

Original article:

Correlation of red cell distribution width and severity of acute coronary syndrome

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Abstract:

Introduction: Cardiovascular diseases consist of pathologies which involve the blood vessels and the heart. Disease that involve the blood vessels are exemplified by conditions like arteritis, thrombosis, atherosclerosis and arteriosclerosis.

Study methodology: It was Prospective cross sectional study carried out at Dr. D.Y. Patil College and Hospital and Research Center, Pimpri, Pune for 2 years duration. Study was approved by the IEC of university. All male and female patients who have evidence of myocardial ischemia based on lab investigations and/or echocardiographic evidence and are taken up for angiographic evaluation were included in the study.

Results: The correlation coefficient between Gensini score and RDW was $r = 0.719$ which suggests a strong correlation. The correlation coefficient between Gensini score and HDL-C was $r = -0.514$ which shows moderate inverse correlation.

Conclusion: We found a strong positive correlation between RDW and the Gensini score ($r = 0.719$) and a moderate inverse correlation between HDL-C and Gensini score ($r = -0.514$).

Keywords: Cardiovascular diseases , Gensini score

Introduction:

Cardiovascular diseases consist of pathologies which involve the blood vessels and the heart. Disease that involve the blood vessels are exemplified by conditions like arteritis, thrombosis, atherosclerosis and arteriosclerosis. The coronary artery disease (CAD) falls in this category. The cardiovascular diseases which directly affect the heart include, but are not limited to myocarditis, cardiomyopathy and myocardial ischemia or infarction. Coronary heart disease (CHD) falls among these conditions. These terms are often used interchangeably but in reality they represent a cause and effect phenomenon. Coronary artery diseases lead to coronary heart disease. Acute coronary syndrome falls under the list of the various coronary artery diseases. [1]

It has always been our purpose to try and prevent illness before the happened. Prevention is better than cure as it were. Now in our fight against coronary artery diseases, we have in our arsenal, weapons to treat the illness, ways to prevent recurrence (secondary prevention) and some broad lifestyle changes that may reduce the risk factors. What we are lacking is a sure fire way to predict the occurrence of ACS. It is the purpose of this study to understand red cell distribution width and its role in acute coronary syndrome and its ability to predict the severity of ACS.(2)

Materials and methodology :

It was Prospective cross sectional study carried out at Dr. D.Y. Patil College and Hospital and Research Center, Pimpri, Pune for 2 years duration. Study was approved by the IEC of university.

Sample Size:

- 100 patients who present with acute coronary syndrome

- Sample size was decided based on the prevalence and calculated using the WinPepi software assuming an error of 10% with a 95% confidence interval.

Sources of Samples:

- Cases will be drawn from the patients who present to the emergency department or out patient department of medicine of Dr. D.Y. Patil College and Hospital and Research Center, Pimpri, Pune.

Inclusion criteria

- All male and female patients who have evidence of myocardial ischemia based on lab investigations and/or echocardiographic evidence and are taken up for angiographic evaluation.

Exclusion criteria

- Coexisting liver disease
- Coexisting renal disease
- Active infection or sepsis
- Patients with anemia

Results:

In our study , most of the subjects were above the age of 50yrs. Maximum (28) were falling in age group of 61-70yrs, followed by 51-60yrs (25) and very few (5) were below age of 40yrs. Mean age for study subjects was 62.07 ± 13.92 yrs and range of 22-92yrs.

Maximum were male subjects. The Male:Female ratio was 2.22:1

Many patients in the study had comorbidities. The most common comorbidity found was hypertension in 25 of the patients studied. Diabetes mellitus was found in 18 of the patients studied. 18 of the patients had both hypertension and diabetes.

There was 70% were having raised RDW with reference to gender cut off values

Table 1 Relationship between alcohol consumption and RDW

Alcoholic	RDW		Total	p value
	Raised	Normal		
Yes	21 (53.8%)	18(46.2%)	39	0.007
No	49(80.3%)	12(19.8%)	61	
Total	70	30	100	

Table 1 show relation of alcohol with RDW among study subjects. Among alcoholics 53.8% were having raised RDW. This relation of alcohol with RDW showed alcoholics have high proportion of Low HDL and this was statistically significant ($p < 0.05$).

Table 2 Relationship between smoking and RDW levels

Smoking	RDW		Total	p value
	Raised	Normal		
Yes	26(74.3%)	9(25.7%)	35	0.648
No	44(67.7%)	21(32.3%)	65	
Total	70	30	100	

Table 2 shows the relationship between smoking and RDW levels amongst study subjects. Among smokers 74.3% had raised RDW levels. This showed that smokers had a higher proportion of patients with elevated RDW levels. However this data did not demonstrate statistical significance. ($p>0.05$).

Table 5 Correlation between HDL-C, RDW and Gensini Score

Variables		Spearman correlation (r) value	P Value
Co-relation with RDW	HDL-C	-0.514	0.001
	GENSINI SCORE	0.719	0.001

Table shows correlation co-efficient (r) RDW and Gensini score with each other. There was strong inverse correlation ($r=-0.715$) between RDW and HDL-C, Strong correlation between RDW and Gensini score ($r=0.719$) and moderate inverse correlation between HDL-C and Gensini score ($r=-0.514$), correlation observed among all three variables was statistically significant ($p<0.05$).

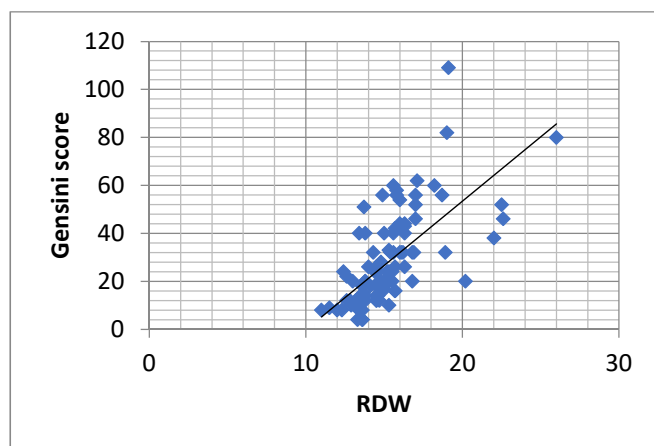


Figure 2 Scatter plot showing correlation between RDW and Gensini score

Discussion

Our study was a cross sectional observational study done at a tertiary care center. The sample collection for this study was underway from 2018-2020 and included 100 participants who presented to the with anginal chest pain and fit into the diagnosis of acute coronary syndrome and underwent an angiogram. A surprising finding in our study was the fact that 35% of the patients who had acute coronary syndrome had no comorbidities at all. This gives credibility to the idea

that the presence of diabetes mellitus or hypertension are not the only factors which predispose patients to develop heart disease. In our study 35% had a history of smoking. E Avci et al had 20.5% of the patients in their study with a significant history of smoking. We found that among the patients in our study who had a history of smoking, 75% of them had elevated RDW levels. Parmar et al. also found a significant correlation between smokers and elevated RDW levels. They found that patients who had a history of smoking had a much higher RDW level.

In our study, we found a correlation that was statistically significant between the Gensini score and RDW. The correlation coefficient between Gensini score and RDW was $r = 0.719$ which suggests a strong correlation. E Avci et al. also showed a direct correlation between the Gensini score and the RDW levels and an inverse correlation between the HDL-C levels and the Gensini score. However, in their study they found a mild inverse correlation between the Gensini score and HDL-C levels with a correlation coefficient of $r = -0.193$. They also did not find any statistical correlation between RDW and the Gensini score.^{5,6,7}

Conclusion

We found a strong positive correlation between RDW and the Gensini score ($r = 0.719$).

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Was informed consent obtained from the subjects involved in the study? YES

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