

RED CELL DISTRIBUTION WIDTH, C- REACTIVE PROTEIN AND ESR IN MYOCARDIAL INFARCTION PATIENTS

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Received 25 November 2014; Accepted 06 December 2014

ABSTRACT

Background: Myocardial Infarction is the cause of morbidity and mortality in Sudan. This study described altered Red Cell Distribution Width –SD (RDW-SD), Red Cell Distribution Width –CV (RDW-CV), C-reactive protein (CRP) and Erythrocyte sedimentation rate (ESR) in patients with Myocardial Infarction compared with other heart diseases and healthy control.

Methods: Red Cell Distribution Width –SD (RDW-SD), Red Cell Distribution Width –CV (RDW-CV) , C-reactive protein (CRP) and Erythrocyte sedimentation rate (ESR) in (30) patients with Myocardial Infarction, (30) patients with heart diseases other than MI and (30) persons were determined as healthy control. Test significance was done to the three groups.

Result: The results of this study showed high level of ESR, CRP, RDW-SD and RDW-CV in patients with MI when compared with healthy group with t.test (P.V: 0.000)

Patients with other heart diseases also showed high ESR, CRP, RDW-SD and RDW-CV when compared with healthy group with t.test (P.V:0.000).But when comparison was done b/w MI and other heart diseases ,results showed MI has more effect on those tests than other heart diseases. But RDW-CV was not significantly different b/w the two groups (P.V:0.133) (Significant less than 0.05 or = 0.05)

Conclusion: Myocardial infarction is associated with increase in RDW-SD, RDW-CV, CRP and ESR. And may be used as probable indicators for Myocardial Infarction.

INTRODUCTION:

Myocardial infarction (MI) or acute myocardial infarction (AMI)

Is the medical term for an event commonly known as a heart attack? An MI occurs when blood stops flowing properly to a part of the heart, and the heart muscle is injured because it is not receiving enough oxygen. Usually this is because one of the coronary arteries that supplies blood to the heart develops a blockage due to an unstable buildup of white blood cells, cholesterol and fat. The event is called "acute" if it is sudden and serious.

A person having an acute MI usually has sudden chest pain that is felt behind the sternum and sometimes travels to the left arm or the left side of the neck. Additionally, the person may have shortness of breath, sweating, nausea, vomiting, abnormal heartbeats, and anxiety. Women experience fewer of these symptoms

than men, but usually have shortness of breath, weakness, a feeling of indigestion, and fatigue.[1] In many cases, in some estimates as high as 64%, the person does not have chest pain or other symptoms.[2] These are called "silent" myocardial infarctions.

Important risk factors are previous cardiovascular disease, old age, tobacco smoking, high blood levels of certain lipids (low-density lipoprotein cholesterol, triglycerides) and low levels of high density lipoprotein (HDL) cholesterol, diabetes, high blood pressure, lack of physical activity, obesity, chronic kidney disease, excessive alcohol consumption, and the use of cocaine and amphetamines.[3][4] The main way to determine if a person has had a myocardial infarction are electrocardiograms (ECGs) that trace the electrical signals in the heart and testing the blood for substances associated with damage to the heart muscle. Common

blood tests are troponin and creatine kinase (CK-MB). ECG testing is used to differentiate between two types of myocardial infarctions based on the shape of the tracing. An ST section of the tracing higher than the baseline is called an ST elevation MI (STEMI) which usually requires more aggressive treatment. [5]

MATERIALS AND METHODS:

This was a cross-sectional restrictive Study about RDW, CRP and ESR in Myocardial Infarction patients (new cases) in Alshab teaching hospital.

90 blood samples collected as 30 samples of myocardial infarction patients, 30 samples of heart disease patients other than myocardial infarction and 30 healthy persons as control group and data collected by using questionnaire.

5ml of venous blood collected 2.5ml in EDTA anticoagulant container and gently mix to measure RDW and ESR. And another 2.5ml in plain container and centrifuge at 1300 rpm for 3min to obtain serum. To measure CRP.

Individual of both sexes with myocardial infarction (new cases, not receiving treatment), diagnosed by Echo, cardiac enzymes or ECG included in this study. And any heart disease other than myocardial infarction included in this study.

Anemic patients, renal failure, cancer and other inflammatory infections or MI on treatment and any factor affect on ESR result excluded from this study. And I told individuals Selected to this study before took their samples with all detailed objectives of this study and health emphasis in the future.

Collected data are recorded in a master sheet and analyzed by using SPSS.

METHODS:

RDW test was analyzed by automated method used Sysmex

CRP test analyzed by Immuno Gassy for Quantitative measurement of High-sensitivity C-Reactive protein (hsCRP) in Human whole blood with i-CHROMA TM Reader system.

Principle: i-CHROMA TM hsCRP is based on fluorescence immunoassay technology. Uses a sandwich immunodetection method, such that by mixing detector buffer with blood specimen in test vial, the fluorescence – labeled detector anti-CRP antibody in buffer binds to CRP antigen in blood specimen.

As the sample mixture is loaded onto the sample well of the test device and migrates the nitrocellulose matrix of test strip by capillary action, the complexes of detector antibody and CRP are captured to anti-CRP sandwich pair

antibody that has been immobilized on test strip. Thus the more CRP antigen is in blood specimen, the more complexes are accumulated on test strip. Signal intensity of fluorescence of detector antibody reflects amount of CRP captured and is micro processed from: i-CHROMA TM Reader to show CRP concentration in blood specimen. The default result unit of i-CHROMA TM hsCRP is displayed as an mg/L from i-CHROMA TM Reader. The working range and the detection limit of i-CHROMA TM hsCRP system are 0.1 – 10 mg/L. And 0.1 mg/L, respectively.

RESULTS:

In the present study, the analysis of the ESR, CRP, RDW-SD and RDW-CV in (30) patients with Myocardial Infarction, (30) patients with Heart diseases other than MI and (30) healthy persons. In Alshab teaching hospital. The mean of ESR of MI was (43.17) and Std Deviation was (20.632) and the mean of control was (5.43), Std Deviation was (1.040). When compared with t.test showed (P.V:0.000) table (1). And the mean of CRP of MI was (10.823) and Std Deviation was (1.4710) and the mean of control was (0.160), Std Deviation was (0.0814). When compared with t.test showed (P.V:0.000) table (2).

The mean of RDW-SD of MI was (47.500) and Std Deviation was (4.8045) and the mean of control was (39.607), Std Deviation was (1.4680). When compared with t.test showed (P.V: 0.000) table (3). And the mean of RDW-CV of MI was (15.053) and Std Deviation was (1.9571) and the mean of control was (13.040), Std Deviation was (.5123). When compared with t.test showed (P.V: 0.000) table (4).

Also showed the mean of ESR of HD was (32.63) and Std Deviation was (14.998) when compared with control with t.test showed (P.V: 0.000) table (1). And the mean of CRP of HD was (3.747) and Std Deviation was (0.9446) when compared with control with t.test showed (P.V:0 .000) table (2).

The mean of RDW-SD of HD was (43.047) and Std Deviation was (6.0884) when compared with control with t.test showed (P.V:0.007) table (3). and the mean of RDW-CV of HD was (14.030) and Std Deviation was (2.6351) when compared with control with t.test showed (P.V: 0.052) table (4) .

When mean of ESR of MI with HD were compared with t.test, was (P.V:0.054). While was (P.V:0.000) when mean of CRP of MI with HD were compared.

When compared b\w the mean of RDW-SD of MI with HD using t.test, P.V was 0.007. And when t.test of the mean of RDW-CV of MI with HD was (P.V:0.133).

Table 1: Association of ESR with MI and control and HD:

	Number	Mean	Std Deviation
ESR Control	30	5.43	1.040
ESR MI	30	43.17	20.632
ESR HD	30	32.63	14.998

Table 2: Association of CRP with control, MI and control and HD:

	Number	Mean	Std Deviation
CRP Control	30	.160	.0814
CRP MI	30	10.823	1.4710
CRP HD	30	3.747	.9446

Table 3: Association of RDW-SD with MI, control and HD

	Number	Mean	Std Deviation
RDW-SDControl	30	39.607	1.4680
RDW-SD MI	30	47.500	4.8045
RDW-SD HD	30	43.047	6.0884

Table 4: Association of RDW-CV with MI, control and HD:

	Number	Mean	Std Deviation
RDW-CVControl	30	13.040	.5123
RDW-CV MI	30	15.053	1.9571
RDW-CV HD	30	14.030	2.6351

DISCUSSION:

The findings of this study suggest a possible correlation b/w increased level of CRP, RDW-SD, RDW-CV and ESR and Myocardial Infarction when compared with healthy group with t.test showing high significant variation. Figure s (1) and (2).

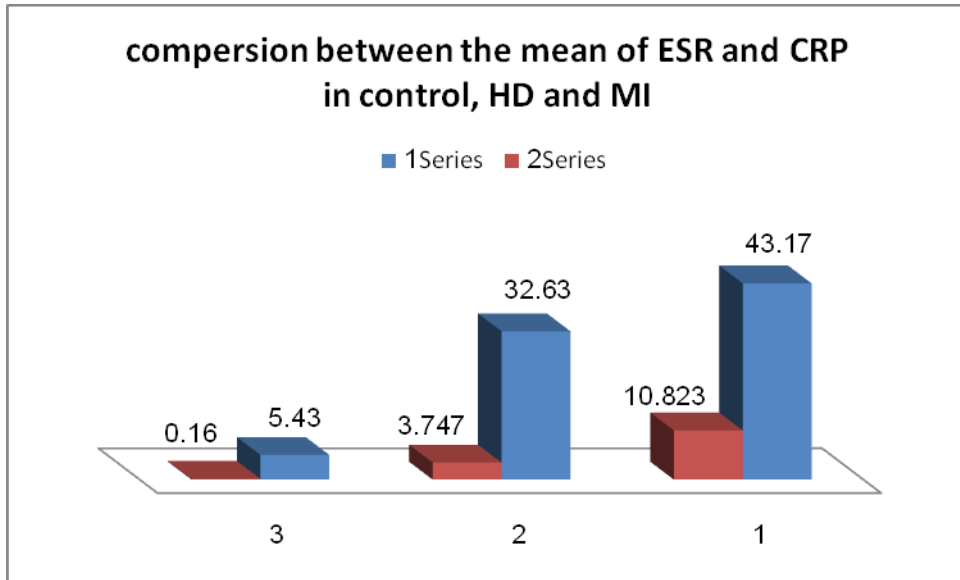
Patients with other heart diseases also showed high ESR, CRP, RDW-SD and RDW-CV when compared with healthy group with t.test showed high significant variation .but when comparison was done b/w MI and other heart diseases, results showed MI may have more effect on those tests than other heart diseases. But RDW-CV was not significantly different b/w the two groups.

Erikssen et al, previously reported that the Erythrocyte sedimentation rate may be a good indicator for coronary heart disease, mortality, and the risk of death from coronary heart disease [6]. My result finding is agreed with them.

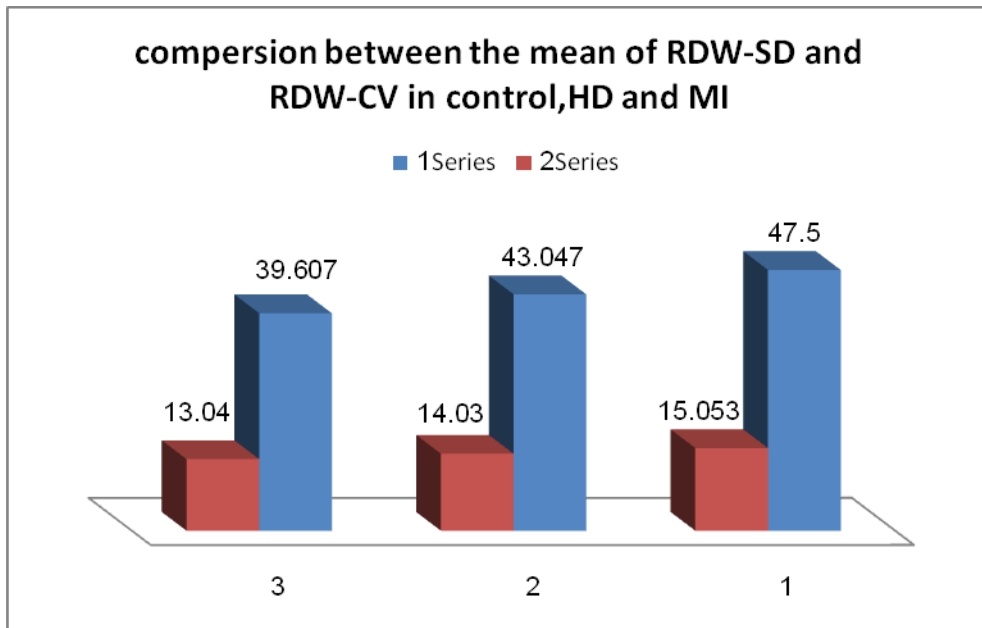
Gillum et al described that an increased erythrocyte sedimentation rate is a risk factor for coronary heart disease [7]. This relationship between the erythrocyte sedimentation rate and the risk of coronary heart disease was also observed in this study.

Also F.Mach f et al, previously reported that C-reactive protein levels measured at the time of admission in patients with suspected ischemic heart disease could be a marker for acute coronary syndromes, and helpful in identifying patients at high risk for acute myocardial infarction [8] . My result finding is agreed with them.

Ma FL et al previously reported that RDW is associated with both presence of coronary artery diseases and the severity of coronary stenosis , suggesting that it might be a readily available marker for the prediction of coronary artery diseases and it is severity [9]. This relationship between the RDW and coronary artery diseases was also observed in this study.



Series1 mean of ESR
 Series 2 mean of CRP
 (1) Mean of MI
 (2) Mean of HD
 (3) Mean of control



Series1 mean of RDW-SD
 Series 2 mean of RDW-CV
 (1) Mean of MI
 (2) Mean of HD
 (3) Mean of control

CONCLUSION:

This study showed that RDW-SD, RDW-CV, CRP and ESR were increased in Myocardial Infarction patients. Larger sample size should be reevaluated for and hence could be

used during diagnosis and follow up. such as study AS, IHD, is major health problem in Sudan.

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