

## LEFT MAIN STEM DISEASE ON CORONARY ANGIOGRAPHY IN PATIENTS WITH NON-ST SEGMENT ELEVATION MYOCARDIAL INFARCTION

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### Contribution

KAH conceived the idea and designed the study. Data collection and manuscript writing was done by KAH, MRK, AAH, FA, and MI. All the authors contributed equally to the submitted manuscript.

All authors declare no conflict of interest.

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## ABSTRACT

**Objectives:** The purpose of our study was to determine the frequency of left main stem disease on coronary angiography in patients with non-ST segment elevation myocardial infarction (NSTEMI). By studying the exact frequency of the left main stem (LMS) disease in NSTEMI patients in our population, we will be able to better risk stratify and plan further management for this group of patients.

**Methodology:** This cross-sectional study was conducted at the Department of Cardiology, Chaudhry Pervaiz Elahi Institute of Cardiology (CPEIC), Multan from 14-June-2017 to 13-Dec-2017. Total 248 patients with NSTEMI were included in the study. Coronary angiography was done in all selected patients. Diagnosis of LMS disease was made when stenosis in the LMS artery was more than half of the diameter of the left main coronary artery.

**Results:** There were 80.6% male and 19.4% female patients with a mean age  $49.39 \pm 7.23$  years. In this study, 37.1% patients were found with left main stem disease. Among LMS disease patients, there was 82.6% male and 17.4% female patients. 55.4% of patients were aged 50 years and above. 40.2% were smokers and 33.7% were diabetic. No significant association of LMS was found with the age group ( $p=0.66$ ), gender ( $p=0.54$ ), smoking status ( $p=0.54$ ) and diabetes mellitus ( $p=0.95$ ).

**Conclusion:** In this study, we found a high frequency of LMS disease in our population. This subset of patients with NSTEMI requires early re-vascularization. This also signifies a need to re-evaluate our screening programs and management protocols related to coronary artery disease.

**Keywords:** Myocardial Infarction (MI), Left main stem (LMS) disease, non-ST segment elevation myocardial infarction (NSTEMI), coronary artery disease (CAD)

## INTRODUCTION

There is no geographic, gender or socio-economic boundary yet defined for heart disease. Developing countries have a bigger share to the common load of cardiovascular disease than developed countries. Out of many causes, one of the crucial cause of mortality in Pakistan is cardiovascular diseases (CVD). As compare to the west, in Pakistan, CVD comes into sight before the expected age and for this reason mortality ratio is rising upward at a younger age.<sup>1</sup> Moreover, in Pakistan we notice a high frequency of CVD related complications like atrio-ventricular block and left ventricular thrombus formation after myocardial infarction (MI)<sup>2,3</sup> and high in-hospital mortality<sup>4</sup> owing to delayed presentation and lack of screening programs.

MI, in simple terms is also named as a heart attack.<sup>5</sup> Most of the MIs crop up because of coronary artery disease. In support of the diagnosis of MI, it is helpful to endure electrocardiogram (ECG), blood tests, and coronary angiography. As already known that acute MI has two subtypes of acute coronary syndrome (ACS), ST segment elevation MI (STEMI) and non-ST segment elevation MI (NSTEMI).<sup>6</sup> A NSTEMI is also named as a non-transmural or non Q-wave MI. STEMI occurs because of complete occlusion of the coronary artery. Alternatively, partial or subtotal occlusion results in unstable angina (UA) and NSTEMI.

The left main coronary artery (LMCA) supplies blood and nutrients to the left side of the heart. This artery bifurcates into the left anterior descending (LAD) and left circumflex (LCX) coronary arteries. One can consider coronary artery diseases (CAD) clinically as left main stem (LMS) disease and single, double or triple vessel CAD.<sup>7</sup> Traditional cardiologist have a trepidation to lay a hand on this lesion, as they thought a sudden occlusion within this vessel is life threatening. It has the most important presaged significance because of the proportion of myocardium at risk. Along with patients with CAD, LMCA stenosis was found by a number of studies to be an independent indicator of increased morbidity and mortality rates. Different studies evaluated the frequency of LMS in patients with MI with differing results. Rathi N et al.<sup>8</sup> found a high frequency of LMS disease (52.6%) in patients presenting with NSTEMI. Chikwe et al.<sup>9</sup> reviewed the anatomy,

epidemiology and diagnosis of LMS disease in their work. Khan MH et al.<sup>10</sup> compared the degree of CAD among STEMI and NSTEMI patients and found more widespread CAD in NSTEMI other than STEMI. Lin et al.<sup>11</sup> carved grounds to evaluate if left ventricular dyssynchrony leads to left main coronary artery stenosis in individuals with NSTEMI. It seems that there is a huge variation in the reported incidence of LMS disease involvement in patients with NSTEMI, ranging from 31% to 52.63%. By studying the exact frequency of LMS disease in NSTEMI patients in our population, we will be able to better risk stratify and plan further management for this group of patients. As in NSTEMI patients, LMS disease denotes a particularly high risk patient group. We can refer these patients for early revascularization to decrease mortality of these patients.

The objective of our study was to determine the frequency of left main stem disease on coronary angiography (CA) in patients with NSTEMI.

## METHODOLOGY

This cross sectional study was conducted at Department of Cardiology, Chaudhry Pervez Elahi Institute of Cardiology (CPEIC), Multan from 14-June-2017 to 13-Dec-2017.

Total 248 patients with NSTEMI of either gender aged between 20 years to 60 years were included in the study. Patients with previous history of MI, valvular heart disease, left or right bundle branch block, atrial fibrillation, chronic renal disease or chronic heart failure were excluded from the disease.

All of the selected patients following inclusion and exclusion criteria were registered from Emergency Department of cardiology in Chaudhry Pervez Elahi Institute of Cardiology, Multan, after taking permission from the Institutional Ethical Committee. Informed consent was taken from the patients after describing them the objective of this study, ensuring them confidentiality about the information provided for the study and the fact that no risk will be engrossed to the patient while taking part in this study. Coronary angiography was performed in all

## Left Main Stem Disease on Coronary Angiography in Patients with Non-ST Segment Elevation Myocardial Infarction

selected patients after admission by a senior consultant cardiologist having minimum five years of post-fellowship experience. Diagnosis of LMS disease was made when stenosis in the LMS artery was more than half of the diameter of the left main coronary artery. Data regarding confounder e.g. smoking and diabetes mellitus were also collected from the previous history of the patients. All the findings including demographic variables were recorded in the performa and record was observed by the researcher. For analysis of data, IBM SPSS Statistics for Windows, Version 25.0 was used. Mean and standard deviation were assessed for quantitative variable and frequency and percentage were computed for qualitative variables. Stratification was done and association with exploratory variables was assessed by applying chi-square test, taking p-value of  $\leq 0.05$  as significant.

### RESULTS

There were 80.6% male and 19.4% female patients with mean age  $49.39 \pm 7.23$  years. Among 248 patients, 42.7% were smokers and 33.4% were diabetic. In our study, 37.1% patients were found with left main stem disease. Descriptive statistics of studied population are shown in Table 1.

**Table 1: Descriptive statistics of study population**

	n (%)
Age(years)	49.39 $\pm$ 7.23
<b>Gender</b>	
Male	200(80.6)
Female	48(19.4)
<b>Smoking Status</b>	
Smokers	106(42.7)
Non Smokers	142(57.3)
<b>Diabetes Mellitus</b>	
Yes	83(33.4)
No	165(66.6)
<b>Left Main Stem Disease</b>	
Yes	92(37.1)
No	156(62.9)

Among left main stem disease patients, there was 82.6% male and 17.4% female patients. 55.4% of patients were aged 50 years and above. 40.2% were smokers and 33.7% were diabetic as presented in Table 2. In our study, we found no significant

association of left main stem disease with age group ( $p=0.66$ ), gender ( $p=0.54$ ), smoking status ( $p=0.54$ ) and diabetes mellitus ( $p=0.95$ ) as presented in Table 2.

**Table 2. Association of left main stem (LMS) disease with clinical parameters and risk factors**

	Left main stem Disease		p-value
	Yes (n=92)	No (n=156)	
<b>Age Group</b>			
<50 years	41(44.6)	74(47.4)	0.66
$\geq 50$ years	51(55.4)	82(52.6)	
<b>Gender</b>			
Male	76(82.6)	124(79.5)	0.54
Female	16(17.4)	32(20.5)	
<b>Smoking Status</b>			
Smokers	37(40.2)	69(44.2)	0.54
Non-Smokers	55(59.8)	67(55.8)	
<b>Diabetes Mellitus</b>			
Yes	31(33.7)	52(33.3)	0.95
No	61(66.3)	104(66.6)	

### DISCUSSION

In the present study we found the frequency of LMS disease in patients with NSTEMI to be 37.1%. As three-vessel and LMS disease confers a need of early revascularization and knowledge of loco-regional disease statistics are essential in establishing local management protocols. Although compared to STEMI, NSTEMI is considered less dangerous; in previous studies done at our institution, it was noted that a high percentage of patients with NSTEMI have underlying multi-vessel disease.<sup>12</sup>

In our study, mean age of patients was  $49.39 \pm 9.23$  years. The mean age of patients in the study by Rathi et al. were  $56.65 \pm 15.44$  years.<sup>8</sup> Mean age of patients in the study by Bacci et al. were  $58.37 \pm 9.70$  years.<sup>13</sup> Mean age in another study was 60 years. Mean age in our study was little less compared to the other studies; this difference may be because of early onset of cardiovascular disease in our country compared with the western countries.

In our study, we found male predominance. There were 200 (80.65%) male patients and 48 (19.4%)

female patients. Alternatively, there were 77.19% male patients in the study by Rathiet et al.<sup>8</sup>

In our study, LMS disease was diagnosed in 92 (37.10%) patients. The frequency of LMS plus triple-vessel disease in the study by Rathi et al. was 52.0%.<sup>8</sup> Husein et al. found 44.7% prevalence of LMS plus triple-vessel disease in patients of NSTEMI patients.<sup>14</sup> Masami et al. found 31.0% prevalence of LMS/triple-vessel disease in patients of NSTEMI patients.<sup>15</sup> The difference in the results of our study and other studies is because we determined the frequency of LMS disease separately and the other previously published studies determined the prevalence of LMS disease and triple-vessel disease combined.

We view our study with a few limitations as our study represents a single institution data and therefore feel a need of large-scale multi-institutional studies in our population to exactly determine the CAD characteristics in our population.

## CONCLUSION

In this study, we found a high frequency of LMS disease in our population. This subset of patients with NSTEMI requires early re-vascularization. This also signifies a need to re-evaluate our screening programs and management protocols related to coronary artery disease.

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