

ORIGINAL RESEARCH

Medicine Science 2019;8(4):975-9

Comparison of ACR 1990 and ACR 2010 classification criteria in fibromyalgia syndrome

Mustafa Gur , Arif Gulkesen, Gurkan Akgol

Firat University, Faculty of Medicine, Department of Physical Medicine and Rehabilitation, Elazig, Turkey

Received 27 May 2019; Accepted 25 June 2019

Available online 12.09.2019 with doi:10.5455/medscience.2019.08.9083

Copyright © 2019 by authors and Medicine Science Publishing Inc.

Abstract

Purpose of this study is to compare the American College of Rheumatology (ACR) 1990 and ACR 2010 classification criteria in fibromyalgia syndrome. Fifty-one patients with fibromyalgia syndrome (FMS) and 50 control patients were included in the study. Patients with FMS were diagnosed by a specialist, and ACR 1990 or ACR 2010 classification criteria were not considered as a necessity. Control group consisted of patients with non-inflammatory pain such as osteoarthritis, periarthritis, regional pain syndrome. Patients were evaluated for ACR 1990 and ACR 2010 criteria, and they were examined for algometry. While ACR 1990 classification criteria had a sensitivity of 0.74, a specificity of 0.88, accuracy of 0.81, ACR 2010 criteria had a sensitivity of 0.78, a specificity of 0.76, and an accuracy of 0.77. In our study, ACR 2010 classification criteria were found to be more sensitive than ACR 1990 classification criteria, but specificity was lower. Besides, the ACR 2010 classification criteria do not require a tender point examination and may be more advantageous in assessing physical and psychological symptoms. It is considered that the classification criteria of ACR 2010 may be more favorable for clinical diagnosis and monitoring of diagnosed disease.

Keywords: Fibromyalgia, ACR 1990 criteria, ACR 2010 criteria

Introduction

Questions about intelligence have always occupied human beings' Fibromyalgia Syndrome (FMS), with an unknown etiology, is a chronic painful condition of the musculoskeletal system, characterized by fatigue, muscular tenderness, and the presence of tender points. [1]. Morning stiffness, headache, dizziness, irritable bowel and bladder syndrome, abdominal and chest pains, jaw pain, Raynaud's phenomenon, cyclic symptoms, reticular skin discoloration, restless leg syndrome, hypermobility syndrome, skin sensitivity, dysmenorrhea, subjective swelling of hands, paresthesias, mitral valve prolapse and symptoms are accompanied by the disease [2,3].

FMS is a controversial disease such as other functional somatic syndromes [4-7]. After the criteria defined by Symthe and Moldofsky, FMS was considered as a separate clinical entity for the

first time [8]. Then, in 1990, the American College of Rheumatology (ACR) constituted the new benchmark in the classification of FMS.

According to this criterion group, there should be widespread pain for a diagnosis and at least 11 of the 18 determined points [9]. Over time, objections to the 1990 ACR classification criteria began to emerge with further recognition of FMS [10].

However, according to our current FMS approach, FMS patients have a broader symptom complex than pain and localized body tenderness. Frequently somatic symptoms and cognitive changes accompanying the disease are not included in the ACR 1990 classification criteria [11-13].

To complete these shortcomings, Wolfe et al. Established a new criterion group in 2010 that did not include a tender point examination. This criterion, called FMS preliminary criteria, represents an alternative method in the diagnosis of FMS [10].

The purpose of this study was to compare ACR 2010 and ACR 1990 classification criteria in female FMS patients.

*Corresponding Author: Gurkan Akgol, Firat University, Faculty of Medicine, Department of Physical Medicine and Rehabilitation, Elazig, Turkey
E-mail: drgurkanakgol@gmail.com

Materials and Methods

Patient and Control Group

One hundred one patients admitted to the Physical Medicine and Rehabilitation outpatient clinic were included in this study. The study group included 51 FMS patients who were diagnosed as FMS and but not treated in the last three months, while the control group included 50 patients with non-inflammatory pain such as osteoarthritis, periartthritis, and regional pain syndrome. Male patients, patients under the age of 18 and patients older than 65 years, patients having systemic inflammatory rheumatic diseases, patients who cannot communicate in socio-cultural terms, patients with acute or known clinical confusion at the time of the study (malignancy, fracture, etc.) and pregnant patients were excluded from the study.

The study protocol was approved by the ethics committee of the Faculty of Medicine of Firat University, and all patients were informed about the study.

Study Protocol

Age, height, body weight, marital status, working status, educational status, additional diseases, smoking and alcohol habits, presence of menopause and osteoporosis in standard form (FMS screening form) were questioned. Body mass index (BMI: Weight (kg) / Height (m) ²) was calculated.

Visual Analog Scale (VAS) pain score was measured to determine the pain level of the patients. Beck depression and anxiety scale were used to assess the level of anxiety and depression. In the FMS patient group, fibromyalgia impact questionnaire (FIQ) was used to evaluate the functional status.

Painful areas and pain duration of the patients were questioned. Eighteen points, which were determined by ACR 1990 classification criteria, were evaluated with algometer (Wagner Instruments) for tender point. Pain points below 4 kg / cm² were considered as tender points. To avoid exaggerated responses, control points of the patients were also evaluated by an algometer. Patients with generalized pain of more than three months and sensitivity of at least 11 of 18 points were considered to have met the ACR 1990 classification criteria.

Patients were questioned for pain at 19 points determined by ACR 2010 classification criteria during the last week, and painful regions were recorded. To calculate the widespread pain index (WPI), the number of painful areas was recorded. Patients were questioned in terms of 3 main symptoms (fatigue, waking up in the morning, cognitive symptoms) during the last week. Those who have no problem scored as 0 points; those with mild or transient problems scored as 1 point; intermediate level, those with considerable problems scored as 2 points; serious, widespread, continuous, life complicating problems scored as 3 points. Patients were questioned for 39 somatic symptoms during the last three months. Patients with somatic symptoms 0, scored as no symptoms 0; somatic symptom number 1-13, composed as a small number of symptoms 1; patients with somatic symptoms 14-26, scored as moderate symptoms 2; Patients with somatic symptoms 27-39; scored as multiple symptoms.

Scores obtained from 3 main symptoms and scores from somatic symptoms were collected, and the SS (symptom severity) scale score was calculated. Patients with symptoms of at least three months of common pain index (WPI) ≥ 7 and symptom severity (SS) scale score ≥ 5 or WPI 3-6 and SS scale scores ≥ 9 were considered to have met the ACR 2010 classification criteria.

Laboratory Reviews

Biochemistry, complete blood count, blood sedimentation values, C reactive protein (CRP), RF, TSH, parathormone (PTH), calcium, phosphorus, vitamin D levels were recorded for routine control of patients.

Statistical analysis

All statistical evaluations were performed with 'Statistical Packages for Social Sciences Version 21.0 for MS Windows'. Data were analyzed using parametric or nonparametric statistical methods. Descriptive values were expressed as number, percentage, mean $\pm$ standard deviation. Chi-square test was used for categorical variables and T-test for continuous variables. The Mann-Whitney U test was used to compare continuous variables that did not reflect the normal distribution. Spearman correlation test was used for correlation analysis. $P < 0.05$ was considered statistically significant.

Results

A total of 101 patients, 51 of whom were FMS and 50 were a control group, were included in the study. The mean age of the FMS group was 40.5 ± 10.7 years, and the mean age of the control group was 39.2 ± 11.1 ($p: 0.550$).

The mean duration of pain in the FMS group was 5.86 ± 6.1 and 3.74 ± 2.9 in the control group ($p < 0.05$). The mean VAS score in the FMS group was 6.61 ± 1.7 , and 4.52 ± 2.3 in the control group ($p < 0.001$).

The mean Beck depression score was 18.1 ± 9.8 in the FMS group and 7.7 ± 6.4 in the control group ($p < 0.001$). The mean Beck Anxiety score was 19.7 ± 10.9 in the FMS group and 9.2 ± 5.9 in the control group ($p < 0.001$).

The mean FIQ score was 58.2 ± 14.2 in the FMS group and 34.47 ± 16.51 in the control group, and there was a statistically significant difference between two groups ($p < 0.001$). The mean number of tender points in the FMS group was 11.6 ± 3.6 and 5.9 ± 3.2 in the control group ($p < 0.001$). The mean WPI score was 9.1 ± 3.5 in the FMS group and 4.6 ± 2.3 in the control group ($p < 0.001$). The mean SS scale score in the FMS group was 6.2 ± 1.8 and 4.1 ± 1.8 in the control group ($p < 0.001$) (Table 1).

The ACR 1990 classification criteria had a sensitivity of 0.745, a specificity of 0.880, a positive predictive value of 0.863, a negative predictive value of 0.771. The ACR 2010 classification criteria had a sensitivity of 0.784, a specificity of 0.760, a positive predictive value of 0.769, a negative predictive value of 0.775. The ACR 1990 classification criteria had a positive likelihood ratio of 6.21, and a negative likelihood ratio was 0.29. The ACR 2010 classification criteria had a positive likelihood ratio of 3.27 and

a negative likelihood ratio of 0.28. While the accuracy of ACR 1990 classification criteria was found to be 0.811, the ACR 2010 classification criteria were 0.772 (Table 2).

When both classification criteria were co-administered, and the presence of either was considered sufficient for diagnosis, the sensitivity was 0.902, the specificity was 0.680, the positive predictive value was 0.741, the negative predictive value was 0.871, the positive likelihood ratio was 2.82, the negative likelihood ratio was 0.14, and the accuracy was 0.792.

Table 1. Number of tender points, WPI score and SS scale score

	FMS group	Control group	P
Number of tender points	11.6±3.6	5.9±3.2	0.000
WPI score	9.1±3.5	4.6±2.3	0.000
SS scale score	6.2±1.8	4.1±1.8	0.000

WPI: Widespread pain index SS: Symptom severity

Table 2. Comparison of ACR 1990 and ACR 2010 classification criteria

	ACR 1990 classification criteria	ACR 2010 classification criteria
Sensitivity	0.745	0.784
Specificity	0.880	0.760
Positive predictive value	0.863	0.769
Negative predictive value	0.771	0.775
Positive likelihood ratio	6.21	3.27
Negative likelihood ratio	0.29	0.28
Accuracy	0.811	0.772

Discussion

FMS; In the musculoskeletal system, pain and stiffness in the physical examination is a clinical condition without specific laboratory findings with painful tender points detected by palpation [9,14]. In our study, while the ACR 1990 classification criteria had a sensitivity of 0.74, a specificity of 0.88, a positive predictive value of 0.86, a negative predictive value of 0.77; the ACR 2010 classification criteria had a sensitivity of 0.78, a specificity of 0.76, a positive predictive value of 0.76, a negative

predictive value of 0.77. The positive likelihood ratio of the ACR 1990 classification criteria was 6.21, the negative likelihood ratio was 0.29, and the accuracy was 0.81; the ACR 2010 classification criteria had a positive likelihood rate of 3.27, a negative likelihood ratio of 0.28, and an accuracy of 0.77. However, the most critical limitations of the study are a low number of patients and the inclusion of only female patients in the study.

On the other hand, although the etiology and pathophysiology are not fully understood, neuroendocrine dysfunctions, central pain mechanisms, and central sensitivities are known as the most critical factors [15-17]. The treatment of FMS is multidisciplinary; patient education, psychotherapy, cognitive behavior therapy, physical medicine applications, exercise, hydrotherapy, and drug treatment are the primary treatment methods [18,19].

Many FMS patients do not fully meet a standard diagnostic criterion. FMS should not be considered as a diagnosis of exclusion since health workers often diagnose FMS by excluding other diagnostic diagnoses since there are no definitive diagnostic criteria [20]. Because the symptoms are widespread and uncertain, FMS is challenging to diagnose and can often be missed. However, pain, fatigue, and sleep disturbance are the three main symptoms seen in almost all patients [21,22].

After the criteria defined by Symthe and Moldofsky, FMS was considered as a separate clinical entity for the first time [8]. In 1990 ACR formed a new set of criteria for classifying the FMS [9]. Many studies have been conducted over 20 years following the establishment of the ACR 1990 criteria. With the establishment of these criteria, numerous benefits have been obtained, such as elucidating the etiology and developing treatment strategies [23]. Although the ACR 1990 criteria are useful in the standardization of the diagnosis, it has been subject to many objections and criticisms over the past 20 years. These objections and criticisms most relate to the interpretation and use of the number of tender points and the absence of FMS-related symptoms in the criterion [11,24-29].

To solve these problems, Wolfe et al. developed a two-phase and multi-center study to develop criteria that did not include tender point examination and that measured the severity of FMS-related symptoms and established the ACR 2010 classification criteria [10].

Bidari et al. [30] compared the ACR 2010 and ACR 1990 classification criteria in their study in the Iranian population. A total of 278 people were included in the study, 168 of them were FMS group, and 110 of them were the control group. According to the study, the sensitivity of ACR 2010 classification criteria was found to be 58.9%, specificity was 92.8%, and accuracy was found as 72.4%.

Usui et al. [31] in their study in Japan, found that the sensitivity of the ACR classification criteria for 2010 was 82%, specificity was 91%, positive predictive value was 95%, negative predictive value was 70%, and the positive likelihood ratio was 8.8.

Kim et al. [32] in the study of 98 FMS patients, found 93.9% of

the patients met the ACR 2010 classification criteria while 78.6% of the patients met the ACR 1990 classification criteria and a significant difference was found between the two classification criteria.

Conclusion

In conclusion, in our study, we compared ACR 1990 and 2010 classification criteria in the diagnosis of FMS patients and ACR 2010 classification criteria were found more sensitive than ACR 1990 classification criteria, but the specificity was lower. Also, the classification criteria of ACR 2010 do not require a tender point examination and appear to be more advantageous in evaluating physical and psychological symptoms. Therefore, the classification criteria of ACR 2010 may be more favorable for the clinical diagnosis and for monitoring the diagnosed disease.

Conflict of interest

The authors declare that there are no conflicts of interest.

Financial Disclosure

All authors declare no financial support.

Ethical approval

The study protocol was approved by the ethics committee of the Faculty of Medicine of Firat University.

Mustafa Gur ORCID: 0000-0002-3841-5282

Arif Gulkesen ORCID: 0000-0002-3008-7333

Gurkan Akgol ORCID: 0000-0003-1948-6410

References

- Wilke WS. New developments in the diagnosis of fibromyalgia syndrome: say goodbye to tender points? *Cleve Clin J Med*. 2009;76:345-52.
- Şendür Ö. F. Ağrılı Kas Sendromları. In: Oğuz H, Dursun E, Dursun N, editors. *Tıbbi Rehabilitasyon*. 2nd ed. Istanbul, Turkey: Nobel Tıp Kitabevleri; 2004. p.1221-38.
- Çapacı K, Hepgüler S. Fibromiyalji sendromu: etiopatogenez. *Ege Fiziksel Tıp ve Rehabilitasyon Dergisi*. 1998;4:219-25.
- Shir Y, Fitzcharles MA. Should rheumatologists retain ownership of fibromyalgia? *J Rheumatol*. 2009;36:667-70.
- Fitzcharles MA. Is fibromyalgia a distinct clinical entity? The approving rheumatologist's evidence. *Baillieres Best Pract Res Clin Rheumatol*. 1999;13:437-43.
- Goldenberg DL. Fibromyalgia syndrome. An emerging but controversial condition. *JAMA*. 1987;257:2782-7.
- Goldenberg DL. Fibromyalgia syndrome a decade later: what have we learned? *Arch Intern Med*. 1999;159:777-85.
- Smythe HA, Moldofsky H. Two contributions to understanding of the "fibrositis" syndrome. *Bull Rheum Dis*. 1977;28:928-31.
- Wolfe F, Smythe HA, Yunus MB, et al. The American College of Rheumatology 1990 criteria for the classification of fibromyalgia. Report of the Multicenter Criteria Committee. *Arthritis Rheum* 1990;33:160-72.
- Wolfe F, Clauw DJ, Fitzcharles MA, et al. The American College of Rheumatology preliminary diagnostic criteria for fibromyalgia and measurement of symptom severity. *Arthr Care Res (Hoboken)*. 2010;62:600-10.
- Mease P, Arnold LM, Bennett R, et al. Fibromyalgia syndrome. *J Rheumatol*. 2007;34:1415-25.
- Yunus MB. Role of central sensitization in symptoms beyond muscle pain, and the evaluation of a patient with widespread pain. *Best Pract Res Clin Rheumatol*. 2007;21:481-97.
- Yunus MB. Fibromyalgia and overlapping disorders: the unifying concept of central sensitivity syndromes. *Semin Arthritis Rheum*. 2007;36:339-56.
- Yunus MB, İnanıcı F. Fibromyalgia syndrome: clinical features, diagnoses, and biopathophysiologic mechanisms. In: Rachlin ES, Rachlin IS, editors. *Myofascial Pain and Fibromyalgia. Trigger Point Management*. 2nd ed. St. Louis, MO, USA: Mosby; 2002. p. 3-31.
- Yunus MB, Kalyan-Raman UP, Masi AT, et al. Electron microscopic studies of muscle biopsy in primary fibromyalgia syndrome; a controlled and blinded study. *J Rheumatol*. 1989;16:97-101.
- Simms RW. Fibromyalgia is not a muscle disorder. *Am J Sci*. 1998;315:346-50.
- Sprott H, Bradley LA, Oh SI, et al. Immunohistochemical and molecular studies of serotonin, substance P, galanin, pituitary adenylyl cyclase-activating polypeptide and secretoneurin in fibromyalgic muscle tissue. *Arthritis Rheum*. 1998;41:1689-94.
- Richards SC, Scott DL. Prescribed exercise in people with fibromyalgia: parallel-group randomized controlled trial. *BMJ*. 2005;325:185-7.
- Mannerkorpi K, Gard G. Physiotherapy group treatment for patients with fibromyalgia- an embodied learning process. *Disabil Rehabil*. 2003;25:1372-80.
- Sim J, Madden S. Illness experience in fibromyalgia syndrome: a meta-synthesis of qualitative studies. *Soc Sci Med*. 2008;67:57-67.
- Aaron LA, Burke MM, Buchwald D. Overlapping conditions among patients with chronic fatigue syndrome, fibromyalgia, and temporomandibular disorder. *Arc Intern Med*. 2000;160:221-7.
- Aaron LA, Buchwald D. A review of the evidence for overlap among unexplained clinical conditions. *Ann Intern Med*. 2001;134:868-81.
- McBeth J, Mulvey MR. Fibromyalgia: mechanisms and potential impact of the ACR, 2010 classification criteria. *Nat Rev Rheumatol*. 2012;8:108-16.
- Buskila D, Neumann L. fibromyalgia syndrome and nonarticular tenderness in relatives of patients with FM. *J Rheumatol*. 1997;24:941-4.
- Fitzcharles MA, Boulos P. Inaccuracy in the diagnosis of fibromyalgia syndrome: analysis of referrals. *Rheumatology*. 2003;42:263-7.
- Choy EH, Arnold LM, Clauw DJ, et al. Content and criterion validity of the preliminary core dataset for clinical trials in fibromyalgia syndrome. *J Rheumatol*. 2009;36:2330-4.
- Mease PJ, Clauw DJ, Arnold LM, et al. Fibromyalgia syndrome. *J Rheumatol*. 2005;32:2270-7.
- Mease PJ, Clauw DJ, Gendreau RM, et al. The efficacy and safety of milnacipran for treatment of fibromyalgia. A randomized, double-blind, placebo-controlled trial. *J Rheumatol*. 2009;36:398-409.
- Wolfe F, Michaud K. Outcome and predictor relationships in fibromyalgia and rheumatoid arthritis: evidence concerning the continuum versus discrete disorder hypothesis. *J Rheumatol*. 2009;36:831-6.
- Bidari A, Hassanzadeh M, Ghavidel Parsa B, et al. Validation of the 2010 American College of Rheumatology preliminary diagnostic criteria for fibromyalgia in an Iranian population. *Rheumatol Int*. 2013;33:2999-3007.

31. Usui C, Hatta K, Aratani S, et al. The Japanese version of the 2010 American college of rheumatology preliminary diagnostic criteria for fibromyalgia and the fibromyalgia symptom scale: reliability and validity. *Mod Rheumatol*. 2012;22:40-4.
32. Kim SM, Lee SH, Kim HR. Applying the ACR preliminary diagnostic criteria in the diagnosis and assessment of fibromyalgia. *Korean J Pain*. 2012;25:173-82.