



ALTERATION IN SERUM LIPID PROFILE PATTERN IN RHEUMATOID ARTHRITIS PATIENTS

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ABSTRACT

Aim: Rheumatoid Arthritis (RA) is the most common autoimmune arthritis which causes chronic inflammation of the joints and associated with accelerated atherogenesis and increased cardiovascular mortality. Recently it has been focused on the significant association between lipid components and RA disease. This study was designed to investigate the association between lipid components and RA disease Jordanian patients sample.

Methods: The study was conducted at a Rheumatology clinic of royal rehabilitation centre and included 200 RA patients and 50 healthy subjects. Fasting blood samples were drawn for lipid analysis. Relationship between the two group results was assessed using Pearson's correlation method.

Results: Blood samples were collected from 200 patients attended Rheumatology clinics in royal rehabilitation centre in King Hussein Medical Centre during the period from 15 June 2016 to 27 March 2017, 32 were males (16%) and 168 were female (84%) and also from 50 healthy subjects.

Mean duration of disease was 6.75 ± 2.09 years and mean age was 48 ± 9.3 . The results of the patients had shown a high mean serum level of total cholesterol (TC) in comparison to control group with a significant difference 218.9 ± 37.5 Vs 187.6 ± 42.3 ($p < 0.05$). The mean serum level of LDL-C in patients was significant higher than the mean serum level of LDL-C in control group 139.9 ± 21.6 Vs 112.3 ± 19.8 ($p < 0.05$). On the other hand the mean serum TG level in patients was significant higher than the mean serum TG level in control group with significant difference ($p > 0.05$) (234.6 ± 87.3 Vs 177.3 ± 35.8), the mean serum level of HDL-C in patients with RA was significant lower than the mean serum level of control group, with a significant difference ($p < 0.05$) (32.8 ± 15.6 Vs 47.3 ± 7.5).

Conclusion: RA is a disease with lipid paradox. A high inflammatory burden is associated with low level of HDL-C, high LDL-C and Total cholesterol.

Keywords: Atherogenesis; Cardiovascular Events; CRP; Lipids; Rheumatoid Arthritis.

Introduction

Rheumatoid arthritis (RA) is a chronic autoimmune disease causing pain, swelling, stiffness and loss of function in the joints. A healthy immune system protects the body by attacking foreign bacteria and viruses, but an autoimmune disease causes the body to mistakenly attack healthy tissue, this creates inflammation in the tissue that lines inside of joints (the synovium) causing thickness, swelling and pain in and surrounded the joints. The synovium makes a fluid that lubricates joints and helps them move smoothly. Rheumatoid arthritis most commonly affects the joints of the hands, feet, wrists, elbows, knees and ankles. The joint effect is usually symmetrical. That means if one knee or hand is affected, usually the other one is, too. [1,2]

The risk for decreased life expectancy and early cardiovascular mortality in particular, among people with rheumatoid arthritis is increasingly recognized. The increased risk of coronary heart disease may precede the onset and diagnosis of RA [3].

Lipid profile test is a routine test for the patients with autoimmune and inflammatory diseases, and many studies it was reported that there is a strong association between active early rheumatoid arthritis and dyslipidemia [4]. In patients with active and untreated RA, serum high density lipoprotein cholesterol (HDL-C) was decreased in the RA patients, and a proatherogenic lipid profile has been reported in patients with active and untreated RA [5, 6].

Rheumatoid arthritis (RA) is associated with increasing overall mortality [7] mainly because increasing of cardiovascular (CV) disease, which accounts for over 50% of premature deaths unambiguously in the general population [8]. The association between RA and CV morbidity has been not established yet, as the disease effect on CV risk is considered comparable to that of diabetes [9,10]. RA patients appear to have about a twofold higher possibility for myocardial infarction than non-RA patients [11].

Other CV manifestations including valvular heart disease,

arrhythmia, pericarditis and endocarditis as well as rheumatoid cardiac nodules have also been described but rarely cause clinically overt disease [12]. On the contrary, myocarditis and microvascular disease are common, as suggested by newer imaging techniques, although their contribution to CV mortality remains unclear [13].

The objective of this study was to study the change in lipid profile pattern in patients with RA and compare these results with that in healthy subjects.

Method and Materials

Subjects and samples

Blood samples were collected from 200 patients attended Rheumatology clinic in royal rehabilitation centre in King Hussein Medical Centre during the period from 15 June 2016 to 27 March 2017, 168 were female (84%) and 32 were males (16%). Mean duration of disease was 6.75 ± 2.09 years and mean age was 48 ± 9.3 years patients were enrolled into the study after fulfilling inclusion criteria. A proper consent was taken from each patient, 27 of them were healthy and the members of both groups were enrolled in the study voluntarily. Ethical Committee approval was obtained for the collection of samples from the patients.

Venous blood samples were collected between 8:00 and 10:00 h into plain tubes after a minimum 14-h overnight fast from both patients and control group. The samples were allowed to clot for 15 minutes at room temperature then similarly were centrifuged at 4000g for 10 minutes then analyzed immediately.

We excluded from this study patients with smokers, diabetes mellitus, hypothyroidism, liver disease, kidney disease, Cushing's syndrome, obesity (body mass index >30). In addition, patients receiving medications affecting lipid metabolism, such as lipid-lowering drugs, beta-blockers, oral contraceptives, oestrogen, progestin, thyroxin and vitamin E.

Analysis

The triglyceride, total cholesterol and high-density lipoprotein cholesterol concentrations (HDL-cholesterol) were measured using Cobas 501 (Roche Diagnostics GmbH, Mannheim, Germany), levels of low-density lipoproteins cholesterol (LDL-cholesterol) were calculated by Fried Wald formula.

Reference range

Normal values for lipid profile parameters are total cholesterol (150-200 mg/dl), triglyceride (50-200 mg/dl), HDL-Cholesterol (10-60 mg/dl), LDL-Cholesterol (60-160 mg/dl), and total cholesterol/ HDL-Cholesterol is 4 mg/dl.

Statistical analysis

Results are reported as mean \pm standard deviation (SD), All statistical analysis were performed using SPSS for windows 20.0 (SPSS Inc. Headquarters, Chicago, III., USA) software program and Microsoft Excel 2007 program. $P <$

0.05 was considered to be statistically significant.

Results:

In study patient selection period (from 15 June 2016 to 27 March 2017), two hundred patients were included in the study 168 were female (84%) and 32 were males (16%). Mean duration of disease was 6.75 ± 2.09 years and mean age was 48 ± 9.3 . 50 healthy subjects were selected as a control group. The clinical characteristics and lipid profiles of patients and controls are described in Table 1.

The results of the patients had shown a high mean serum level of total cholesterol (TC) in comparison to control group with a significant difference 218.9 ± 37.5 Vs 187.6 ± 42.3 ($p < 0.05$) as shown in table (1). The mean serum level of LDL-C in patients was higher than the mean serum level of LDL-C in control group 139.9 ± 21.6 Vs 112.3 ± 19.8 ($p < 0.05$). On the other hand the mean serum TG level in patients was higher than the mean serum TG level in control group with significant difference ($p < 0.05$) (234.6 ± 87.3 Vs 177.3 ± 35.8), the mean serum level of HDL-C in patients with RA was lower than the mean serum level of control group. With a significant difference ($p < 0.05$) (32.8 ± 15.6 Vs 47.3 ± 7.5).

The percentage increase in the lipid profile of RA patients were as follows; TC=16.8%, TG= 33.3%, HDL 46.9% LDL= 24.6% in comparison with healthy group results.

Table 1: Characteristics of whole study population.

Parameters	Patients	Control	p-value
Age (year mean)	46.8 ± 11.3	44.3 ± 12.6	0.47
TC (mg/dL)	218.9 ± 37.5	187.6 ± 42.3	0.042
TG (mg/dL)	234.6 ± 87.3	177.3 ± 35.8	0.039
HDL-C (mg/dL)	32.8 ± 15.6	47.3 ± 7.5	0.032
LDL-C (mg/dL)	139.9 ± 21.6	112.3 ± 19.8	0.018
BMI (Kg/m ²)	26.23 ± 4.5	23.7 ± 2.9	0.019

Discussion

Patients with Rheumatoid Arthritis (RA), who by definition manifest persistent high levels of inflammation are at

greater risk of developing cardiovascular disease [14]. Lipid profile abnormalities is frequently observed in patients with active RA[15]. Systemic inflammation has a general effect in lowering circulating lipid levels[16]. Moreover, patients with RA have an increased CVD risk at relatively low cholesterol levels, in contrast to that observed in the population without RA. These paradoxical changes in the lipid profiles of RA patients are still unclear, and the interactions between lipid fractions, inflammation and CVD risk in RA appears to be very complex.

Our main aim of the current study to was measure the lipid profile of RA patients and to investigate whether this could be influenced by disease activity in the rheumatoid arthritis. Depend on our finding patients with RA exhibited an atherogenic lipid profile characterized by a significantly increase in the ratio of TC/HDL-C or LDLC/HDL-C and decreasing of serum level of HDL-C was noted in patients results so they are under a high risk of atherosclerosis.

In previous many articles the serum lipid profile of patients with RA has been investigated .in Some of these studies serum levels of HDL-C and TC, higher TC/HDL-C and LDL-C/HDL-C ratios were found lower in patients in comparison with general population [17,18].While in other studies no significant difference lipid levels were found [19,20], in other hand in some reported that there is an overall reduction in all lipid sub-fractions in cases of active RA disease [21,22], the differences in results may be due to the number of subjects, the stage (early or established), activity and duration of disease and the kind of the study (prospective or cross-sectional).

A lower serum level in cardio protective HDL-C and increase in LDL-C exposes rheumatoid arthritis patients to higher risk of CVD [23].In the present study it has also found significant decrease in serum HDL-C level in rheumatoid arthritis patients.

Conclusion

Depends on obtained results from the current study, it can be concluded that (RA) is accompanied with raised blood lipid profiles. This also showed that in clinical practice RA patients were tested for dyslipidemia less frequently. because of the increased risk of CVD and mortality among RA patients who have elevated lipid levels.

Additional prospective, long term studies are needed to comprehensively determine the role of inflammation and the impact of biologics on lipid levels and CV outcomes in patients with RA.

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