Original Article

Correlation of Lipid Profile & Acute Inflammatory Markers in Rheumatoid Arthritis

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Abstract

Background: Rheumatoid arthritis (RA) primarily affect the synovium and is a chronic inflammation disease, which leads to joint damage and bone destruction. Causes of significant morbidity are due to result of synovial inflammation, joint destruction and associated disability. Many pieces of evidence suggest that proatherogenic disease associated with increased cardiovascular (CV) mortality is rheumatoid arthritis (RA). Addition to genetic and conventional CV risk factors, chronic inflammation has emerged as a key component of this process. Cardiovascular concerned demises shown a preferment in CRP among RA cases who have ongoing active inflammation that's why CRP can be self-sufficient pointer for cardiovascular disease. **Subjects and Methods:** Current study has been conducted in Teerthanker Mahaveer hospital, Teerthanker Mahaveer medical college. Data has been collected in duration of 12 months. After obtaining consent, data has been collected from 60 consecutive established case of rheumatoid arthritis. Almost equal number of participants were belonging to 30-39 years (16, 26.7%), 40-49 years (15, 25.0%), and 50-59 years (16, 26.7%) age groups. Very few participants were belonging to 20-29 years (4, 6.7%) and 60-69 years (9, 15.0%). Range of age was from 25 years to 69 years. **Results:** Pearson correlation coefficient of CPR with Total cholesterol, HDL-C, Triglyceride, LDL-C and VLDL-C were -0.326, -0.269, -0.307, -0.310 and -0.307 respectively. All the correlation coefficients were statistically significant (<0.05). Correlation coefficient of ESR with Total cholesterol, HDL-C, Triglyceride, LDL-C and VLDLC were -0.294, -0.311, -0.226, -0.253 and -0.226 respectively. Among them correlation coefficient of ESR with total cholesterol (p-value=0.023) and HDL-C (p-value=0.016) were statistically significant (<0.05). **Conclusion:** General population danger of atherosclerosis surmount with increment in LDL and wane of HDL but in RA population there is wear off in HDL LDL and total cholesterol, when present in its inflammatory condition. There is a difference in the lipid trend in RA patient then the general population. Rheumatoid arthritis is a disease with lipid paradox. A high inflammatory burden determined by the mean values of ESR and CRP in active disease is associated with low lipid levels but more risk of CV events.

Keywords: LDL, HTL, ESR, CRP, RA.

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Introduction

Rheumatoid arthritis (RA) primarily affect the synovium and is a chronic inflammation disease, which leads to joint damage and bone destruction.[1] Causes of significant morbidity are due to result of synovial inflammation, joint destruction and associated disability.[2] Several Epidemiological data have shown an enhancement in premature demises in patients of RA then the general population. RA, a chronic inflammatory disease of, etiology being unknown RA is noticeable by a symmetric, peripheral polyarthritis. Most hackneyed form of long standing inflammatory arthritis is RA and every so often results in joint damage causing physical disability. Other than articular manifestation, it can lead to fatigue, subcutaneous nodules, lung involvement, pericarditis, peripheral neuropathy, vasculitis, and hematologic abnormalities.[3-7] Its occurrence is around 1 percent, and has a female predisposition twice more than that in men.[8-10]

RA is gentle in onset over weeks to months in 55% to 65% of cases.[11] The preliminary symptoms probably systemic or articular. Other symptoms include fatigue, malaise, swollen hands, and diffuse musculoskeletal pain which can be the prime nonspecific complaints, joints are involved later in the disease s it progresses. A focused attention is required in periarticular structure if the tendon sheath are involved early in the process. Initial presentations are asymmetric and it is common than the symmetric presentation. Symmetric presentation is seen in late stage of disease. The cause of symmetry is still unknown. 8% to 15 percent of the patient can have an acute presentation of disease with peak within a few days. Before making a diagnosis of acute onset of RA, sepsis and vasculitis should be rule out. One prominent sign of sepsis is fever. If the symptoms develop over days to week, a diagnosis of intermediate type of onset can be made, occurring in 15 -20 percent of patient. In intermediate type onset systemic complaint are more noticeable than in

insidious.[12] Patients with a typical initiation of gradual discomfort, morning stiffness and symmetric inflammation of tiny joints are just one of the trends with no visible symptoms of swelling or proof of joint degradation on radiological investigation.

Acute onset found in one third patients and characterized by fatigue, weightloss, myalgias, malaise and morning stiffness and joint pain without any inflammation and radiological sign of joint erosion.

Traditionally RA affect the small joint of hands, wrist and feet. Sparing interphalangeal joints. Waiting for symmetry to initiate the therapy is not advisable as it occur late in the disease process. 30 – 40 percent patients present with bilateral arthropathy of the shoulder and wrist.

Patient presenting with the involvement of knee is less than 5 %. RA can involve any joint but hands, wrist, elbow, shoulder and knee are involved most commonly followed by hip joint and temporomandibular joint. It also affects the clavicular and cricoarytenoid joint.

Among the known complication of RA atlantoaxial subluxation is a dreaded one and the patient may present with, pain radiating toward the occiput, spastic quadriparesis or sensory finding. These patient belong to high risk of progression and immediate surgical stabilization is required in patients with evidence of cord compression.

Tenosynovitis /bursitis can also be presenting feature. Which can cause "trigger" finger. "Swan neck" and "boutonniere" deformity is the classical deformity but appear late in disease and are hallmark features of chronic illness.

In the initial presentation sign of synovitis and joint damage are usually subtle. There is no evidence of stress either physical or physiological being a risk factor to trigger for a disease. Following cardiac disease, it is the second most common cause of death. Most specifically, patients with RA are more vulnerable to septic arthritis, frequently worsened by the use of immunosuppressive drugs, including steroids. The normal symptoms of sepsis may be missing in such a case, preventing the diagnosis. Felty's syndrome

In this there is splenomegaly and neutropenia are linked with seropositive RA. Often common hepatomegaly and lymphadenopathy in RA. There is increasing evidence that people with RA, irrespective of typical risk factors, are suffering from elevated cardiovascular disease. Many pieces of evidence suggest that proatherogenic disease associated with increased cardiovascular (CV) mortality is rheumatoid arthritis (RA).[13,14] In addition to genetic and conventional CV risk factors, chronic inflammation has emerged as a key component of this process.[15,16]

CRP, which is offered by the hepatocytes cell of liver under the impact of IL6 and TNF that's why taken as indirect indicator of inflammation. This marker is allied with plaque building in vessel. Which further surmount the danger of cardiovascular phenomena.[17-19] This is also seen in various cohort study that cardiovascular concerned demises shown a preferment in CRP among RA cases who have ongoing active inflammation that's why CRP can be self-sufficient pointer for cardiovascular disease 28 In general population danger of atherosclerosis surmount with increment in LDL and wane of HDL, but in RA population there is wear off in

HDL LDL and total cholesterol, when present in its inflammatory condition.[20,21] After giving treatment in these patient there is Surmount in total cholesterol HDL LDL and the interesting thing is that this surmount values are not related with danger of cardiovascular event.[21,22]

Inflammation is believed to play an important role in the progression of atherosclerosis, and it may be clarified by the systemic inflammatory response in RA. Data suggest that coronary mortality rises in early or advanced disease patients and is worse in women, a group that is generally at lower risk. Standardized cardiovascular disease death rates for people are about 1.3 and 1.9 for females.

Aim and objective: To study the lipid profile in patients of established rheumatoid arthritis. To study the association of lipid profile with inflammatory markers: "ESR (Erythrocyte sedimentation rate) and CRP (C eactive protein)."

Subjects and Methods

Study place
- The study will be conducted in the Teerthanker Mahaveer Medical College & Research Centre, Moradabad (Uttar Pradesh). Data taken from the patients attending both OPD and IPD.

Study Duration
- Study will be done for 12 months. After taking approval from ethical and research committee.

Sample method and sample size
- On the next visit of established rheumatoid arthritis patients in OPD; or IPD, blood samples will be taken and the level of different lipid components, ESR and CRP will be detected.
- All Cases will be selected for prospective study.
- In all instances, the test is latex fixation, check for rheumatoid factor was conducted.
- The blood samples were obtained from RA patients after 12 hours of overnight fasting, regular diet (without any fat restriction) for the previous two weeks, and abstinence from alcohol. Serum was separated from the blood and stored in the fridge. This was then used in analytical studies of lipoprotein.
- With commercially available reagents, the concentration of total cholesterol, HDL-cholesterol, and triglycerides was evaluated enzymatically.
- LDL-cholesterol concentration was calculated using the Fried Ewald equation for participants with triglycerides (< 400 mg / dl) LDL = TC = HDL-c = TGL/5.
- Inflammation marker such as ESR has been measured using Wintrobe's method.
  Selection of Patients is on the basis of following Inclusion & Exclusion Criteria

Inclusion criteria
- Diagnosed Patients of rheumatoid arthritis of either sex above the age of 18 years with disease duration of >6 months.

Exclusion criteria:
- Smokers

- Diabetes mellitus
- Hypothyroidism
- Liver or kidney disease
- Obesity (body mass index >/=25)
- Patients receiving medications affecting lipid metabolism, such as lipid-lowering drugs, beta-blockers, oral contraceptives, estrogen, progestin, thyroxin and vitamin E, will be excluded from the study.

Statistical Analysis

It was carried out for 60 patients of established cases of rheumatoid arthritis. Base line data was collected from patients (after taking consent) age, sex, duration of illness, lipid profile, ESR and CRP were analyzed.

The correlation amid in lipid profile and ESR & CRP with the vindication of Pearson's correlation coefficient method. Statistical significance was taken when p value <0.05. Statistical analysis was carried out using standard formulae. Microsoft excel and SPSS (statistical package for social science) was used for data entry and analysis.
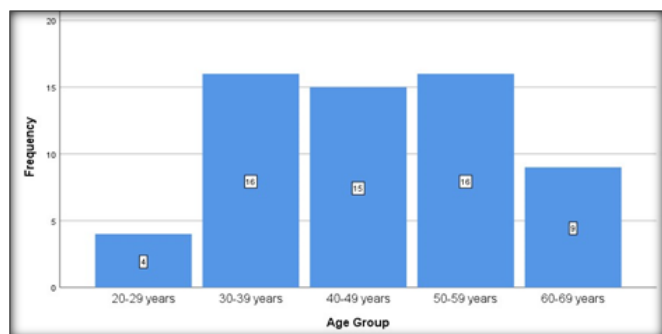
Results

Figure 1: Age distribution of the participants

Table 1: Descriptive statistics of lipid profile parameter Total number of observations n=60

Lipid profile parameter	Minimum	Maximum	Mean	Std. Deviation
Total Cholesterol (mg/dl)	111.0	310.0	196.6	43.7
HDL-C (mg/dl)	26.0	61.0	41.6	7.5
Triglyceride (mg/dl)	70.0	465.0	222.2	96.4
LDL-C (mg/dl)	65.2	182.0	107.8	22.4
VLDL-C (mg/dl)	14.0	93.0	44.4	19.2

Current study has been conducted in Teerthanker Mahaveer hospital, Teerthanker Mahaveer medical college. Data has been collected in duration of 12 months. After obtaining consent, data has been collected from 60 consecutive established case of rheumatoid arthritis.

Almost equal number of participants were belonging to 30-39 years (16, 26.7%), 40-49 years (15, 25.0%), and 50-59 years (16, 26.7%) age groups. Very few participants were belonging to 20-29 years (4, 6.7%) and 60-69 years (9, 15.0%). Range of age was from 25 years to 69 years. [Table 1]

Most of the participants were female (52, 86.7%). Only few (8, 13.3%) were males.

Mean (SD) of Total cholesterol, HDL-C, Triglyceride, LDL-C and VLDL were 196.6(43.7) mg/dl, 41.6(7.5) mg/dl, 222.2 (96.4) mg/dl, 107.8(22.4) mg/dl, and 44.4 (19.2) mg/dl respectively. [Table 2]

Table 2: Descriptive statistics of acute phase reactants

ESR (mm per hour)	8.0	118.0	37.3	27.06174
CRP (mg/dl)	0.4	9.8	1.9650	2.04017

Table 3: Correlation of CRP with Lipid Profile parameters

	CRP	
	Pearson Correlation	P value
Total Cholesterol	-0.326*	0.011
HDL-C	-0.269*	0.037
Triglyceride	-0.307*	0.017
LDL-C	-0.310*	0.016
VLDL-C	-0.307*	0.017

*Statistically significant (p value< 0.05)

Pearson correlation coefficient of CPR with Total cholesterol, HDL-C, Triglyceride, LDL-C and VLDL-C were -0.326, -0.269, -0.307, -0.310 and -0.307 respectively. All the correlation coefficients were statistically significant (<0.05).

Table 4: Correlation of ESR with Lipid Profile parameters

	ESR	
	Pearson Correlation	P value
Total Cholesterol	-0.294*	0.023
HDL-C	-0.311*	0.016
Triglyceride	-0.226	0.082
LDL-C	-0.253	0.051
VLDL-C	-0.226	0.082

*Statistically significant (p value< 0.05)

Correlation coefficient of ESR with Total cholesterol, HDL-C, Triglyceride, LDL-C and VLDLC were -0.294, -0.311, -0.226, -0.253 and -0.226 respectively. Among them correlation coefficient of ESR with total cholesterol (p-value=0.023) and HDL-C (p-value=0.016) were statistically significant (<0.05).

Discussion

RA is systemic inflammatory disease with increased risk of CV diseases. Active RA is a disease with high burden of inflammatory markers and associated with decreased Total cholesterol, LDL-cholesterol and HDL-cholesterol.[21] current study has been conducted in Teerthanker Mahaveer Hospital, Teerthanker Mahaveer medical college. Data has been collected in duration of 12 months. After obtaining consent, data has been collected from 60 consecutive established case of rheumatoid arthritis.

In our study, almost equal number of participants were belong to 30-39 years (16, 26.7%), 40-49 years (15, 25.0%), and 50-59 years (16, 26.7%) age groups. Very few participants were belong to 20-29 years (4, 6.7%) and 60-69 years (9, 15.0%). Range of age was from 25 years to 69

years. Mean age of participants was 47.05 years with standard deviation of 11.7 years. These finding are similar to previous studies conducted by Muzahim F et al,[23] and Wan Heeyoo et al.[24]

In our study, we found that mean (SD) of Total cholesterol, HDL-C, Triglyceride, LDL-C and VLDL were 196.6(43.7) mg/dl, 41.6(7.5) mg/dl, 222.2(96.4) mg/dl, 107.8(22.4) mg/dl, and 44.4(19.2) mg/dlrespectively. Total cholesterol values of our study (mean 196.6, SD 43.7 mg/dl) are in accordance with previous research conducted by Svenson KL et al,[25]Rantapaa-DahlqvistS et al,[26] and Lazarevic MB et al.[27] Mean HDL-C of our study (mean 41.6, SD 7.5 mg/dl) is also similar to studies conducted by Curtis et al,[28]Dursunoglu D et al,[29] and chen et al.[30] Values obtained for Triglyceride (mean 222.2, SD 96.4mg/dl) are in the direction of other studies conducted by Vinapamula K S et al,[31] and Curtis et al.[28] It was also observed that values of LDL-C (mean 107.8, SD 22.4mg/dl) found in our study is in accordance to Dursunoglu D et al,[29] and Curtis et al.[28] Mean VLDL values in our studies were 44.4 mg/dl(with SD 19.2mg/dl).

In this research, Mean (SD) of ESR was 37.3 (SD 27.0) mm in 1st hour, which is in accordance with previous researches conducted by Der yuanchen et al,[30] and Muzahim et al,[23] In our study, Mean (SD) CRP was 1.9 (SD 2.0) mg/dl. The inflammatory markers (CRP/ESR) are high in active disease and low in inactive disease. In current study, Mean Total cholesterol, LDL–cholesterol and Triglycerides were found to be increased, but HDL-cholesterol was decreased.

In this research, Pearson correlation coefficient of CPR with Total cholesterol, HDL-C, Triglyceride, LDL-C and VLDL-C were -0.326, -0.269, -0.307, -0.310 and -0.307 respectively. All the correlation coefficients were statistically significant (<0.05). Similar observations (Negatively correlated CPR and Lipid profile parameters) were also noted by Douglas et al,[32] Robertson J et al,[21] Athanasios et al,[33] and Hyon K Choi et al.[34]

In current study, Correlation coefficient of ESR with Total cholesterol, HDL-C, Triglyceride, LDL-C and VLDL-C were -0.294, -0.311, -0.226, -0.253 and -0.226 respectively. Among them correlation coefficient of ESR with total cholesterol (p-value=0.023) and HDL-C (pvalue=0.016) were statistically significant (<0.05). These findings are in accordance with studies conducted by Douglas et al,[32] and Athanasios et al.[33]

In general population danger of atherosclerosis surmount with increment in LDL and wane of HDL but in RA population there is wear off in HDL LDL and total cholesterol, when present in its inflammatory condition. There is a difference in the lipid trend in RA patient then the general population. Rheumatoid arthritis is a disease with lipid paradox. A high inflammatory burden determined by the mean values of ESR and CRP in active disease is associated with low lipid levels but more risk of CV events. There is oxidative modification in LDL morphology and along with this decrement in the apolipoprotein A1 values. Paraoxnase- one is an enzyme with antioxidant anti-inflammatory and antiatherogenic activity, there is reduction in this activity of paraoxnase led atheroma formation.

Conclusion

A better grip on the activity of RA lesser chances of cardiovascular event in these patients. Use of statin in RA is considerable in atherosclerotic cardiovascular disease. Norwegian researcher sem at al tell from his perusal tell that statin lead to wane in lipid value and 20% decrement in the total cardiovascular risk in active disease with respect to inactive RA. Rollefstad et al also value the use of statin. Mc Carey et al appraise statin (atorvastatin) role in disease activity through this he rooted moderate decrease in disease activity and reformation in lipid. So regardless of lipid value statin have to be considered in RA.

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