Posttraumatic stress disorder, tenderness, and fibromyalgia syndrome: are they different entities?

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Abstract

Objectives: Many features of fibromyalgia syndrome (FMS) resemble those of posttraumatic stress disorder (PTSD). The goal of this study was to investigate the comorbidity of FMS and PTSD in a cohort of men following an intensive, initial, defined traumatic event.

Methods: One hundred twenty-four males (55 patients with PTSD, 20 patients with major depression, and 49 controls) were evaluated for the presence of FMS. The major traumatic events in all PTSD patients were combat-related. Each individual completed questionnaires characterizing his disease, disabilities, and quality of life. Results: Forty-nine percent of PTSD patients, compared to 5% of major depression patients and none of normal controls, fulfilled the American College of Rheumatology criteria for FMS (\(P \leq .0001\)). Significant correlations were detected between tender points and measured parameters in the PTSD group. Conclusions: In male patients, PTSD is highly associated with FMS. The degree and impact of these disorders are also highly related.

Keywords: Fibromyalgia syndrome; Posttraumatic stress disorder; Pain; Depression; Gender; Tenderness

Introduction

Fibromyalgia syndrome (FMS) is an ill-defined clinical disorder characterized by widespread pain and diffuse tenderness at specified anatomical locations. FMS is 10 times more common in females, and its prevalence in the community increases from 2% at the age of 20 years to 8% at the age of 70 years [1]. Although the American College of Rheumatology (ACR) has defined classification criteria and although a diagnostic label has been applied universally to appropriate patients, the pathogenesis of FMS remains vague. Diffuse and persistent musculoskeletal pain consistent with ACR criteria has also been reported among patients with migraine, chronic fatigue pain, myofascial pain, irritable bowel syndrome, and other medical conditions [2–5].

There are mounting data supporting an overlap between FMS and psychiatric conditions, including depression, panic disorders, and anxiety. For example, a lifetime history of major depression has been reported in 50–70% of patients with FMS, and current depression has been detected in 18–36% of patients with FMS [1,6,7]. This association has been questioned in that this high prevalence may be exaggerated and may reflect the long-term effect of coping with chronic disabling pain and disease. A similar prevalence of major depression has been reported in cohorts of
patients with rheumatoid arthritis [8,9]. Epstein et al. [10] reported that the lifetime and current diagnoses of panic disorder in FMS patients reach 17% and 9%, respectively, and that coexistent anxiety is a significant predictor of functional impairment in FMS patients.

Much interest has been focused on the role that trauma plays in the development of physical or mental disability. Anderberg et al. [11] observed that stressful life events may trigger the succeeding development of FMS. They found higher rates of childhood and adolescent negative life events among women with FMS than among age-matched healthy controls (51% vs. 28%, respectively). Furthermore, FMS patients, compared to their counterparts, interpreted their life events as more negative. Receiving a permanent disability pension and having experienced major negative life events were found to be predictors of negative outcome for patients with FMS [12]. Cohen et al. [13] demonstrated that more than half of 77 patients (40 women and 37 men) with FMS who completed questionnaires had clinically significant levels of posttraumatic stress disorder (PTSD) symptoms. Women with FMS and PTSD reported a greater number of posttraumatic events than did male patients. These associations raise several questions: How significant is the contribution of physical or mental trauma or any other traumatic life event to the future development of FMS? Does this association occur in men? Can a correlation be found between the severity of FMS and the severity of PTSD?

In order to better approach the complex interrelationship between trauma and FMS, we conducted a cross-sectional evaluation focusing on the clinical expression of FMS signs and symptoms among PTSD male patients 22–36 years following a specific identifiable traumatic event as compared to patients suffering from a major depressive disorder (MDD) and to healthy subjects. All PTSD enrollees experienced a life-threatening event, some of whom also suffered concomitant physical injuries.

**Materials and methods**

**Patients**

One hundred twenty-four males between the ages of 18 and 60 years were evaluated for the presence of FMS using ACR criteria [14]. The PTSD group was composed of 55 patients who had been diagnosed with PTSD according to the diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders—Fourth Edition (DSM-IV) [15]. Accordingly, each individual had experienced, had witnessed, or had been confronted with an event that involved actual or threatened death, serious injury, or a threat to the physical integrity of self or others. In each case, the traumatic event was related to military combat between 1967 and 1982. All PTSD patients were classified as nonrehabilitative by the rehabilitation department of the Ministry of Defense (suffering from a major disability due to PTSD). These patients were addressed during their activities in a specialized day care center that serves on an outpatient basis.

The MDD group included 20 patients who had been diagnosed with major depression according to DSM-IV criteria, required hospitalization in an inpatient psychiatric facility, or had been discharged from the hospital within 4 weeks prior to enrollment in the study. Eighteen of these patients served in military service; however, MDD developed only in one subject during military service. The healthy control group consisted of 49 healthy men attending the medical surveillance institute for a scheduled unrelated routine annual physical examination. All participants had served in the military for 22–36 years.

All study participants were recruited from the Sheba Medical Center at Tel-Hashomer. Informed consent was obtained from all enrollees according to the protocol approved by an ethical committee.

**Scales and measures**

**Sleep History Questionnaire (SHQ)**

Each individual completed a 12-question questionnaire assessing various aspects of quality of sleep. Each answer was given on a quantitative scale ranging from 0 to 4. In addition, each patient completed a visual analogue scale (VAS), ranging from 0 to 100 marked on a 10-cm line, by making a point that best reflected his assessment of global sleep quality.

**Sheehan disability scale**

A disability assessment scale, measuring subjective disability as related to familial, social, and vocational aspects of life, was completed by each of the enrollees. The questionnaire is scored on a VAS global self-assessment scale [16].

**SF-36 Quality of Life Assessment**

A Hebrew-translated and validated version of the SF-36 scale measured quality of life. The SF-36 contains eight subscales: physical functioning (PF), social functioning (SF), role limitations attributable to physical and emotional problems, mental health, vitality, bodily pain, and general health. Each scale is scored on a VAS (0–100), with a high score indicating better health and less body pain [17,18]. The completion of this measure was conducted with the aid of a senior psychiatrist.

**Clinician-Administered PTSD Scale (CAPS)**

The CAPS is a structured interview designed for the assessment of PTSD severity according to DSM-IV criteria. It measures symptom frequency and intensity by constructing a continuous score reflecting the severity of PTSD [19]. A senior psychiatrist completed a CAPS questionnaire following an interview of all PTSD patients.
Clinical Global Impression (CGI) scale

The CGI scale is a semiquantitative scale that measures the severity of psychiatric illness, as perceived by a skilled psychiatrist, on a continuous scale from 1 to 7. A high numeric rating reflects a greater degree of symptom severity [20,21]. A senior psychiatrist completed the CGI on all MDD patients.

Hamilton Depression Rating Scale (HDRS)

The HDRS is a 17-item scale that measures the presence and severity of depression. The HDRS is a reliable gauge of the degree of symptom severity in depressed patients [22]. A senior psychiatrist completed the HDRS on all MDD patients.

FMS tenderness assessment

Tenderness assessment was performed manually on all subjects by a senior rheumatologist. A count of 18 tender points (TPs) was performed by thumb palpation, as specified in the ACR 1990 classification criteria [14]. The subject was asked to say “yes” when the sensation altered from pressure to definite pain. Preliminary measurement of control sites was obtained in order to familiarize the subject with the process and to discourage anticipation or exaggerated responses. Patients were not informed which were tender or control points. In order to simplify further statistical analysis, we aggregated the sum of sensitive TPs as follows: 0–5=TP borderline, 6–10=mild sensitivity, 11–14=moderate sensitivity, 15–16=severe sensitivity, 17–18=extreme sensitivity. Patients were considered to have FMS if they met the ACR criteria defining FMS (e.g., widespread musculoskeletal pain with excess tenderness in at least 11 of 18 predefined anatomic sites).

Results

Characteristics of patients and controls

The three groups did not differ by age (mean age for PTSD subjects, 49.7±7.5 years; mean age for MDD subjects, 46.2±14.2 years; mean age for healthy controls, 47.2±8 years). Significant differences in the medical history and current medical therapy of the enrollees (Table 1) were observed, showing higher frequencies of diabetes [\( \chi^2 = 9.63, P < .05 \)] and asthma [\( \chi^2 = 10.75, P < .005 \)]. The prevalence of alcoholism is relatively low; therefore, the data originating from Table 1 are not unusual. As expected, the use of antipsychotics [\( \chi^2 = 12.05, P < .005 \)], antidepressants [\( \chi^2 = 64.37, P < .001 \)], anxiolytics [\( \chi^2 = 42.17, P < .001 \)], and lithium [\( \chi^2 = 27.09, P < .001 \)] was significantly more prevalent among PTSD and MDD patients (data not presented).

FMS-related symptoms

Forty-nine percent of PTSD patients, compared to 5% of MDD patients and none of controls, fulfilled the ACR criteria for FMS [\( \chi^2 = 40, P < .001 \)]. The mean number of TP was 8.85 for PTSD patients, 2.85 for MDD patients, and 0.18 for healthy controls, respectively [\( F(2,123) = 69.94, P < .001 \)]. These results indicate high prevalence and a marked degree of tenderness among PTSD patients.

All subjects were aggregated into five subgroups according to the extent of tenderness, as reflected by TP...
Table 2
Comparisons of FMS-related variables as measured in the three study groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Controls (n=49)</th>
<th>PTSD (n=55)</th>
<th>Depression (n=20)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>47.2±8</td>
<td>49.7±7.4</td>
<td>46.2±14.1</td>
<td>.22</td>
</tr>
<tr>
<td>Sleep</td>
<td>2.3±2.2</td>
<td>28.8±6.8</td>
<td>17.7±7.4</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>(sum of 11 parameters)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleep self-assessment scale</td>
<td>14.7±14.7</td>
<td>77.8±21.9</td>
<td>60.5±22.8</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Sheehan vocational scale</td>
<td>0.14±0.5</td>
<td>9.8±0.7</td>
<td>7.8±2.8</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Sheehan social scale</td>
<td>0.9±0.0</td>
<td>8.1±1.8</td>
<td>7.6±2.3</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Sheehan familial scale</td>
<td>0±0.1</td>
<td>1±2.4</td>
<td>4.7±2.8</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Fibromyalgia TP</td>
<td>0.18±0.4</td>
<td>8.9±5.4</td>
<td>2.8±3.3</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>CGI</td>
<td>5.7±0.7</td>
<td>5.6±0.7</td>
<td></td>
<td>.9</td>
</tr>
</tbody>
</table>

Results are expressed as mean±S.D. P values refer to comparisons of all groups, as calculated by ANOVA.

Post hoc Scheffe test revealed that PTSD patients had significantly more sleep disturbances and a lower global quality of sleep compared to major depression patients and controls (mean difference with control=26.57, P<.001; mean difference with depression=11.74, P<.001). As previously mentioned, most patients with FMS reported abnormal sleep patterns. This finding was corroborated by the correlation between the SHQ and FMS severity as measured by TP (r=.357, P<.01; Table 3).

Quality of life and functioning

In order to perceive whether tenderness affected quality of life, we measured SF-36 scores among PTSD patients. Forty-two patients agreed to complete the questionnaires (Table 3). The patients’ severe state was clearly reflected by the low scoring of both the physical and the mental aspects of the SF-36. These aspects also negatively correlated with the degree of tenderness, as recorded by TP count (Table 3). The Pearson correlation coefficient for total SF-36 score and TP was −.432 (P<.005). It is noteworthy that the sum of either the mental components or the physical components of the SF-36 similarly correlated with the degree of tenderness measured by TP count (r=−.424, P<.005 and r=−.423, P<.005, respectively).

FMS characteristics of PTSD

Patients with PTSD and FMS had more severe post-traumatic symptoms, as reflected by a significant correlation between the total CAPS score and TP count (r=−.305, P<.05). This linkage was ascribed mainly to the reexperiencing and controls was 9.6 and with MDD patients was 1.9; P<.001 and P<.001, respectively). A similar trend was noticed also in familial malfunction scoring, demonstrating a mean scoring difference of 7.1 with controls and of 2.3 with MDD patients; P<.001 and P<.001, respectively). MDD and PTSD did not score differently on the Sheehan social scale (Table 2).

Table 3
Correlations between the number of TPs and psychometric data in PTSD patients

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean±S.D.</th>
<th>Pearson correlation coefficient</th>
<th>P</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total CAPS score</td>
<td>92.8±14.3</td>
<td>.305</td>
<td>.024</td>
<td>55</td>
</tr>
<tr>
<td>Reexperiencing</td>
<td>28.7±5.0</td>
<td>.317</td>
<td>.018</td>
<td>55</td>
</tr>
<tr>
<td>Avoidance</td>
<td>35.6±7.7</td>
<td>.250</td>
<td>.066</td>
<td>55</td>
</tr>
<tr>
<td>Hyperarousal</td>
<td>28.5±4.4</td>
<td>.185</td>
<td>.177</td>
<td>55</td>
</tr>
<tr>
<td>Total SF-36</td>
<td>25.1±13.6</td>
<td>−.432</td>
<td>.004</td>
<td>42</td>
</tr>
<tr>
<td>Mental health</td>
<td>29.4±18.4</td>
<td>−.424</td>
<td>.005</td>
<td>42</td>
</tr>
<tr>
<td>Total physical</td>
<td>30.2±16.3</td>
<td>−.423</td>
<td>.005</td>
<td>42</td>
</tr>
<tr>
<td>PF</td>
<td>51.8±28.4</td>
<td>−.219</td>
<td>.163</td>
<td>42</td>
</tr>
<tr>
<td>Physical role limitation</td>
<td>15.5±25.9</td>
<td>−.294</td>
<td>.059</td>
<td>42</td>
</tr>
<tr>
<td>Body pain</td>
<td>28.7±21.7</td>
<td>−.327</td>
<td>.035</td>
<td>42</td>
</tr>
<tr>
<td>General health</td>
<td>31.6±17.9</td>
<td>−.493</td>
<td>.001</td>
<td>42</td>
</tr>
<tr>
<td>Vitality</td>
<td>24.5±18.9</td>
<td>−.233</td>
<td>.138</td>
<td>42</td>
</tr>
<tr>
<td>SF</td>
<td>26.7±22.7</td>
<td>−.336</td>
<td>.03</td>
<td>42</td>
</tr>
<tr>
<td>Emotional role limitation</td>
<td>13.5±25.6</td>
<td>−.142</td>
<td>.371</td>
<td>42</td>
</tr>
<tr>
<td>CGI</td>
<td>5.7±0.7</td>
<td>.229</td>
<td>.092</td>
<td>55</td>
</tr>
<tr>
<td>Sheehan</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vocational scale</td>
<td>9.8±0.7</td>
<td>.078</td>
<td>.571</td>
<td>55</td>
</tr>
<tr>
<td>Social scale</td>
<td>8.1±1.8</td>
<td>.292</td>
<td>.031</td>
<td>55</td>
</tr>
<tr>
<td>Familial scale</td>
<td>7.1±2.4</td>
<td>.119</td>
<td>.385</td>
<td>55</td>
</tr>
<tr>
<td>Sleep SHQ</td>
<td>28.8±6.8</td>
<td>.357</td>
<td>.008</td>
<td>55</td>
</tr>
<tr>
<td>Sleep assessment</td>
<td>77.8±21.9</td>
<td>.233</td>
<td>.086</td>
<td>55</td>
</tr>
</tbody>
</table>

Results are expressed as mean±S.D. Calculated by two-tailed t test.
A significant difference in the mean CAPS score of PTSD patients with or without the coexistence of FMS was noted; the mean CAPS score among subjects without FMS was 88.2±14.0 (n=28) versus 97.6±13.2 for subjects with CAPS and FMS [n=27; F(1,54)=6.61, P<.05].

Interestingly, the CGI score did not correlate with TP count (r=.229, P>.05), probably due to the skewed distribution originating from the highly severe form of PTSD of elected patients.

Discussion

Although estimates of the prevalence of chronic pain vary between different societies, its impact on modern society is astounding. In western countries, chronic pain is one of the leading health problems. In Sweden, a cross-sectional study showed prevalences of current and chronic pain reaching 49% and 54%, respectively [23].

Some medical conditions are characterized by an expression of extreme pain that reaches a point that may dominate almost all components of daily life. Katon et al. [5] observed that patients with anxiety or depression who also had comorbid organic illnesses exhibited symptoms that could not be attributed to any of these conditions, suggesting that these patients coped with pain differently.

One of the most controversial of these ill-defined illnesses is FMS [24]. Wolfe [25] beautifully expressed this complexity by stating that TP count is a “sedimentation rate for distress.”

In this study, we detected a great difference in the average number of TP among PTSD patients compared to depression patients and normal controls (8.9 vs. 2.85 and 0.18, respectively). It should be clearly stated that TP count has been previously shown to be badly reproducible [26]. Given this large and significant difference, we believe that it can be safely assumed that TP count reflected, in this case, a genuine difference.

The understanding that humans may process stress into ill-defined pain syndromes evolves from several findings (e.g., greater frequency of lifetime sexual, physical, and psychological abuse among FMS female patients) [27]. Amir et al. [28] reported an incidence of 21% of FMS in a heterogeneous group of PTSD patients composed of female and male subjects who were exposed to different stressful events.

Despite the lack of pathological findings among patients with FMS, there is increasing evidence pointing to objective findings among these patients. Thermal and mechanical hyperalgesia can be consistently demonstrated among patients with FMS [29,30]. Recent studies have shown that inputs to central nociceptive pathways are abnormally processed in FMS patients and are affected by psychological and social parameters [31,32]. Common psychosocial pathways mediate both PTSD and FMS; elevated adrenergic activity has been reported in both disorders [33–35]. These conditions might be driven from a common origin reflecting different aspects of adaptive behavior and somatization to an initiating traumatic life event.

The medical literature underlies the high lifetime prevalence of depression among patients with FMS, yet the majority of patients with MDD do not have manifestations of FMS [6,9,10,36]. Only 1 of 20 male patients with depression in our study had FMS. Despite similar CGI scores, the prevalence of FMS among the cohort of PTSD patients was significantly higher than that of male patients with MDD. The CAPS score of the severity of PTSD correlated with TP count. Furthermore, our findings corroborate previous reports showing that the comorbidity of PTSD and FMS results in a more severe disorder affecting sleep quality and quality of life [13,37,38]. We failed to show a similar linkage between severity of depression and extent of tenderness.

The findings in this study may be contested by claiming that, in this cohort of PTSD patients, compensatory issues might have altered the true incidence of FMS. This is unlikely since all PTSD patients enrolled in this study were maximally compensated for many years by the rehabilitation department of the Ministry of Defense of Israel. Moreover, none of them had previously attended a rheumatology or chronic pain clinic. Consequently, it is highly unlikely that there was an incentive to exaggerate symptoms in order to obtain secondary benefits. Nevertheless, the Sheehan disability scale score was not significantly correlated with TP count, implying that social and occupational impairments are more likely to be associated with PTSD.

The most noteworthy finding of this study was the high prevalence (49%) of FMS among male patients with PTSD. Little is known about the expression of FMS in men. Neumann et al. [39] analyzed the characteristics of FMS in men and showed that, compared to women, men reported more severe symptoms, decreased PF, and a lower quality of life. On the other hand, a follow-up study of patients who sustained neck injuries following a motor vehicle accident and developed FMS showed that men were less likely than women to remain fibromyalgic 3 years after the event (11% vs. 100%, respectively) [40].

Bourdette et al. [40] conducted a mail survey of Gulf War veterans. Clinical examinations were completed on a subset of these responders who seemed to have unexplained health symptoms. Over half of the veterans with unexplained musculoskeletal pain met the criteria for FMS, and a significant portion of the veterans with unexplained fatigue met the criteria for chronic fatigue syndrome. Recently, Eisen et al. [41] reported on lower rates of FMS in nonpatient military personnel who were addressed 10 years following the 1991 Gulf War. They found higher rates of FMS in deployed veterans than in nondeployed veterans—a difference that may be probably attributed to exposure to significant life events that occurred in that war.
Our study focused on the linkage between an extreme, defined, traumatic event and the emergence of FMS in men 22–35 years after the event. Boisset-Pioro et al. [27] demonstrated a statistical association between reports of abuse and the development of FMS in women. Other investigators have stated that women with FMS who experienced sexual abuse reported significantly more symptoms than did nonsexually abused women [42]. Sexual, physical, or mental abuse, rather than a single well-defined occurrence, may represent a continuum of negative life events. In a study conducted by Petzke et al. [43], 47 women who were representative of the general population demonstrated that manual TP counts and dolorimeter measures of pressure pain threshold were influenced clearly by an individual’s level of distress. Beckham et al. [44] investigated chronic pain occurrence in 129 combat Vietnam veterans with PTSD. He showed that 80% of them mentioned the presence of chronic pain. Furthermore, PTSD reexperiencing symptoms correlated with pain level and pain-related disability. Conceivably, certain individuals (particularly those who lack a resilient comprising personality) who experience a letdown in their self-esteem may, over time, develop a breakdown of normative coping and a clinical picture of FMS.

Similar neuroendocrine abnormalities have been implicated in the pathogenesis of FM and PTSD. Some reports imply that perturbed circadian systems may contribute to their etiology. Irregular secretion of the pineal hormone, melatonin, is an important factor that synchronizes the autonomous circadian system. Hence, alteration of its normal secretion may lead to sleep disturbances and diffuse pain [45,46]. It has been acknowledged that melatonin exerts analgesic actions by binding to receptors that augment the release of β endorphin [46]. Melatonin is closely affected by neurotransmitters. Its chemical structure is similar to that of serotonin, and various neuronal systems take part in its regulation, such as γ-aminobutyric acid, which is involved in the regulation of behavioral functions. It is of no wonder, therefore, that FMS, PTSD, antidepressants, benzodiazepines, and sleep disturbances are so tightly associated [47–49]. Supplementation with melatonin has shown encouraging results (alleviation of pain and improvement in sleep disturbances) in FMS patients [48].

In conclusion, we have shown that PTSD in male patients is highly associated with FMS. The degree and impact of these disorders are also highly interrelated. These data indicate that PTSD might precipitate the emergence of FMS and that these two disorders often coexist. Clearly, the emergence of FMS many years after an intense, defined life event may have general applicability.

References


