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# FREQUENCY OF SIGNIFICANT THREE VESSEL CORONARY ARTERY DISEASE IN NON ST-SEGMENT ELEVATION MYOCARDIAL INFARCTION HAVING LOW HIGH DENSITY LIPOPROTEIN LEVEL

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All the authors contributed significantly to the research that resulted in the submitted manuscript.

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## ABSTRACT

**Objective:** To calculate the frequency of significant three-vessel coronary artery disease in patients presenting with Non ST- segment elevation myocardial infarction having low high density lipoprotein levels.

**Methodology:** This study was conducted at emergency department, Ch Pervaiz Elahi Institute of Cardiology, Multan from February 2010 to August 2010. One hundred and twenty six patients with non ST-segment elevation myocardial infarction having low HDL level admitted, and scheduled for coronary angiography. Demographic data was noted. The data was analyzed by using software SPSS (Version 14.0).

**Results:** Mean age of pts was 53.25 ± 9 yrs. 79(63%) were male and 47(37%) female patients. The incidence of significant three vessel coronary artery disease in the study population was 27(21.4%). Out of 79 male patients 19(25%) showed significant three vessel disease and in 60 (75%) patients there was no significant disease. Similarly out of 47 female patients 8(17%) showed disease while in 39(83%) it was absent. The occurrence of significant three vessel disease was more in male and in younger age group.

**Conclusion:** It was concluded that lower HDL levels are significant predictor of severity of coronary artery disease and are associated with significant three vessel disease.

**Key Words:** High density lipoproteins, non-ST elevation myocardial infarction, significant three vessel disease.

## INTRODUCTION

The major types of lipids (cholesterol, cholesteryl esters, phospholipids and triglycerides) circulate in plasma by lipoprotein transport system.[1] Lipoproteins are complex macromolecular structures, composed of a core of cholesteryl esters and triglyceride surrounded by phospholipids and special proteins, apolipoproteins. Five major families of lipoproteins are chylomicrons, very low density lipoprotein (VLDL), intermediate density lipoprotein (IDL), low density lipoprotein (LDL) and high density lipoprotein (HDL).

HDL is a modifiable risk factor which promotes reverse cholesterol transport and acts as shuttle among tissue cholesterol, triglyceride-rich lipoprotein and liver.[1] HDL also has anti-inflammatory and antioxidant property.[1-2] There is an inverse relationship between plasma levels of HDL cholesterol and the presence of coronary artery disease (CAD). [1] Patients with low HDL are at increased risk of developing cardiac arrhythmia.[3] Lower HDL levels are also significant predictor of severity of coronary artery disease and multiple-vessel involvement.[4] In one study, 93263 patients with non-ST-segment elevation myocardial infarction (NSTEMI) were analyzed,49039 patients had low HDL level and 30% of these patients showed significant three vessel involvement.[5]

In another study conducted in Pakistan by Salahuddin et al revealed that low HDL is a strong and independent risk factor for the development of atherosclerosis.[6] In patients with IHD, cholesterol levels greater than 160 mg/dl and LDL cholesterol levels greater than 130 mg/dl should be treated with drug therapy along with dietary measures. [7-9] HDL level can be increased by life style modifications (modification in high carbohydrate intake, sedentary life style, obesity, smoking), by avoiding medications (progestational agents, anabolic steroids) and by use of drugs like statins, niacin and fibrates.[10]

Low HDL is equally significant factor in determining the progression of coronary artery disease and may be important in our population where elevated cholesterol (the traditional risk factor for coronary artery disease) is commonly not found. The objective of this study was to know the frequency of significant three-vessel coronary artery disease in patients presenting with Non ST- segment elevation myocardial infarction having low high density lipoprotein levels.

## METHODOLOGY

This Descriptive cross sectional study was conducted at emergency department of Chaudary Pervaiz Elahi institute of cardiology, Multan from February 2010 to August 2010. One hundred and twenty six patients with non ST-segment elevation myocardial infarction having low HDL level admitted through emergency department were studied. Sample size was calculated with formula [$n = (z)^2 . p (1-p)/d^2$ )] and sampling technique was non probability purposive. Patients with first episode of Non ST- segment elevation myocardial infarction having low high density lipoprotein at time of admission levels of all age groups and both sexes were included in the study. Patients with ischemic symptoms lasting at least 10 min within the previous 24 hours with ischemic ST-segment changes (ST-segment depression of at least 0.5 mm and/or T-wave inversion) and positive troponins test (>.01ng/dl) . HDL is considered to be low if its value is less than 35mg/dl in males and 45mg/dl in females.

Patients with ST segment elevation acute myocardial infarction, left bundle branch block, acute pulmonary embolism diagnosed on ECG or CT scan, history of previous coronary artery bypass grafting, PCI, Co-morbidities like renal failure, hepatic failure, sepsis, use of drugs like statins, niacin and fibrates, risk factors for CAD which independently can alter HDL levels like diabetes mellitus, smoking, hypertension, sedentary life style and obesity were excluded.

Informed consent was taken from each patient. Coronary angiography was done within 72 hours of admission and interpreted by a cardiac physician (having post FCPS 5yr experience) in all patients; Demographic data was noted.

Data was compiled in the computer and analyzed by using SPSS (Version 14.0) software. All study variables were age, sex and coronary angiographic findings. Qualitative variables were gender, and coronary angiographic findings. While numerical variables under study was age. Qualitative variables were described by frequency and percentage while numerical variables were represented as mean and standard deviation. No test of significance was applied on this data and level of significance (p- value) was not calculated.

## RESULTS

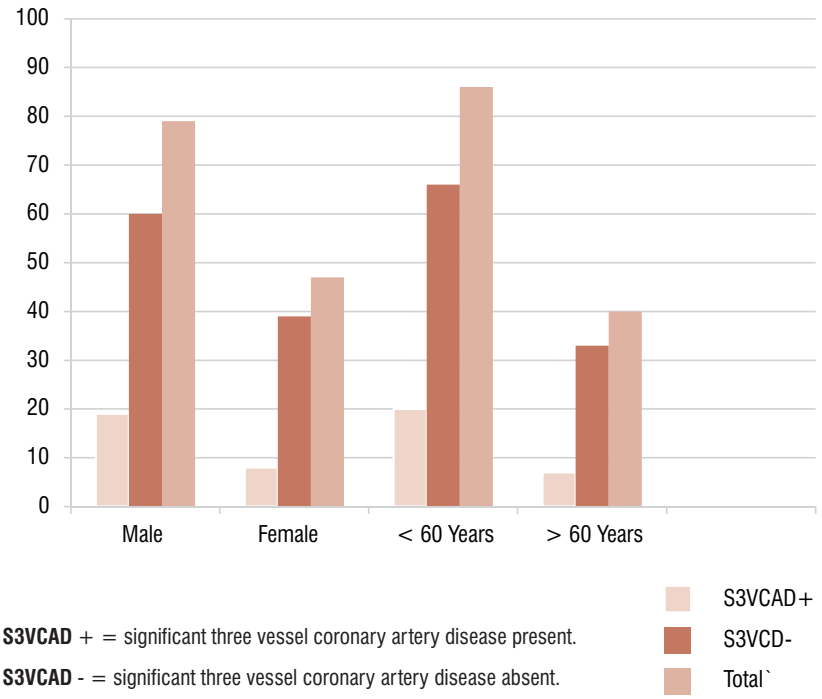
A total of 126 patients were included in this study with non-ST elevation myocardial infarction having low high density lipoproteins levels. There were 79(63%) male and 47(37%) female patients. The age varied between 35-70 years (mean=53.25±9.0). 86(68.3%) patients were less than 60 years (<60yrs) and 40 (31.7%) were more than 60 years(>60yrs).

The incidence of significant three vessel coronary artery disease [A stenosis ⩾ 50 percent in diameter in the major three native coronary arteries (left anterior descending, left circumflex, and right coronary arteries) or a branch vessel on coronary angiography] in the study population was 27(21.4%) {Table 1}. Out of 79 male patients 19(25%) showed significant three vessel disease and in 60(75%)

**Table 1: Frequency of Significant Three Vessel Disease in Patients with NSTEMI and Low HDL Levels**

| Variables | Number of patients (n=126) | Frequency |
|---|---|---|
| Significant three vessel disease(present) | 27 | 21.4% |
| Significant three vessel disease(absent) | 99 | 78.6% |

**Figure 1: Distribution of Significant Three Vessel Disease by Age and Gender**




patients there was no significant disease. Similarly out of 47 female patients 8(17%) showed disease while in 39(83%) it was absent (Figure 1).

The incidence of significant three vessel disease in patients with < 60 years was 20(23%) while in patients >60 years it was 07(17.5%). The occurrence of significant three vessel disease was more in male and in younger age group (Figure 1).

## DISCUSSION

Patients with low HDL levels had a higher risk of severe coronary disease on angiography. Low HDL levels appear to be an adverse prognostic indicator for patients with NSTEMI and may represent a unique target for new therapeutic interventions. Lower HDL levels have been shown to be associated with a higher risk of cardiovascular events and a greater burden of atherosclerosis, even among patients with lower LDL levels.

In our study the frequency of significant three vessel coronary artery disease in patients with NSTEMI having low HDL level was 21.4% as compared with the study done by Roe et al,[5] which showed incidence of 30%. The incidence of significant disease was less in our study as compared with the study done by Roe et al, [5] because in our study we have

included only those patients in which there was no conventional risk factors for CAD except low HDL. This demonstrated that low HDL level is strong and independent risk factor for coronary artery disease as also demonstrated by Salahuddin et al.[6] This study also demonstrated that low HDL level is a significant predictor of severity of coronary artery and multi-vessel involvement which is consistent with studies by Wang et al.[4]

In our study the incidence of significant three vessel disease was higher in male as compared with female i.e 25% vs 17% and also higher in younger age group as compared with older patients i.e 23% vs 17.5. This is consistent with the study done by Roe et al,[5] showing low HDL level is mostly common in male and younger age group. There were few limitations to this analysis. First, low HDL values were not further subclassified and there effect on coronary artery disease was not demonstrated separately as done by Reo et al[5]. Secondly, recorded HDL levels during the hospitalization may differ from chronic HDL levels before presentation, so the impact of low HDL levels on the progression of coronary disease may not be accurately represented by in-hospital HDL levels.

Lower HDL levels appear to be a unique, common, and potentially modifiable risk factor for patients with ACS. As a result, alternative athero-protective treatment strategies designed to modulate HDL levels and/or HDL function will require further study (especially in the primary prevention population) to reduce the risk of future coronary disease, as well as in the ACS population to reduce the risk of subsequent adverse outcomes. In the meantime, identification of patients with ACS who have low HDL levels should prompt the initiation of intensive dietary and lifestyle modification interventions that may mitigate some of the risks associated with this adverse prognostic indicator.

## CONCLUSION

It was concluded that lower HDL levels are significant predictor of severity of coronary artery disease and are associated with significant three vessel involvement.

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