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Original Article

THE CORRELATION BETWEEN FRAMINGHAM RISK SCORE AND THE CLINICAL AND BIOCHEMICAL PARAMETERS THAT MEASURE FUNCTIONAL DISABILITY AND DISEASE ACTIVITY IN IRAQI PATIENTS WITH RHEUMATOID ARTHRITIS

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ABSTRACT

Objective: Rheumatoid arthritis (RA) patients have increased morbidity and mortality from premature cardiovascular (CV) disease (CVD). Framingham risk score (FRS) is a simplified coronary prediction tool developed to enable clinicians to assess the risk of a cardiovascular event and to identify candidate patients for risk factors modifications worldwide. The predictive ability of the FRS varies between populations, ethnic groups, and socio-economic status. The aim of this study is to find if there is any correlation between the Framingham risk score and the inflammatory and biochemical parameters used to measure disease activity and functional ability in Iraqi patients with active RA.

Methods: A cross-sectional study was conducted in the rheumatology outpatient unit of Baghdad Teaching Hospital, from September 2012 to April 2013. A total of 140 patients (40 males and 100 females) with active RA were involved in this study. Disease activity was measured by disease activity score of 28 joints (DAS28) and the simplified disease activity index (SDAI); whereas functional status of the patients were measured using The patient reported outcomes measurement information System (PROMIS HAQ) score. The FRS was calculated using a computerized formula from the web. Then the correlation between FRS with clinical parameters (DAS28, SDAI and PROMIS HAQ), plus the biochemical parameter (hsCRP, TNF and ESR) was determined.

Result: There was a significant positive correlation between FRS and both of (DAS28 and SDAI). Additionally FRS was significantly correlated with each of (TNF, ESR and hsCRP).

Conclusion: We found a significant correlation between FRS and the two most important methods used to measure disease activity (DAS28 and SDAI) but to obtain more significant result with other clinical parameter, long-term prospective studies with a larger sample size are needed.

Keyword: Rheumatoid arthritis (RA), Framingham risk score (FRS)

INTRODUCTION

Rheumatoid arthritis (RA) patients have increased morbidity and mortality from premature cardiovascular (CV) disease (CVD) [1].

Immune dysregulation and systemic inflammation are believed to be integral to the development of accelerated atherogenesis in RA [2], and there are many parallels between the pathological and the immunological processes that occur in the synovium and the atheromatous lesions in the vessel walls [3].

Many RA severity markers such as autoantibody production (RF, anti-citrullinated peptide antibodies), markers of systemic inflammation (ESR, CRP, TNF, IL-6), number of inflamed joint, early functional decline and the presence of extra-articular features have all been reported to be strongly associated with adverse CV outcomes in RA [4,5].

Large longitudinal cohort studies performed in the 20th century have discovered which factors are most adequately predict the risk for CV disease in the general population resulting in several CV risk estimation models, such as the Framingham Risk Score (FRS), the Reynolds Risk Score (RRS) and the Systematic Coronary Risk Evaluation (SCORE)[6,7].

The FRS is a simplified coronary prediction tool developed to enable clinicians to assess the risk of a cardiovascular event and to identify candidate patients for risk factor modifications worldwide [8].

The predictive ability of the FRS varies between populations, ethnic groups, and socio-economic status [9].

The aim of this study is to find if there was any correlation between the Framingham risk score and the inflammatory, clinical and biochemical parameters used to measure disease activity and functional ability in Iraqi patients with active RA.

MATERIALS AND METHODS

Study DESIGN

A cross-sectional study was conducted in the rheumatology outpatient unit of Baghdad Teaching Hospital, from September 2012 to April 2013. A total of 140 patients (40 males and 100 females) with active RA were involved in this study. Patients were diagnosed to have active RA by a rheumatologist. Ethical approval for research was obtained from the Ethics Committee of Baghdad University, College of Medicine, and Department of Medicine. Patients with diseases other than rheumatoid arthritis were excluded from participating in this study.

Clinical and Laboratory Evaluation

Disease activity was measured by disease activity score of 28 joints (DAS28) and the simplified disease activity index (SDAI) [10, 11]. The patients were clinically examined and swelling joints count (SJC) (0-28) and tender joints count (TJC) (0-28) were noted.

The 28 joints included are bilateral knees, shoulders, elbows, wrists, metatarsophalangeal and proximal interphalangeal joints. The patients were asked to mark on the visual analogue scale (VAS) of 0-10 cm according to their global assessment of pain. Erythrocytes sedimentation rate was measured by Westergren method [12], whereas high sensitive CRP and TNF are measured using enzyme linked immunosorbant assay ELISA technique [13, 14].

Framingham risk score (FRS) was calculated using a computerized formula from the web: http: //www. http: //cvdrisk. nhlbi. nih. gov/.

It includes: age, gender, systolic blood pressure, smoking, total cholesterol (TC), high density lipoprotein (HDL) and whether or not the patient used antihypertensive drugs [15].

Systolic blood pressure was measured using a blood pressure monitor. TC and HDL were measured by colorimetric method using spectrophotometer [16, 17]. Other required information was taken directly from the patients.

Disease activity score in 28 joint was calculated using an internet calculator: http: //www. das-score. nl/das28/ DAScalculators/ dasculators. html. The values > 2.6 and ≤ 3.2 were considered as low RA disease activity, values > 3.2 and 5.1 were considered as moderate disease activity and those > 5.1 were considered as high disease activity [18]; Whereas the SDAI was calculated by a direct summation of the five variables (SJC, TJC, VAS, EGA, and CRP) [11]. Simplified disease activity index value > 3.3 and ≤ 11 was considered as low RA disease activity, value > 11 and ≤ 26 was considered as moderate disease activity and those > 26 were considered as high disease activity [18].

Assessment of functional ability were done by using The patient reported outcomes measurement information system questionnaire (PROMIS HAQ) which is a self-reported instrument comprised of 20 items. Each item is scored from 0 (no difficulty) to 4 (unable to perform), The PROMIS HAQ score is the mean scores of the 20 items. It can be self-administered in five minutes and scored in less than one minute. It has been validated in numerous studies, is sensitive to change, and is widely used in observational studies and clinical trials [19]. Additionally morning stiffness of each patient was calculated according to patient approximate.

Statistical Analysis

All data were statistically analyzed using Statistical Package for the Social Sciences software version 16 (SPSS v.16). Pearson correlation coefficient was used to assess the correlation between continuous variables. All p values used were asymptotic and two sided. Values with $p < 0.05$ were considered significant.

RESULTS

The general demographic data for the 140 participated patients were elucidated in Table (1). While Table (2) showed the correlation between the Framingham risk score with RA disease activity, and other inflammatory and clinical parameters in RA patient.

Table 1: Demographic data of patients

Age (year) (mean±SD)	40.08 ± 10.9
Female/male ratio	100/40
Duration of RA (year) (mean±SD)	10.43 ± 7.09
DAS28 (mean±SD)	5.67 ± 1.04
SDAI (mean±SD)	25.9 ± 9.11
Drug used ETN only number (%)	80 (57.14)
MTX plus ETN number (%)	60 (42.86)

RA=Rheumatoid arthritis; DAS28=Disease activity score of 28 Joints; SDAI= Simplified disease activity index; ETN= Etanercept; MTX= Methotrexate;

Table 2: Correlation of the Framingham risk score with RA disease activity, and other inflammatory and clinical parameters in RA patient.

Parameter	R	P. value
Age	0.296	0.024*
Proms HAQ	0.089	0.464
SJC	0.121	0.364
TJC	0.018	0.367
VAS	0.143	0.316
Mor. stiff	0.091	0.497
DAS28	0.262	0.049*
SDAI	0.303	0.025*
ESR	0.294	0.025*
CRP	0.314	0.016*
TNF	0.269	0.041*
Disease duration	0.082	0.541

SJC= Swollen joint count; TJC=Tender joint count; VAS=Visual analogue scale; SDAI=Simplified disease activity index; DAS28=disease activity score of 28 joints; ESR=Erythrocyte sedimentation rate; CRP= C– reactive protein. (*) Correlation is significant at the 0.05 level (2-tailed).

There is a significant positive correlation between the Framingham risk score and the inflammatory markers (ESR, TNF and CRP). Additionally FRS was significantly correlated with disease activity score DAS28, disease activity score SDAI and age. While other clinical markers and parameters (Proms HAQ, SJC, TJC, VAS, Mor. Stiff and disease duration) showed anon significant correlation with FRS.

DISCUSSION

This is the first study that try to collect the inflammatory, clinical and biochemical parameters; which are not included together in a single research before and to determine their relation to the risk of cardiovascular disease represented by (the Framingham risk score) in Iraqi patients, which may differ from other populations in epidemiological, socio economic and socio medical characteristic.

This study showed a significant positive correlation between FRS and patient's age plus many parameters that used to measure the functional disability and disease activity in Iraqi patients with RA like (DAS28, SDAI, ESR, CRP and TNF).

This significant correlation between FRS and the age of the patients could be expected since it was demonstrated that the patients with RA with increasing age had a higher risk for CVDs, such as cardiovascular death, ischemic heart diseases, and heart failure [20]

This study showed a significant correlation between FRS and disease activity scores (DAS28 and SDAI) which differ from another study made by Mustafa G-LER [21] that showed a statistically non significant correlation with DAS28. This difference can be explained since the two studies are differing in epidemiological and socio-economic status of patients.

High sensitive C reactive protein is a sensitive acute-phase protein that directly induces atherogenesis by disturbing endothelial function. In epidemiological studies, elevated levels of hsCRP are associated with an increased risk for CVD [22].

This study showed that FRS was significantly correlated with hsCRP and that consist with many other studies [23-25]

Framingham risk score showed a significant correlation with TNF and ESR; (the two inflammatory parameter which have been shown to be associated with CVD in patients with RA and in the general population) [26-28]; and that consist with many other studies [26-28].

Although patients with longer RA disease duration would be subjected to higher CV risk [29]; and a good correlation could be expected between FRS and RA disease duration but this study showed a non-significant correlation between FRS and disease duration and that can be attributed to the small sample size of this study.

The non-significant correlation with other inflammatory clinical parameters like (PROMIS HAQ, SJC, TJC, morning stiffness) can be attributed to different reasons like small sample size and presence of other factors which not incorporated into FRS CV risk assessment tools which may affect cardiovascular risk other than inflammation; like the loss of function and muscle mass that commonly occurs after diagnosis of RA.

Furthermore, therapies used to treat RA, such as corticosteroids, disease modifying anti-rheumatic medications and biologic response modifiers may have the disparate impact on CVD risk [30].

CONCLUSION

we found a significant correlation between FRS and the two most important methods used to measure disease activity (DAS28 and SDAI) but to obtain more significant result with other clinical parameter or PROMIS-HAQ, long-term prospective studies with a larger sample size are needed.

CONFLICT OF INTERESTS

Declared None

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