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

KHALID A AMEER, SAMER I MOHAMMED
Clinical Pharmacy Department - College of pharmacy - Baghdad University.
Email: samerpharma70@gmail.com

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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 factor 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].


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/
das28-calculator. 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 [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
cchange, 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 ENTY only number (%) | 80 (57.14) |
| MTX plus ENTY number (%) | 60 (42.86) |

RA=Rheumatoid arthritis; DAS28=Disease activity score of 28 Joints;
SDAI= Simplified disease activity index; ENTY= 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 |

**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 arterogenesis 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

REFERENCES