Lipid Profile in Patients with Fibromyalgia and Myofascial Pain Syndromes

Salih Ozgocmen¹ and Ozge Ardicoglu²

Abstract

In this study serum lipid profile of patients with fibromyalgia syndrome (FMS) and myofascial pain syndrome (MPS) were investigated and compared with healthy controls. Thirty women who had FMS and 32 women who had MPS with the characteristic trigger points (TrP), especially on the periscapular region were included in this study. Thirty one age matched healthy women were assigned as a control group. All of the subjects were sedentary healthy housewives. Total cholesterol, triglyceride and high-density lipoprotein cholesterol (HDL-c) levels were not significantly different between the FMS and control groups. On the other hand the MPS group had total cholesterol (198.7 vs 172.9 mg/dL, p=0.003), triglyceride (124.7 vs 87.6 mg/dL, p=0.01), low-density lipoprotein cholesterol (LDL-c) (127.5 vs 108.4 mg/dL, p=0.02) and very low-density lipoprotein cholesterol (VLDL-c) (24.9 vs 17.3 mg/dL, p=0.008) levels, which were significantly higher than the controls. There was no significant difference between the lipid profiles in the FMS and MPS groups. Tissue compliance, which was measured from trigger points in the MPS group, correlated significantly with total cholesterol and LDL-c levels. In conclusion, a significant difference was found between the lipid levels of patients with MPS and the controls. More extensive investigation of lipid and lipoprotein levels is required to determine whether high lipid levels are the cause or result of MPS.

Key Words: Fibromyalgia, myofascial pain, lipid profile, cholesterol

INTRODUCTION

Fibromyalgia is a chronic musculoskeletal disorder characterized by widespread pain, increased tenderness at specific anatomic sites (i.e. tender points), and other clinical manifestations such as fatigue, sleep disturbance and irritable bowel syndrome.¹ As with fibromyalgia syndrome (FMS), myofascial pain syndrome (MPS) is one of the most common cause of chronic musculoskeletal pain and is defined as a muscular pain disorder that involves regional pain, which is referred to by trigger points (TrP) within the myofascial structures local or distant from the experienced pain.² They have been described in the literature over the past 100 years by various names, the definitive pathophysiological mechanisms are currently unknown.

A number of studies have suggested that there is an association between hyperlipidemia and musculoskeletal manifestations.³⁴ In these studies, most of the patients had myalgia and arthralgia, tendo Achilles tendinitis, oligoarthritis or migratory polyarthritits, which are all associated with markedly elevated levels of hyperlipidemia. However, the pathogenesis of the musculoskeletal system manifestations in hyperlipidemia are not fully understood.³⁴

In this study, the serum lipid profile of patients with FMS and MPS were determined and compared with healthy controls. The correlation between lipid profile and disease manifestations has also been investigated.

MATERIALS AND METHODS

Thirty women (ages 18–60 years) who met the ACR 1990 criteria for the classification of fibromyalgia⁶ and 32 women (ages 17–60 years) who had myofascial pain with characteristic trigger points

¹Department of Physical Medicine & Rehabilitation, Ankara State Hospital, Ankara, ²Department of Physical Medicine & Rehabilitation, Division of Rheumatology, Firat University, Faculty of Medicine, Elazig, Turkey.

Address reprint requests to Dr. Salih Ozgocmen, Rektorluk Lojmanları R-3 Blok, Daire: 7 TR-23119, Elazig, Turkey. Tel: 90-424-233-3555 (int.: 2488) Fax: 90-424-237-7411, E-mail: sozgocmen@hotmail.com
especially on the periscapular region and pain in a zone of reference, were included into the study. Thirty-one age matched (ages 23–57 years) healthy women were chosen as a control group. All of these female subjects were Turkish. The numbers of postmenopausal women in the FMS, MPS and the control group were similar (4, 3 and 4, respectively). Subjects were accepted into the study, after a preliminary evaluation, which consisted of a physical examination and detailing the patients medical history.

Subjects were excluded if they had evidence of endocrine, neurologic, cardiovascular or gynecologic disorders, or inflammatory rheumatic disease. Subjects using drugs, which could potentially affect serum lipid levels (i.e. birth control pills or non-steroid anti-inflammatory drugs, hypnotic drugs antidepressant agents and muscle relaxants), were also excluded. All subjects were sedentarily women, from the same geographical region and had similar dietary and smoking habits, defined as those expending less than 10% of their daily energy in the performance of moderate or high-intensity activities. The number of women smoking in the FMS, MPS and control groups had a similar distribution (4, 3 and 3, respectively). Clinical properties of these groups are shown in Table 1.

In the MPS group pain threshold and tissue compliance were measured by using a dolorimeter, which was developed by Fischer for both purposes. Tissue compliance was established as the depth of penetration in millimeters of a 3 kg stable force on periscapular muscles in which the TrP was located. If there was more than one TrP on the periscapular region measurements were performed from each TrP.

and the mean value calculated. Tender points (TP) were examined in FMS group using the protocol described by Wolfe et al. Pain threshold was measured by applying a 1 kg per second force on the tender points up to the pressure that the patient felt pain. A pain threshold, which was measured at 4 kg or less, was considered positive for a TP. A score for number of TPs was obtained and this ranged between 11 to 18.

All women were invited to the hospital laboratory after a 12-hour fast. Premenopausal women in three groups were invited on the first day after the end of menstrual bleeding, in order to eliminate the risk of incurred pregnancy and the effect of the menstrual cycle on serum lipid profiles.

Erythrocyte sedimentation rate (Westergren), C reactive protein, complete blood count and routine biochemical parameters were measured by routine methods in the clinical chemical laboratory.

Plasma was stored at +4 C and analyzed within 24 hours. Total cholesterol and triglyceride levels were measured on a Hitachi 717 auto analyzer using (Boehringer Mannheim, Germany) enzymatic kits. High-density lipoprotein cholesterol (HDL-c) levels were measured using the technique for lipoprotein class isolation by precipitation. Low-density lipoprotein cholesterol (LDL-c) and very low-density lipoprotein cholesterol (VLDL-c) levels were calculated using the formula developed by Fridewald et al. Results were obtained in mg/dL.

Statistics

Statistical analysis was performed using the SPSS

<table>
<thead>
<tr>
<th>Table 1: Baseline Clinical Characteristics of the Groups</th>
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<tbody>
<tr>
<td>Fibromyalgia group</td>
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<td>Age (year)</td>
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<td>Length (cm)</td>
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<tr>
<td>Weight (kg)*</td>
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<td></td>
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<td>BMI (kg/m²)</td>
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<td>ESR (mm/h)</td>
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<td>CRP (mg/dL)</td>
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* p<0.05 in FMS vs Control.
† CRP values=6 mg/dL are negative.
Table 2. The Lipid and Lipoprotein Levels in the Three Groups (mg/dL)

<table>
<thead>
<tr>
<th></th>
<th>Fibromyalgia group n=30</th>
<th>Myofascial pain group n=32</th>
<th>Control group n=31</th>
<th>p values*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Range</td>
<td>Mean (SD)</td>
<td>Range</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>T. Cholesterol</td>
<td>122–243</td>
<td>183.5 (31.4)</td>
<td>117–268</td>
<td>198.7 (33.4)</td>
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<tr>
<td>Triglyceride</td>
<td>40–256</td>
<td>107.7 (33.3)</td>
<td>52–244</td>
<td>124.7 (48.6)</td>
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<tr>
<td>HDL-c</td>
<td>25–72</td>
<td>45.8 (10.7)</td>
<td>21–72</td>
<td>45.4 (12.2)</td>
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<tr>
<td>LDL-c</td>
<td>55–191</td>
<td>116.2 (30.2)</td>
<td>65–188</td>
<td>127.5 (32.1)</td>
</tr>
<tr>
<td>VLDL-c&lt;sup&gt;†&lt;/sup&gt;</td>
<td>8–51</td>
<td>21.3 (10.6)</td>
<td>10–49</td>
<td>24.9 (9.7)</td>
</tr>
</tbody>
</table>

*All p values in the table represent MPS vs Control subjects; in addition MPS vs FMS and FMS vs Control subjects are not significantly different.
†Calculated values.

for Windows program. One-way analysis of variance (ANOVA) was used to identify variables of the three groups followed by Tukey’s HSD (honesty significant difference) test. Values were correlated using partial correlation coefficients to adjust for age and body mass index (BMI). A two tailed p value < 0.05 was considered statistically significant.

RESULTS

No significant difference was observed in terms of age, height, menopausal period, or BMI among the groups (Table 1). The weight of the FMS group was higher than the controls (p < 0.05). Table 2 represents the results of lipid levels in the three groups. In the FMS group total cholesterol, triglyceride, HDL-c, LDL-c and VLDL-c levels were not significantly different from the controls. The MPS group had total cholesterol, triglyceride, LDL-c and VLDL-c levels which were significantly higher than the controls. Total cholesterol, triglyceride, HDL-c, LDL-c and VLDL-c levels of the MPS group were not significantly different from the FMS group (Table 2).

The total cholesterol and LDL-c levels of patients with MPS correlated significantly with tissue compliance (mean 8.28 ± 1.85 mm) (r: 0.68 and r: 0.69, p < 0.001, respectively, -values are the partial correlation coefficients, adjusted for age and BMI) (Fig. 1). There was no significant correlation between the number of tender points (mean 16.9 ± 2.0, range 11–18) or pain thresholds (mean total myalgic score 57.1 ± 7.6) and lipid levels in the FMS group.

![Fig. 1. Relationship between tissue compliance and total cholesterol, LDL-c levels of patients with MPS (r: 0.68 and r: 0.69, p < 0.001, respectively) (values are partial correlation coefficients, adjusted for age and BMI).](image-url)

Two patients in the MPS group had total cholesterol levels higher than 260 mg/dL (263–268 mg/dL), normal triglyceride levels and a family history of
atherosclerotic heart disease. Three patients in the FMS group had 223 mg/dL, 229 mg/dL, and 243 mg/dL of total cholesterol. These three patients had trigger points on the periscapular region with a referred pain by palpation, as was the case in the MPS group patients.

DISCUSSION

The lack of previous studies on serum lipid and lipoproteins in FMS and MPS patients poses some difficulty in terms of discussing the significance of our findings. In the literature, musculoskeletal changes, which were mentioned in association with markedly elevated hyperlipidemia, concerned migratory polyarthritis, achilles pain or tendinitis, not chronic pain syndromes such as FMS or MPS. On the other hand the lipid levels determined in these studies were well above the upper ranges found in our study. The results of lipid levels obtained in the control group, on the other hand, were entirely consistent with the results of the Turkish Heart Study. The significant correlation between total cholesterol, LDL-c levels and both tissue compliance and pain threshold in MPS strengthens the possibility of these being an etiological factor associated with lipids in this syndrome.

Some of the drugs affected lipid and lipoprotein levels (i.e. non-steroidal anti-inflammatory drugs, birth control pills, and antidepressants), and because of this many of the patients who had been previously diagnosed and were using these drug types were excluded.

Fibromyalgia and myofascial pain syndromes have overlapping features, and it is widely accepted that regional vs generalized pain is the single most important differential characteristic of these two clinical conditions. In our study group of FMS three patients had characteristic TrPs on the periscapular region, and interestingly their lipid levels were well above 200 mg/dL.

Reduced physical activity caused by these painful conditions may be a confounding factor in terms of the measured serum lipids and lipoproteins. Therefore, we enrolled subjects who were sedentarily housewives who lead sedentary lives and had similar daily physical activities.

The etiology of the chronic pain syndromes has not been completely clarified. The typical feature of these syndromes are painful TrPs in muscles and tendon insertions. Muscle biopsy studies provided unique evidence that gives us an indication of the relationship between lipids and TrPs. Marked fatty infiltration and a localized increase in fibrous connective tissue have been noted in the histologically studied biopsies of myoglobin from hip and back muscles, which were sites of chronic pain. In another electron microscopic study subsarcolemnal accumulation of glycogen and mitochondria, and interfibrillar deposition of lipids have been found. Unfortunately, the microscopic findings are not enough to clarify the microstructure of taut bands and TrPs in patients with MPS, since all of the patients in these studies were fibromyalgic, however, biopsies were taken from muscles affected by chronic pain.

In conclusion, a significant difference was found between the lipid levels of patients with MPS and the controls. Lipid and lipoprotein levels should be further investigated in a more comprehensive controlled series in order to determine whether high lipid levels are the cause or result of MPS.

REFERENCES


