CONCISE REPORTS

The relation between tender points and fibromyalgia symptom variables: evidence that fibromyalgia is not a discrete disorder in the clinic

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Abstract

Objective—To investigate the relation between measures of pain threshold and symptoms of distress to determine if fibromyalgia is a discrete construct/disorder in the clinic.

Methods—627 patients seen at an outpatient rheumatology centre from 1993 to 1996 underwent tender point and dolorimetry examinations. All completed the assessment scales for fatigue, sleep disturbance, anxiety, depression, global severity, pain, functional disability, and a composite measure of distress constructed from scores of sleep disturbance, fatigue, anxiety, depression, and global severity—the rheumatology distress index (RDI).

Results—In regression analyses, the RDI was linearly related to the count of tender points ($r^2=0.30$). Lesser associations were found between the RDI and dolorimetry measurements ($r^2=0.08$). The RDI was more strongly correlated with the two measures of pain threshold than any of the individual fibromyalgia symptom variables. In partial correlation analyses, all of the information relating to symptom variables was contained in the tender point count, and dolorimetry was not independently related to symptoms.

Conclusion—Tender points are linearly related to fibromyalgia variables and distress, and there is no discrete enhancement or perturbation of fibromyalgia or distress variables associated with very high levels of tender points. Although fibromyalgia is a recognisable clinical entity, there seems to be no rationale for treating fibromyalgia as a discrete disorder, and it would seem appropriate to consider the entire range of tenderness and distress in clinic patients as well as in research studies. The tender point count functions as a ‘sedimentation rate’ for distress, and is a better measure than the dolorimetry score.

Fibromyalgia represents the intersection of a considerably abnormal and reduced pain threshold with a series of clinical distress variables, including pain, fatigue, sleep disturbance, anxiety, and depression, among others. In the clinic, it is best diagnosed by counting the number of tender points a patient has. In the presence of 11 or more tender points and widespread pain, fibromyalgia is diagnosed (classified) according to American College of Rheumatology (ACR) Criteria.

The ability to diagnose fibromyalgia with commonly agreed upon criteria has stimulated research into basic and clinic aspects of the syndrome. In general, research has used ‘normals’ or patients with other rheumatic diseases as control subjects. This comparison, of fibromyalgia with such control subjects, implies that fibromyalgia is a discrete entity. However, epidemiological studies suggest, instead, that fibromyalgia may be merely the end of a continuum of distress. Epidemologically defined disease may be different from clinically defined disease, and the issue of whether fibromyalgia is a relatively discrete clinical entity has not been investigated in the clinic. This is an important question, because if fibromyalgia does represent a clinical as well as an epidemiological continuum, then we may be failing to identify many patients in the clinic with syndromes similar to fibromyalgia, though with fewer symptoms or tender points. In addition, in characterising patients as having or not having fibromyalgia we may be missing, in those with not enough tender points, important symptoms of distress. Finally, we may be concentrating basic and clinical research inappropriately into a constricted area of a pain-distress continuum.

We investigated the question of whether fibromyalgia is a relatively discrete clinical entity in 627 clinic patients by obtaining measures of fibromyalgia symptoms as well as physical measures of tender point counts and dolorimetry scores.

Methods

SUBJECTS

Subjects in this study were 627 patients seen at an outpatient rheumatology centre (Wichita Arthritis Center) during a period of three and
The mean dolorimetry score was 2.7 kg/cm\(^2\) for women and 4.25 kg/cm\(^2\) for men, being thought to be a measure of pain threshold. The variance containing the dolorimetry scores was approximately 0.55.

The statistical analyses showed no significant differences in variances between males and females for pain, fatigue, fatigue, global severity, sleep disturbance, VAS sleep, and VAS fatigue, which is scored 0-100, with a standard deviation of 20.7. To test the appropriateness of the RDI index, a new variable that represented the first principal component of the RDI variables (anxiety, depression, global severity, sleep disturbances, and fatigue) was created and then compared with the RDI result. The correlation between the new principal component variable and tender point count was 0.55, and the correlation between the new principal component variable and tender point count was 0.55. Therefore, the index is an appropriate composite measure of the five variables.
Results

Of the 627 patients, there were 267 patients with a primary diagnosis of fibromyalgia, 156 with rheumatoid arthritis (RA), and 182 with osteoarthritis (OA). Of the RA patients, 22.4% had 11 or more tender points; 24.73% of OA patients had 11 or more tender points, and 89.9% of those diagnosed with fibromyalgia (including 95.8% of fibromyalgia patients seen for the first time in the clinic) satisfied the ACR tender point criterion.\(^1\) Patients not having RA, OA or fibromyalgia (n=22) had other disorders such low back pain, tendonitis, arthralgias, and miscellaneous inflammatory disorders.

The RDI was directly related to the count of tender points (fig 1). The $r^2$ of the regression of RDI on tender point count was 0.30, and the estimated $\beta$ coefficient was 1.89, SEM 0.11, p<0.001. Thus, on the average, an increase of one tender point is associated with a two unit increase in RDI, and a 10 unit increase in tender points with a 20 unit increase in RDI. By contrast, the $r^2$ for the regression of RDI on dolorimetry score was 0.08 (fig 2). Therefore dolorimetry is a poor predictor of distress. The

Bandwidth of 0.4.\(^1\) Lowess regression is very sensitive to local changes, and would be expected to identify, by alteration of the prediction line, specific associations between RDI and pain threshold at tender point counts of 11 or more. Statistical significance was set at 0.05. All tests were two sided.

Discussion

As expected, we found associations between fibromyalgia variables (fatigue, sleep, anxiety, depression, global severity, pain) and the tender point count, and we found the strongest association with the composite distress variable, RDI. As shown in figure 1, a linear relation between tender points and RDI exists throughout the entire range of values. In addition, there are high values for RDI in those patients having 11 or more tender points, as would be expected among fibromyalgia patients. We believe these data show that there is a parallel continuum of distress and tender points, and that there is no discrete enhancement or perturbation of fibromyalgia or distress variables associated with very high levels of tender points. That is, the relation between clinical symptoms and tender points is linear, not quadratic. In addition, our findings—that intermediate levels of tender points may be associated with clinical distress, support the data of Middleton et al in a population of systemic lupus erythematosus patients.\(^3\)

We also found that pain threshold as measured by dolorimetry scores was generally poorly correlated with clinical symptoms. This finding extends a similar observation we made in an epidemiological population survey.\(^1\) Dolorimetry can be conceived of as a pure measure of pain threshold, while the tender point count seems to have increased psychological or distress associated symptom content. In this study, partial correlation analysis showed that dolorimetry was not independently correlated with RDI.

These findings suggest, then, that fibromyalgia tenderness and symptoms are part of a continuum. Physicians will diagnose fibromyalgia when the symptoms and tenderness reach the physician’s threshold, and it seems clearly appropriate and useful to use the ACR classification criteria.\(^1\) But in a broader sense, there is no discrete point where fibromyalgia does or does not exist; and it is important
to recognise the importance of distress symptoms whether or not the patient reaches the fibromyalgia diagnostic threshold.

The implications of our data may be important to rheumatologists and others in the medico-legal arena where fibromyalgia is often assumed to be a discrete disease and trauma may be though to be causally related. Our data would suggest that fibromyalgia is not a discrete disease, and that it is just as rational to associate (or not associate) trauma with five tender points or 10 tender points or the requisite 11 or more tender points. Similarly, for basic research, there seems to be no rationale for treating fibromyalgia as a discrete disorder, and it would seem more appropriate in such studies to examine the entire range of tenderness and distress.

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