

# Association of Left Coronary Artery Disease with Diabetes and Hypertension among patients presenting with Chest Pain

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## ABSTRACT

**Background:** Coronary artery disease (CAD) is the major cause of death in United States<sup>1</sup> as well as globally. It usually present as severe chest pain.

**Aim:** To determine the incidence of left coronary artery disease (LCAD) among high risk patients presenting with chest pain.

**Methodology:** This study was conducted in Department of cardiology, Services hospital, Lahore for 6 months. Both genders (n=246) with age (35-75years) were enrolled in the study. All patients underwent coronary angiography which was a gold standard to diagnose coronary artery disease.: Collected data was analysed using SPSS Version 11.0. Numerical data like age and gender with diabetes and hypertension variables were presented as frequency and percentages. Chi Square test was applied with significant p value ( $\leq 0.05$ ).

**Results:** Patients (n=246) with mean age of 52.42±9.39 years. Out of 246 patients 160 (65.04%) were males and 86(34.96%) were females. Out of 246 patients, 190(77.20%) patients had left main coronary artery disease. Out of 134 hypertensive patients, 105(78.20%) patients had left main coronary artery disease. Out of 118 diabetic patients, 92(78%) patients had left main coronary artery disease. Left main coronary artery disease was insignificantly associated with diabetes and hypertension as ( $P>0.05$ ).

**Conclusion:** We concluded that in patients of ACS, diabetes and hypertension are risk factors for LMCA stenosis and predictor of serious complications of coronary heart disease.

**Keywords:** Electrocardiography, Diabetes, Hypertension.

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## INTRODUCTION

Coronary artery disease (CAD) is one of most frequent fatality cause in United States<sup>1</sup> as well as globally. Acute coronary syndrome (ACS) is constituted by unstable angina (UA), acute ST elevation myocardial infarction (STEMI), acute non-ST elevation myocardial infarction (NSTEMI). Quick clinical diagnosis with help of electrocardiographic (ECG) features showing left main coronary artery disease is of utmost importance with an acute coronary syndrome.<sup>1</sup>

Approximately 50% of the vessel diameter is occupied by left main Stem (LMS) stenosis. The frequency of occurrence of LMS stenosis is 4-6% for all patients undergoing coronary angiography<sup>2</sup> and 30% for patients of Coronary Artery Bypass Grafting (CABG).<sup>3</sup>

In 70% of the patients, the presence of the LMS is linked to the multi-vessel coronary artery disease (MVCAD).<sup>4,5</sup> The occlusion of this vessel results in at least 75% compromised blood flow to the left ventricle. Mostly patients are symptomatic with the history of diabetes and hypertension thus more prone towards cardiovascular events. The survival rate which was only 37% before the revascularization with CABG became the standard with a poor prognosis of only average three-year survival.<sup>6</sup> As compared to other medical therapies, CABG has shown significantly better outcomes in the patients with cardiovascular diseases, including mortality.<sup>7</sup>

In one study held at Iran, it was concluded that diabetes and hypertension with smoking are the major risk factors for adverse cardiovascular events<sup>8</sup>. We planned this study, in-order to evaluate the association of left coronary artery disease (LCAD) among patients with diabetes and hypertension presenting with chest pain in our population. Patients STEL-aVR will be further investigated with coronary angiography. If lead aVR will have diagnostic value of 80% for LMCAD, then in future this prognostic information from ECG could be taken routinely to diagnose LMCAD.

## METHODOLOGY

The sample size of 246 was estimated with by taking 95% confidence level with 3% margin of error, taking 6% prevalence of LMCAD in ACS. This study was conducted in Department of endocrinology, Services hospital, Lahore for 6 months (01-01-2015 to 30-06-2015) following approval from the Hospital's ethical committee. Non-probability consecutive sampling was adopted. Cases fulfilling the inclusion criteria were enrolled throughout project. Inclusion criteria included both genders with age range of 35 to 75 years, history of diabetes, hypertension, smoking and those presenting with ACS having STEL-aVR > 0.5 mm as well.<sup>8-10</sup> Demographic history was also taken. Written informed consent was taken from the patient before the start of project. Exclusion criteria included patients with chronic kidney disease, severe anemic and history of Coronary artery bypass graft. Demographic parameters like name,

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age, gender, diabetic and hypertensive status were recorded at the time of enrollment. All patients having STEL-aVR were undergo coronary angiography which is the gold standard to diagnose coronary artery disease.

**Statistical analysis:** Data was analyzed by SPSS version 11.0. Data like gender, age and LMCAD (yes/no) were presented on frequency tables and percentages. Data was stratified for diabetes and hypertension. Chi Square test was applied with significant p value ( $\leq 0.05$ ).

**RESULTS**

There were 65.04% male and 34.96% female patients which indicated higher ratio of male patients with disease. LMCAD was present in 77.24% patients (table-1). However, 22.76% patients were without LMCAD but they presented with chest pain. The results revealed that 75.2% patients were below 55 years as compared to the patients above 55 years were 24.8% (table-1).

The results showed that only 121 patients out of 246 had true STEMI. In case of NSTEMI, 52 patients had true

NSTEMI. But however, true and negative unstable angina were equal i.e 17 cases each. Therefore, 190 patients of 246 patients are true positive who have having STEL-aVRlead and LMCAD.

Results of table-3 showed that there is no significant association among LMCAD, hypertension and diabetes with insignificant p-value ( $p>0.05$ ).

Table-1: Results of Demographic Parameters among enrolled patients(n=246)

Gender	Frequency	Percent(%)
Male	160	65.04%
Female	86	34.96%
<b>Age Groups</b>		
Below 55 years	61	24.8%
Above 55 years	185	75.2%
<b>Left main coronary artery disease</b>		
Yes	190	77.2%
No	56	22.8%

Table 2: Chest pain presentation and Left main coronary artery disease (n=246)

ACS Constituents	Left main coronary artery disease			
	NO		YES	
	Frequency	Percentage	Frequency	Percentage
STEMI	02	1.4%	121	98.6%
NSTEMI	37	41.6%	52	58.4%
UA	17	50%	17	50%
TOTAL	56	22.8%	190	77.2%

Table-3: Cross tabulation of Hypertension and Diabetes with LMCAD(n=246)

Variables	Left main coronary artery disease				p-value
	Yes		No		
Hypertension	Frequency	Percentage	Frequency	Percentage	
Yes (n=134)	105	78.4%	29	21.6%	0.646
No(n=112)	85	75.6%	27	24.4%	
Diabetes	Frequency	Percent	Frequency	Percent	
Yes (n=118)	92	78%	26	22%	0.783
No (n=128)	98	76.6%	30	23.4%	

**DISCUSSION:**

The quick diagnosis of LMCAD like stenosis is very important to drive intervention and suitable clearance with ACS. ECG is an appropriate bedside tool to make early diagnosis of ACS. However, the ST-segment elevation in lead aVR is critical for primary diagnosis of ACS requiring instant treatment.

The association between diabetes, hypertension and LMCAD was observed in current project presenting with chest pain. Patients (n=246) having ACS. Different statistics related to the diabetes and hypertension of the patients are presented in the Table-3.

In one Iranian study, 91% and 35% patients enrolled were hypertensive and diabetic respectively.<sup>8</sup> In our study 55% and 48% patients enrolled were hypertensive and diabetic respectively. Our work was in line with previous studies showing higher percentages of diabetic and hypertensive patients presented with chest pain with insignificant p-value.<sup>8</sup>Hence, both are the leading risk factors.

Males had significant LMCAD stenosis as compared with female i.e. 65% versus 34.96% respectively in our

study. Patients above 55years of age were more prone to LMCAD (81.57%) as suggested by results so our work was in line with studies done by Yamaj et al<sup>11</sup>, Hengrussamee et al<sup>12</sup> and Rostoff et al<sup>13</sup> previously.

**CONCLUSION**

We concluded that in patients of ACS, diabetes and hypertension are risk factors for LMCA stenosis and predictor of serious complications of coronary heart disease.

**Limitations:** It included lack of parameters like diabetic control check, cardiac workup, lipid profile of patients enrolled and financial constraints with lack of resources.

**Conflict of interest:** None.

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