Original Article

Serum Lipid Profile in Patients with Primary Fibromyalgia

Enas J. Kadim * BSc (Chemistry)
Munaf S. Daoud ** BSc, PhD
Mohammed H. Alosami *** CABM, FICMS (Med), FICMS (Rheum)

Summary:

Background: Fibromyalgia syndrome (FMS) is a chronic musculoskeletal disorder characterized by wide spread body pain, chronic fatigue, irritable bowel syndrome and increased tenderness at specific anatomic sites .This study is undertaken to compare the serum lipid profiles between patients with primary FMS and healthy controls, and to investigate if there is a relationship between the serum lipid levels and the symptoms in FMS patients.

Patients and methods: Fifty patients with primary FMS were included in this study (37 females and 13 males) the age range of (17-65) years (Mean ± SD) (40.13 ± 12.0) years, and thirty healthy individual volunteers (21 females and 9 males), their age and sex matching with FMS patients, age ranging (18 - 63) years, (Mean ± SD) (36.1 ±10.0) years. Serum lipid profile parameters: Total cholesterol (T.chol), Triglyceride (Tg), and high density lipoprotein-cholesterol(HDL-C) were quantitatively determined by colorimetric method in sera of patients and controls while low density lipoprotein-chol. (LDL-C) and very low density lipoprotein-chol. (VLDL-C) levels were determined according to Fridewald equation . Pain intensity was measured using visual analogue scale (VAS) clinical features like sleep disturbance, emotional distress, and fatigue were reported. .

Results : HDL levels was lower in FMS patients than controls (Mean ± SD) (43.94 ± 3.54) mg/dl vs. (63.30 ± 7.03) mg/dl, this lowering was highly significant statistically ($p < 0.000$) ,while serum LDL-C concentration was higher in patients than in control group (Mean ± SD) (112.38 ± 25.05) mg/dl vs. (94.67 ± 18.13) mg/dl, , this elevation was highly significant statistically ($p = 0.001$).

Conclusion: the result of the current study showed significant difference in lipid levels between FMS patients and healthy match controls. More extensive investigation of the lipid levels is required to determine whether the lipid levels are associated with FMS .

Keywords: Fibromyalgia, Lipid profile, High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL).

Fac Med Baghdad 2011; Vol. 53, No. 1
Received Nov. 2010
Accepted Dec. 2010

Introduction:

According to the criteria of the American College of Rheumatology (ACR) , fibromyalgia (FMS) is characterized by chronic widespread pain in all 4 quadrants of the body at least for 3 months duration associated with tender points and associated with constitutional symptoms of fatigue, aching, and nonrestorative sleep. The etiology of FMS remains elusive (1). A number of studies have suggested that there is an association between hyperlipidemia and musculoskeletal manifestation (2-4). In these studies , most of the patients had myalgia and arthralgia, tendo Achilles tendinitis ,oligoarthritis or migratory polyarthritis, which are all associated with markedly elevated levels of hyperlipidemia. However, the pathogenesis of hyperlipidemia in musculoskeletal system manifestations are not fully understood (5). In this study, serum lipid profile of patients with primary FMS were determined and compared with healthy controls.

Patients and methods:

Subjects: The study included 50 patients with primary FMS (37 females and 13 males) the age range of (17-65) years (Mean ± SD) (40.13 ± 12.0) years. The clinical diagnosis of these patients was confirmed by Consultant Rheumatologists of the Baghdad Teaching Hospital according to the ACR 1990 criteria for the diagnosis of FMS. Patients with primary fibromyalgia were included in this study. Thirty healthy individuals volunteers (21 females and 9 males), whose age and sex matching with FMS patients, age ranging (18 - 63) years, (Mean ± SD) (36.1 ±10.0) years. They had no musculoskeletal complaints or lower back pain and did not seek any medical help for pain. A pre- tested questionnaire was designed to obtain information from both patients and control group about past medical and drug history .

Inclusion criteria:- Known cases of FMS approved by clinical, laboratory, and radiological diagnosis. Patients on medical treatments that never affect the laboratory tests.

Exclusion Criteria: Diabetes mellitus (DM) ,Rheumatoid arthritis (RA),Systemic lupus erythematosis (SLE), Sjögren's syndrome (SS), Osteoarthritis (OA),Sleep apnea ,Patients on steroid therapy, Chronic renal failure, Chronic liver disease, Previous breast surgery, Inflammatory systemic disease or infection, Serious cardiopulmonary, vascular or other internal medical condition. Medication that may influence the results (e.g. local corticosteroids , oral contraceptive , lipid lowering drugs, biological agents).

**The Specialized Center of Endocrinology and Diabetes*
***Dep. Of Physiological Chemistry, College of Medicine, University of Baghdad.*
****Dep. Of medicine, College of Medicine, University of Baghdad.*

Blood collection: After an overnight fasting venous blood samples (10 ml) were aspirated from each patient and control at 9.00 am - 12.00 pm using disposable plastic syringes . Seven ml of the blood samples were allowed to clot in plane tubes at room temperature for (2030-) minutes. Sera were separated by centrifugation at 3000 rpm for 10 minutes. For each sample, the serum was transferred into plastic plane tubes and kept frozen at (-20C) until the time of assay. The rest 3 ml blood samples were collected in EDTA tubes for ESR, PCV, and WBC tested by routine work to exclude inflammatory reasons.

Methods: total serum cholesterol , triglyceride , high density lipoprotein were measured by colorimetric method using enzymatic kits provided by linear Chromatest company-Spain . low density lipoprotein cholesterol (LDL-c)and very low density lipoprotein (VLLDL-c) levels were calculated using the formula developed by Fridewald . Pain was measured using Visual Analogue Scale (VAS).

Statistical analysis: To compare the significant of the difference in the means values of the measured parameters between patients and controls, SPSS (social process statistical system) was used. Student t-test was applied ($P < 0.05$) was considered statistically significant , and the correlation coefficient (r) test is used to describe the association between different parameters studied .

Results:

As shown in table-1 , in this study serum HDL-C concentration in patients with FMS was significantly lower than its concentration in healthy controls (Mean ± SD) (43.94 ± 3.54) mg/dl, (n=50) vs. (63.30 ± 7.03) mg/dl, (n=30) , ($p< 0.000$) figure (1) while serum LDL-C was higher in patients than its concentration in controls group (Mean ± SD) (112.38 ± 25.05) mg/dl (n=50) vs. (94.67 ± 18.13) mg/dl, (n=30), ($p = 0.001$) , figure (2). In this study, a significant positive correlation between serum TG (mg/dl) and age (year) was found, (r=0.302), (p=0.033), figure (3) and Tg was significantly correlated with cholesterol (r=0.343), (p=0.15), figure (4).

Table (1) Shows the mean values of all lipid profile parameters measured for patients and control group,(Mean ± SD) values for , cholesterol, Triglyceride , HDL-c ,VLDL-c , LDL-c

parameter	FMS patients n=50 Mean ± SD	HC n =30 Mean ± SD	P-value	Sig
S.cholesterol (mg/dl)	182.06 ± 22.0	181.67 ± 17.49	0.935	NS
Tg (mg/dl)	127.64 ± 30.15	118.23 ± 21.08	0.137	NS
HDL-C (mg/dl)	43.94 ± 13.54	63.30 ± 7.03	0.000	HS
VLDL-C (mg/dl)	25.80 ± 6.25	26.97 ± 18.05	0.677	NS
LDL-C (mg/dl)	112.38 ± 25.05	94.67 ± 18.13	0.001	HS

Table (2) Shows the clinical features for patients and controls group; sleep disturbance, emotional distress, and fatigue .

Clinical features	FMS (n=50) n (%)	HC (n=30) n (%)	Total (n=80) n(%0)	P-value	Sig
Sleep disturbance +ve -ve	47(94.0 %) 3(6.0 %)	3(10.0%) 27(90.0 %)	50(62.0%) 30(38.0 %)	0.000	HS
Emotional distress +ve -ve	50(100.0 %) —	6(20.0 %) 24(80.0 %)	56(69.7 %) 24(30.3 %)	0.000	HS
Fatigue -ve Mild Moderate Severe	— 11(22.4 %) 25(51.0 %) 14(27 .0 %)	22(73.3 %) 8(26.7 %) 0(0.0 %) 0(0.0 %)	22(27.8 %) 19(24.1 %) 25(31.6 %) 14(16.5 %)	0.000	HS

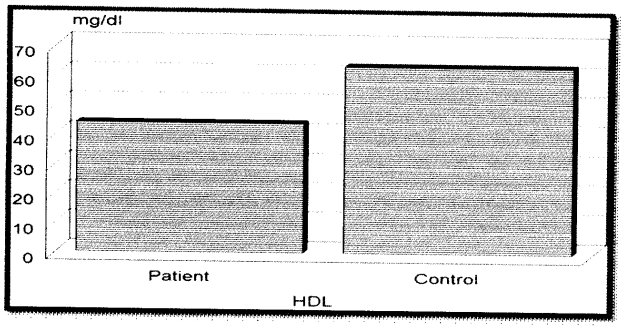

Figure (1) : mean value for serum HDL-C level in FMS patients and control group

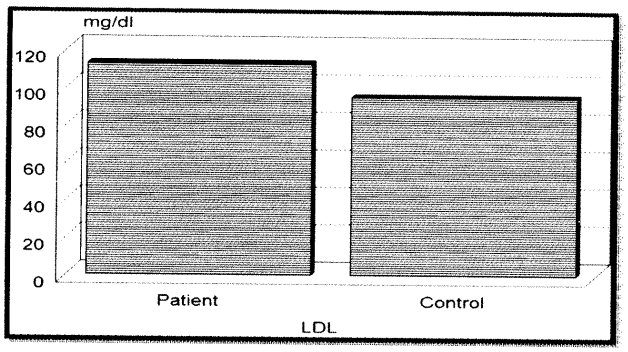

Figure (2) : mean value for serum LDL-C level in FMS patients and control group

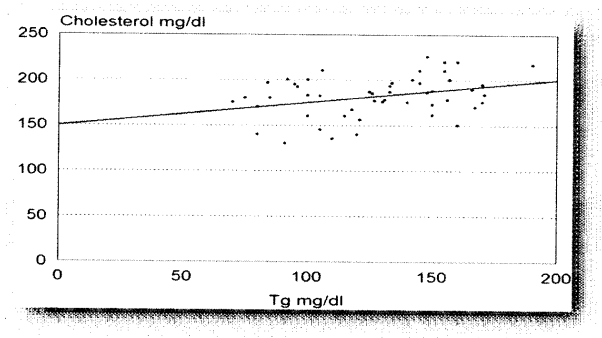

Figure (3) :Correlation between Tg(mg/dl) and age(years) ,(r=0.302) ,(p=0.0033) , (n=50) .

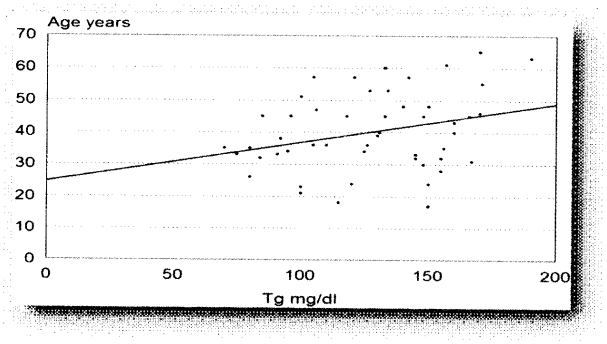

Figure (4): Correlation between Tg (mg/dl) and cholesterol (mg/dl), (r=0.343), (p=0.15), (n=50).

Discussion:

In this study, serum HDL-C was significantly lower in FMS patients than its concentration in control group, while LDL-C was significantly higher in FMS patients than in controls group. These results come in agreement with several studies where abnormal T.Chol ,LDL-C were observed in patients with FMS .Lee et al observed high concentration of total cholesterol in patients with FMS than in control (208.9± 38.5) mg/dl vs. (194.2± 37.1)mg/dl respectively,(p=0.047) and LDL-C (121.9±31) mg/dl vs. (109.3±32.2)mg/dl respectively (p=0.043) (6). Gurer et al also found that the mean serum total cholesterol and LDL-C were significantly higher in the FMS than that in controls group, ($p < 0.05$) (7). In both later studies there were no difference in HDL-C concentration and this disagree with the present study which could be explained by the differences in population selected in these studies and food type consumed by each studies populations and Iraqi people in this study. HDL-C has been shown to be protective with regard to coronary artery disease (CAD) because of its role in reverse transport of cholesterol and by its capacity to remove triglyceride rich lipoproteins (8).Many studies have shown that poor efficiency in removing the lipid from the circulation would increase the risk of atherosclerosis (9). Reduced physical activities caused by the painful condition of FMS may be a confounding factor in terms of the measured serum lipid and lipoproteins (10). In this study subjects who were sedentarily housewives or who lead sedentary lives and had similar daily physical activities were enrolled. The etiology of the chronic pain syndromes has not been completely clarified. The typical features of these syndromes are painful tender points in muscles and tendon insertion (11,12). Muscle biopsies studies provided unique evidence that gives us an indication of the relationship between lipid and tender points (13-15) . Marked fatty infiltration and a localized increase in fibrous connective tissue have been noted in the histologically studied biopsies in which there were sites of myogelosis from hip and back muscle which were sites of chronic pain (15) .In another electron microscopic study subsarcolemmal accumulation of glycogen and mitochondria and interfibrillar deposition of lipid has been found (16). Patients with FMS commonly have an elevated BMI and are physically inactive, two major risk factors for metabolic syndrome yet little is known about the relationship between chronic pain condition and metabolic disturbance (17) .In the present study triglyceride concentration is positively correlated with age and triglyceride positively correlated with cholesterol concentrations , this result comes in agreement with the concept that lipid concentration continue to increase throughout the adult life (18). In general population, several factors are associated with increased TGs concentrations including obesity, cigarette smoking, physical inactivity ,excess alcohol intake and several diseases (e.g. , type 2 diabetes and chronic renal failure) (18).In conclusion this study revealed that HDL-C was significantly lower in FMS patients in this study and LDL-C was found to be significantly higher in FMS patients when compared to healthy controls ; but lipid profile have no role in development of FMS.

Extensive research to be done in the role of lipid profile in FMS like apolipoprotein AI and AII, the apo B-100/AI ratio , since it was a better discrimination of cardiovascular risk than the LDL-C/HDL-C ratio.

References:

1. *Wolfe F, Smythe H, Yunus M, et al. The American College of Rheumatology 1990 Criteria for the Classification of Fibromyalgia. Report of the Multicenter Criteria Committee . Arthritis Rheum .1990 ; 33:160–172.*
2. *Klemp P, Halland MA, Majoos FL, Steyn K. Musculoskeletal manifestations in hyperlipidaemia : a controlled study. Ann Rheum .1993;52:44-48.*
3. *Carless DJ,Cohen MG.Rheumatic Manifestations of hyperlipideamia and antihyperlipideamia drug therapy. Semin Arthritis Rheum.1993;23:90-98.*
4. *Andreu JL, Sanz J. Fibromyalgia and diagnosis. Rev Clin Esp.2005;205:333-336.*
5. *Bruce CG. Fibromyalgia, arthritis associated with systemic disease, and other arthritides. In :Kasper DL, Braunwald E, Fauci AS, Hauser SL, Longo DL, Jameson JL,eds. Harrison's textbook of medicine. 16 th ed. New Yourk , McGrow-Hill .2005.p.2055-2064.*
6. *Lee JN, Kim S, Park JR, et al. Serum lipid profile in patients with fibromyalgia . The Korean Journal of Medicine.2006; 71(5):535-542.*
7. *Gürer G, Sendur OF, Ay C. Serum lipid profile in fibromyalgia women. J Clin Rheumatol.2006;25(3):300-303.*
8. *Mayes PA. Lipid transport and storage . In: Murray RK, Granner DK, Mayes PA, Rodwell VW (edi). Harperis biochemistry .25th ed. Stamford: Appleton and Lange.2000: 274-276.*
9. *Sposito AC, Ventura LI, Vinagre CG, Lemos PA, Quintella E, Santos RD, et al. Delayed intravascular catabolism of chylomicrons-like emulsions is an independent predicator of coronary artery disease. Athersclerosis .2004; 176: 397-403.*
10. *Ozgocmen S, Ardicoglu O. Lipid profile in patients with fibromyalgia and myofacial syndromes. Yonsei Medical Journal.2000; 41(5):541-545.*
11. *Fricton JR. Myofacial pain syndromes characteristics and epidemiology in advances in pain research and therapy .In: Fricton JR, Awad E (edi). New York Raven Press Ltd;1990;17:107-129.*
12. *Yunus M, Masi AT, Calabro JJ, Miller KA, et al. Primary fibromyalgia(fibrositis): clinical study of 50 patients with match normal Controls. Semin Arthritis Rheum.1981; 11:151-171.*
13. *Bengtsson A,Henriksson KG, Larsson J. Muscle biopsy in primary fibromyalgia. Scand .J. Rheum.1986;15:1-6.*
14. *Yunus MB, Kalyan-Raman UP, Masi AT, Aldag JC. Electron microscopic studies of muscle biopsy in primary fibromyalgia syndrome. A controlled and blinded study.J Rheumatol.1989; 16: 97-101.*
15. *Yunus MB, Kalian-Raman UP . Muscle biopsy findings in primary fibromyalgia and other forms of non articular rheumatism. Rheum Dis Clin North Am.1989; 15:115-134.*
16. *Loevingera B, Muller D, Alonso C, et al. Metabolic syndrome in women with chronic pain. Metabolism. 2007; 56 (1):87-93.*
17. *Brown SA, Hutchinson R, Morrisett J, et al. Plasma lipid lipoprotein cholesterol, and apoprotien distribution in selected US communities .the Atherosclerotic Risk In Communities (ARIC) study. Arterio Scler Thromb.1993; 13:1139-1158.*
18. *Executive summary of the third report of the National Cholesterol Education Program (NCEP). Expert panel on education , evaluation , and treatment of high blood cholesterol in adults(adult treatment panel III). JAMA.2001;285: 2486-2497*