnaire to 212 patients studied 15 years earlier. They found that the average duration of pain was long (median: 12 years), especially if it started in the second or third decade of life. Pain persisted in 68 cases of cyclic mastalgia (57%) and in 35 cases (64%) of non-cyclic mastalgia patients. They stated that “Resolution more often seemed to be spontaneous in non-cyclic mastalgia patients” [18]. In the present study, five patients (5.6%) had mild to moderate improvement, 55 (61.7%) showed significant improvement, 29 (32.5%) achieved complete remission after conservative treatment provided by a physical therapy and rehabilitation specialist. While the average VAS value of the first examination was 7.06, it decreased to 1.11 at the follow-up assessment. Fourteen of the 29 patients with complete relief of pain had diffuse annular bulging on their MRIs; 14 had cervical disc protrusion, and one of them had cervical diffuse annular bulging plus thoracic disc protrusion.

The authors concluded that vertebral pathologies might be accepted as an extramammary cause of mastalgia, and if none of the known causes of breast pain is found in a patient, this patient should be evaluated for vertebral pathologies.

References

- [1] **Smith RL, Pruthi S, Fitzpatrick LA:** Evaluation and management of breast pain. *Mayo Clin Proc* 2004, 79, 353–372.
- [2] **Cairncross L:** Mastalgia. *Cont Med Educ* 2010, 28, 504–506.
- [3] **Boyles R, Toy P, Mellon J Jr:** Effectiveness of manual physical therapy in the treatment of cervical radiculopathy: A systematic review. *J Man Manip Ther* 2011, 19, 135–142.
- [4] **Gould D, Kelly D, Goldstone L, Gammon J:** Examining the validity of pressure ulcer risk assessment scales: Developing and using illustrated patient simulations to collect the data. *J Clin Nurs* 2001, 10, 697–706.
- [5] **Rosolowich V, Saettler E, Szuck B:** Mastalgia. *Obstet Gynaecol Can* 2006, 28, 49–71.
- [6] **Iglehart JD, Kaelin CM:** Diseases of the breast. [In:] *Sabiston Textbook of Surgery*, Eds: Beauchamp RD, Evers BM, Mattox KL. Elsevier Inc. 2004, USA, 867–944.
- [7] **Duijm LE, Guit GL, Hendriks JH, Zaat JO, Mali WP:** Value of breast imaging in women with painful breasts: Observational follow up study. *BMJ* 1998, 317, 1492–1495.
- [8] **Carette S, Fehlings MG:** Clinical practice. Cervical radiculopathy. *N Engl J Med* 2005, 353, 392–399.
- [9] **Rodine RJ, Vernon H:** Cervical radiculopathy: A systematic review on treatment by spinal manipulation and measurement with the neck disability index. *J Can Chiropr Assoc* 2012, 56, 18–28.
- [10] **Arce CA, Dohrmann GJ:** Herniated thoracic disks. *Neurol Clin* 1985, 3, 383–392.
- [11] **Papadakos N, Georges H, Sibtain N, Tolia CM:** Thoracic disc prolapse presenting with abdominal pain: Case report and review of the literature. *Ann R Coll Surg Engl* 2009, 91, 4–6. DOI: 10.1308/147870.809X401038.
- [12] **Sebastian D:** T2 radiculopathy: A differential screen for upper extremity radicular pain. *Physiother Theory Pract* 2013, 29, 75–85.
- [13] **Xiong Y, Lachmann E, Marini S, Nagler W:** Thoracic disk herniation presenting as abdominal and pelvic pain: A case report. *Arch Phys Med Rehabil* 2001, 82, 1142–1144.
- [14] **Eleraky MA, Apostolides PJ, Dickman CA, Sonntag VK:** Herniated thoracic discs mimic cardiac disease: Three case reports. *Acta Neurochir (Wien)* 1998, 140, 643–646.
- [15] **Georges C, Toledano C, Zagdanski AM:** Thoracic disk herniation mimicking renal crisis. *Eur J Intern Med* 2004, 15, 59–61.
- [16] **Gore DR, Sepic SB, Gardner GM:** Roentgenographic findings of the cervical spine in asymptomatic people. *Spine* 1986, 11, 521–524.

- [17] Olawaiye A, Withiam-Leitch M, Danakas G, Kahn K: Mastalgia: A review of management. *J Reprod Med* 2005, 50, 933–939.
- [18] Davies EL, Gateley CA, Miers M, Mansel RE: The long-term course of mastalgia. *J R Soc Med* 1998, 91, 462–464.

Address for correspondence:

Kemal Kismet
General Surgery Department
Ankara Education and Research Hospital
S.B. Ankara Egitim ve Arastirma Hastanesi
Yanik Unitesi Klinigi
Ulucanlar
06430 Ankara
Turkey
E-mail: kemalkismet@yahoo.com

Conflict of interest: None declared

Received: 16.01.2014

Revised: 27.01.2014

Accepted: 1.09.2014