Original Research Article

Assessment of Biochemical Parameters in Patients with Rheumatoid Arthritis for Cardiovascular Diseases at Tertiary Care Centre

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ABSTRACT

Background: Rheumatoid arthritis (RA) patients have higher cardiovascular risk due to dyslipidemia, inflammation etc. Serum lipid concentrations are predictive for the development of atherosclerosis. The present study was conducted to assess Serum Lipid Profile and other Biochemical Parameters as Risk Factors of Cardiovascular Diseases in Patients with Rheumatoid Arthritis.

Materials and Methods: The present cross-sectional, case control study was conducted over the period of 6 months in 50 newly diagnosed RA patients of age group 25-65 years and same number of age and sex matched healthy individuals as control. Blood sample was collected after overnight fast and laboratory analysis was done. Serum lipid profile and other biochemical parameters were measured in study subjects. Data analysis was performed using SPSS version 18. A p-value < 0.05 was considered as statistically significant.

Results: The present study was conducted in 100 subjects (49 males and 51 females) of which 50 RA and 50 control subjects. Alkaline phosphatase level was increased in RA subjects compared to controls. In RA subjects there was higher total cholesterol and LDL cholesterol respectively RA patients had statistically significantly lower HDL increase in the levels of total proteins in RA subjects compared to controls. Serum magnesium levels were decreased in cases as compared to controls. The study found that RA patients had higher alanine transaminase (ALT) compared to controls. There was no significant difference in the levels of triglyceride, VLDL cholesterol, glucose, aspartate transaminase (AST) between RA cases and control group.

Conclusion: Our study concluded that magnesium level was decreased and dyslipidemia which may be more potent risk factors for CVD in newly diagnosed RA subjects. So, further studies are needed to confirm the impact of various biochemical parameters and cardiovascular outcomes in patients with RA.

Keywords: Magnesium, Serum, Biochemical.

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INTRODUCTION

Rheumatoid arthritis (RA) is an inflammatory rheumatic disease with progressive course affecting articular and extra-articular structures resulting in pain, disability and mortality.[1] Persistent inflammation leads to erosive joint damage and functional impairment in the vast majority of patients.[2,3] Rheumatoid arthritis (RA) is an autoimmune disease characterized by chronic and deforming polyarthritis that is accompanied by systemic involvement in many patients. Morning stiffness, fatigue and loss of energy is usually observed in patients with RA.[4] The prevalence of RA is 0.5% to 1.0% worldwide and 0.3% to 0.9% in India.[5] Rheumatoid arthritis (RA) patients die earlier than the general population[6] and part of this increased mortality results from atherosclerotic coronary artery disease.[7,8]

Serum lipid concentrations are predictive for the development of atherosclerosis: men with cholesterol in the highest fifth of the population range have 3.5 times the risk of ischaemic heart disease (IHD) compared with those in the lowest fifth.[9] There is scarcity of information regarding the pattern of biochemical parameters like, magnesium, total proteins, albumin, globulin, glucose, urea, creatinine, bilirubin and various enzymes like transaminases in RA. Inflammation, irrespective of etiology is capable of inducing marked systemic alterations in trace metal distribution and metabolism.[10] The present study was conducted to assess Serum Magnesium, Lipid Profile and other Biochemical Parameters as Risk Factors of Cardiovascular Diseases in Patients with Rheumatoid Arthritis.

MATERIALS AND METHODS

The present cross-sectional, case control study was conducted over the period of 6 months in 50 newly diagnosed RA patients of age group 25-65 years and same number of age and sex matched healthy individuals as control. Before the commencement of the study ethical approval was taken from the Ethical Committee of the institute and written consent was taken from all participants. Patients who were newly diagnosed cases of RA as per revised criteria of American Rheumatology Association (ARA)[11] having diseases duration less than one month and without history of anti-rheumatic treatment were included in the study. In all patients Rheumatoid Factor (RF) was positive. Blood sample was collected after overnight fast and laboratory analysis was done in the Clinical Biochemistry laboratory on the same day by using commercially available kits on semi- automated clinical chemistry analyser (Robonic company). Serum magnesium measured by Calmagite method. Total cholesterol, triglycerides and HDL cholesterol measured by enzymatic method.[12] LDL cholesterol and VLDL cholesterol were calculated by the Friedewald's formula.[12] Alanine transaminase (ALT), aspartate transaminase (AST) and alkaline phosphatase measured by the modified International Federation of Clinical Chemistry (IFCC) method. Data analysis was performed using SPSS version 18. A p-value < 0.05 was considered as statistically significant.

Table 1: Demographic characteristics of RA patients and control group

	Rheumatoid arthritis		Controls		Total
Age	25-45yrs	45-65yrs	25-45yrs	45-65yrs	
Males	6	18	8	17	49
Females	7	17	9	18	51
Total	13	35	17	35	100

Table 2: Serum Magnesium and other biochemical parameters

Biochemical parameters	Rheumatoid arthritis Mean± SD	Controls Mean± SD	p- value
Total cholesterol (mg/dl)	214.54±43.56	197.56±45.77	0.056
Triglyceride (mg/dl)	147.78±42.85	138.65±48.65	0.33
HDL cholesterol (mg/dl)	32.65±7.56	43.78±7.95	< 0.001
LDL cholesterol (mg/dl)	153.67±43.62	127.76±54.87	0.07
VLDL cholesterol (mg/dl)	28.67±5.67	26.75±4.98	0.3
Alkaline phosphatase(IU/L)	354.67±97.54	152.04±54.56	< 0.001
Aspartate transaminase(IU/L)	31.34±10.43	32.01±9.23	0.786
Alanine transaminase(IU/L)	31.46±10.46	27.23±8.97	0.04
Magnesium(mg/dl)	1.76±0.52	2.16±0.32	< 0.001

RESULTS

The present study was conducted in 100 subjects (49 males and 51 females) of which 50 RA and 50 control subjects. We found lower magnesium concentrations in RA subjects compared to the controls. Alkaline phosphates level was increased in RA subjects compared to controls. In RA subjects there was higher total cholesterol and LDL cholesterol respectively RA patients had statistically significantly lower HDL increase in the levels of total proteins in RA subjects compared to controls. The study found that RA patients had higher alanine transaminase (ALT) compared to controls. There was no significant difference in the levels of triglyceride, VLDL cholesterol, glucose, aspartate transaminase (AST) between RA cases and control group.

DISCUSSION

Cardiovascular disease in RA may result from accelerated atherosclerosis caused by clinical or subclinical vasculitis.[13] The increase in mortality in RA equates to a median of four years of life lost in men and up to 10 years in women.[6] Cardiovascular disease accounts for part of this increase in mortality— a recent Finnish study of over 1000 women with RA calculated a standard mortality ratio of 1.51 for IHD. In that study cardiovascular disease as a whole accounted for 40% of excess mortality in the group.[8]

The present study was conducted in 100 subjects (49 males and 51 females) of which 50 RA and 50 control subjects. We found lower magnesium concentrations in RA subjects compared to the controls. Alkaline phosphates level was increased in RA subjects compared to controls. In RA subjects there was higher total cholesterol and LDL cholesterol respectively RA patients had statistically significantly lower HDL increase in the levels of total proteins in RA subjects compared to controls. The study found that RA patients had higher alanine transaminase (ALT) compared to controls. There was no significant difference in the levels of triglyceride, VLDL cholesterol, glucose, aspartate transaminase (AST) between RA cases and control group. Low levels of magnesium in RA is due to chronic inflammation and autoimmune injury as chronic inflammatory conditions are likely to affect magnesium level.[14-16]

Decreased levels of serum magnesium may be due to water softeners and purifiers used for purification of drinking water.[17] Agarwal et al. indicated that various CVD risk factors were worse in RA although a 10-year CVD risk with Framingham score was similar between the patients with RA and control groups.[18] Previous studies showed that a great number of patients with RA with low or moderate cardiovascular risk scores had carotid atherosclerosis on ultrasound.[19-21] Chavan et al. studied various biochemical parameters as CVD risk components in RA and they observed that increased uric acid levels may play a part for CVD.[22]

CONCLUSION

Our study concluded that magnesium level was decreased which may be more potent risk factors for CVD in newly diagnosed RA subjects. So, further studies are needed to confirm the impact of various biochemical parameters and cardiovascular outcomes in patients with RA.

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