# CO-RELATION BETWEEN TRIGLYCERIDE/HDL RATIO AND HbA1C LEVELS IN DIABETIC PATIENTS WITH ACUTE CORONARY SYNDROME

**Medicine**

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## KEYWORDS

## INTRODUCTION-

The term acute coronary syndrome (ACS) refers to any group of clinical symptoms compatible with myocardial ischemia and covers the spectrum of clinical condition ranging from unstable angina , non ST segment elevation myocardial infarction ( NSTEMI ) and ST segment elevation MI (STEMI). Unstable angina and NSTEMI are closely related conditions. ACS are triggered by fissuring or rupture of an atheromatous plaque in the coronary arterial wall. [1]

HbA1C is a biomarker reflecting both Fasting and Post Prandial plasma glucose concentration over preceeding 3 months and also it has been registered as an important tool in management of diabetes. [2]

Triglyceride is a well established risk factor for the development of Coronary artery Disease and has been demonstrated in various Clinical and Epidemiological Studies. [3,4]

Low baseline levels of high-density lipoprotein cholesterol (HDL-C) are a key criterion for metabolic syndrome (MetS), which is associated with increased risk for cardiovascular disease (CVD). Epidemiological data show that low HDL-C is inversely and independently predictive of higher incident rates of cardiovascular events in patients without coronary artery disease (CAD).In patients with stable CAD and in those receiving intensive lipid-lowering therapy, lower HDL-C predicted cardiovascular outcomes.It also is frequently observed in patients with acute coronary syndrome (ACS) upon hospital admission and is associated with increased prevalence of cardiovascular risk factors and more extensive CAD burden upon angiography. [5,6]

Relationship between Triglyceride HDL- Cholesterol ratio and severity of CAD in patients of ACS is directly proportional and is a strong indicator for the same. It indicates an atherogenic plaque and a significant risk of development of CAD.

## AIMS AND OBJECTIVES-

1.  To Study Co-relation between Triglyceride/HDL Ratio and HbA1C Levels in patients presenting with Acute Coronary Syndrome.

## MATERIALS AND METHODS-

The Cross-Sectional Study was conducted in the Department of Medicine, SRMS-IMS, Bareilly, from 1/1/2015 to 31/5/2016

Sample Size- Randomly selected 51 diabetic patients presenting with Acute Coronary Syndrome.

## INCLUSION CRITERIA-

1.  Known patients of Diabetes Mellitus on treatment with either Insulin or Oral Drugs or both.
2.  Patients presenting with Acute Coronary Syndrome in Emergency

## EXCLUSION CRITERIA-

1.  Patients already on Hypolipidemic Drugs
2.  Old Case of CAD

3.  Newly Diagnosed Cases of Diabetes Mellitus
4.  Patients of Hypothyroidism, Obstructive Liver Disease, Chronic Kidney Disease, Nephrotic Syndrome
5.  On Drugs – Estrogen, Anabolic Steroids, Corticosteroids, Retinoids, Cyclosporine and ART.

## PROCEDURE-

Approval from the ethical committee was taken. Cross- Sectional Study was carried out in diabetic patients admitted in Cardiology Department with Acute Coronary Syndrome. They were subjected to the following Investigations-

*   ECG
*   Cardiac Troponins
*   HbA1C
*   Fasting Lipid profile

Diagnosis of ACS was made on the basis of ECG, Cardiac Troponins and Clinical Features.

## OBSERVATIONS
### Table No 1 – Age and Sex distribution of subjects

| | | SEX | | | | TOTAL | |
|---|---|---|---|---|---|---|---|
| | | FEMALE | | MALE | | | |
| | | N | % | n | % | N | % |
| Age in Years | <=50 | 1 | 14.3 | 3 | 6.8 | 4 | 7.8 |
| | 51-60 | 2 | 28.6 | 13 | 29.5 | 15 | 29.4 |
| | 61-70 | 2 | 28.6 | 21 | 47.7 | 23 | 45.1 |
| | 71+ | 2 | 28.6 | 7 | 15.9 | 9 | 17.6 |
| Total | | 7 | 100 | 44 | 100 | 51 | 100 |

This table shows that this study included 7 females and 44 males. Out of 7 females, patients of ACS two female each were present in age group of 51-60, 61-70 and 71+ respectively while only one female had age below 50 years.

Among 44 males, maximum(21) were found in 61-70 years age group while age group of less than 50, 51-60 and 71+, contained 3,13 and 7 patients respectively.

### Table No 2- Distribution of subjects according to distribution of diabetes

| | | SEX | | | | TOTAL | |
|---|---|---|---|---|---|---|---|
| | | Female | | Male | | | |
| | | N | % | n | % | N | % |
| DM Duration | <=5.0 | 1 | 14.3 | 9 | 20.5 | 10 | 19.6 |
| | 5.1-10.0 | 3 | 42.9 | 15 | 34.1 | 18 | 35.3 |
| | 10.1-15.0 | 2 | 28.6 | 13 | 29.5 | 15 | 29.4 |
| | 15.1+ | 1 | 14.3 | 7 | 15.9 | 8 | 15.7 |
| Total | | 7 | 100 | 44 | 100 | 51 | 100 |

This table shows distribution of male and female patients according to duration of diabetes, one female and 9 males were having duration of diabetes less than 5 years. In duration of diabetes 5-10 years, 3 females

and 15 males were there. 2 females and 13 males were having duration of diabetes between 10-15 years. With duration of diabetes more than 15 years 1 female and 7 males were there.

### Table 3- HbA1c and Coronary Vessels Involved

| | | Coronary Vessel Involved | | | | Total | |
|---|---|---|---|---|---|---|---|
| | | Single Vessel | | Multi Vessel | | | |
| | | n | % | N | % | N | % |
| HbA1C | 6.5-8.4 | 31 | 79.5% | 0 | 0 | 31 | 60.8 |
| | 8.5+ | 8 | 20.5% | 12 | 100 | 20 | 39.2 |
| Total | | 39 | 100 | 12 | 100 | 51 | 100 |
| Mean | | 7.67 | | 10.78 | | 8.40 | |
| Std. Deviation | | 0.71 | | 1.44 | | 1.62 | |
| Independent samples Mann-Whitney U-test p-value <0.001 | | | | | | | |

This table shows distribution of patients according to HbA1C(%) in relation with single/multivessel disease. Of the 51 diabetic patients with ACS taken in study 39 patients were found to have single vessel disease, from which 31 had HbA1c below 8.5 i.e between 6.5-8.4 and 8 patients had HbA1c more than 8.5 with mena HbA1C 7.67 +-0.71. 12 patients found to have multivessel disease as found in coronary angiography. All had HbA1C more than 8.5 with mean HbA1C 10.78+-1.44.

### Table 4- Coronary Vessel Involevent in relation with TG/HDL Ratio

| TG-HDL Ratio | CORONARY VESSEL INVOLVEMENT | | | | | |
|---|---|---|---|---|---|---|
| | Single Vessel | | Multi Vessel | | Total | |
| <4.00 | 31 | 79.5% | 3 | 25% | 34 | 66.7% |
| 4.00+ | 8 | 20.5% | 9 | 75% | 17 | 33.3% |
| Total | 39 | 100% | 12 | 100% | 51 | 100% |
| Mean | 3.3 | | 6.3 | | 4.0 | |
| SD | 1.9 | | 4.7 | | 3.0 | |
| Independent samples Mann- Whitney U- test p-value 0.013 | | | | | | |

This table shows distribution of patients according to Tg/HDL Ratio in relation with single/multivessel disease. In patients with single vessel disease 31 patients were found to have Tg/HDL <4 and 8 were having >4 with mean of 3.3+-1.9.

In patients with multivesssel disease 3 patients were having TG/HDL<3 and 9 were having >4 with mean of 6.3+-4.7

Statistically significant co-relation has been found between TG/HDL ration and severity of ACS depicted in form of Single/ Multivessel disease.

### DISCUSSION-
Our study showed significant co-relation between TG/HDL-C ratio and severity of CAD in relation to severity of ACS. This is similar to study "Relationship between TG/HDL-C ratio and severity of CAD in patients with ACS by Amin MR et al[7] in 2014 on 118 patients with newly diagnosed ACS undergone coronary angiography. Patients with previous history of PCI/CABG, on lipid lowering drugs, with congenital heart diseases or valvular heart diseases were excluded. Angiographic severity of CAD was assessed as single/multiple vessel disease. It was found that more than 82% of patients with multivessel disease had high TG/HDL-C ratio ( >4). In the end it was concluded that high TG/HDL-C ratio(>4) is the most powerful predictor of CAD among all lipid variables examined. High TG/HDL-C ratio indicates an atherogenic plaque and significant risk of development of CAD.

Similar kind of results were also obtained in the study " Changes in Triglyceride, HDL Cholesterol and Non HDL Cholesterollevels in patients with ACS" by Peter koncos et al[8] in 2016 on 424 caucasians patients over 50 years of age with well controlled HDL Cholesterol levels with a first or subsequent ACS event and 443 control subjects were age, gender matched and had controlled HDL cholesterol and free of cardiovascular diseases. It was found that patients with ACS had significantly high TG and low HDL and high TG/HDL-C ratio, no significant difference regarding non HDL Cholesterol levels found between the two groups.

In a study examining the associations between CHD risk markers and carotid intima-media thickness (cIMT) progression in subjects at moderate risk of CHD, the ratio of TG to HDL-C independently predicted cIMT progression[9]. Shimizu et al. found that there was a significant positive correlation between diabetes, especially associated with high TG/HDL-C ratio and an evaluated risk of cIMT and arterial stiffness.[10]TG/ HDL-C and HDL-C have been demonstrated by a receiver operating characteristic curve analysis to be a useful marker for the detection of the extent of coronary disease.[11]Gaziano et al. showed that the log TG/HDL-C ratio predicted the risk for myocardial infarction.[12] Even after adjusting for non-lipid risk factor, LDL peak particle size and LDL-C concentrations, log TG/HDL-C ratio was found to be independently predictive of the risk of ischemic heart disease.

Hence we conclude that high TG/HDL-C ratio in diabetic population is a significant marker for ACS.

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