

## CLINICAL AND ANGIOGRAPHIC PROFILE OF PATIENTS WITH LEFT MAIN CORONARY ARTERY STENOSIS

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### Abstract

**Background:** Cardiovascular diseases (CVDs) pose a significant global health challenge, with coronary artery disease (CAD) being a leading cause of mortality. Left main coronary artery stenosis (LMCAS) is a critical manifestation of CAD, necessitating specialized attention due to its potential life-threatening consequences. This study aimed to explore the risk factors contributing to LMCA disease and analyze the clinical, angiographic characteristics, and in-hospital outcomes of patients with left main coronary artery disease. **Materials and Methods:** A prospective observational study was conducted over two years, involving 100 patients with left main coronary artery disease who underwent emergency and elective coronary angiograms in a tertiary care hospital. Standard pre-procedural evaluations and coronary angiography were performed, and data analysis encompassed various clinical, investigational, and angiographic parameters. **Result:** The study cohort had a mean age of  $55.89 \pm 7.49$ , with 68% males. Clinical presentations included 71% unstable angina, 23% stable angina, and 6% STEMI. Obstructive lesions were identified in 34 patients, with 15% experiencing cardiogenic shock. Diabetes mellitus showed a significant association with obstructive disease ( $P = 0.021$ ). ECG findings and angiographic characteristics revealed distinct patterns in different clinical conditions. **Conclusion:** These findings contribute to a better understanding of LMCA disease and guide future interventions for improved patient outcomes.

## INTRODUCTION

Cardiovascular diseases (CVDs) continue to be a leading cause of morbidity and mortality worldwide, posing a significant public health challenge. A World Health Organisation (WHO) report states that coronary artery disease (CAD) is the primary cause of death for 24.8% of Indian deaths each year, which are caused by different cardiovascular illnesses.<sup>[1]</sup>

Left main coronary artery stenosis (LMCAS) is one of the many symptoms of coronary artery disease (CAD), and because of its potentially fatal consequences, it is a condition that requires special treatment. Since the myocardium receives a large amount of its blood supply from the left major coronary artery (LMCA), any notable narrowing or occlusion is quite concerning.<sup>[2]</sup>

The illness of the left main coronary artery (LMCA) predicts a worse prognosis due to the vast

myocardial region that is at risk (75% to 100%, depending on the left coronary circulation's dominance).<sup>[3]</sup> Substantial left main coronary artery disease (LMCA) is the highest risk lesion subgroup of obstructive coronary artery disorders (CAD) and is linked to worse clinical outcomes than non-LMCA disease. Clinical manifestations of LMCA range from rapid death to asymptomatic.

Only 5–10% of individuals assessed by angiography for coronary artery disease have an isolated atherosclerotic obstructive lesion, which is defined as a stenosis higher than 50% of the left main.<sup>[4]</sup> This condition affects around 4% of all patients. Because the blockage of this coronary artery segment affects roughly 75% of the left ventricle's total blood flow, patients with left main coronary artery disease (LMCAD) are at high risk.<sup>[5]</sup> This puts them at risk for massive infarction and sudden cardiac death, both of which can have a detrimental impact on their prognosis.

## Aims and Objectives

1. To investigate risk factors contributing to the development of LMCA disease.
2. To analyse the clinical, angiographic characteristics, and in-hospital outcomes of patients presenting with left main coronary artery disease.

## MATERIALS AND METHODS

This prospective observational study was conducted among 100 patients who had left main coronary artery disease among those who underwent emergency and elective coronary angiograms in a tertiary care hospital. The study was conducted for a period of 2 years.

Individuals who underwent a coronary angiography and had valvular heart disease, congenital heart disease, or cardiomyopathy were not eligible for this research.

### Data Collection

Pre-procedural evaluations that are standard were performed, such as EKG, transthoracic echocardiography, chest X-ray, and blood tests.

### Coronary Angiography

Using a PHILIPS machine and departmental cardiologists, the treatment used fewer views if left main stem disease was found. Coronary artery diameter stenosis was determined via quantitative coronary angiography. Regardless of their obstructive condition, patients with left main coronary artery disease were included.

### Data Analysis

Numerous parameters were examined in the analysis of patients diagnosed with left main coronary artery disease, including the course of the disease, clinical features, blood investigations, electrocardiogram, chest X-ray, transthoracic echocardiogram, coronary angiographic characteristics, and in-hospital outcomes.

### Patient Presentation

Chronic stable angina, unstable angina/non-ST elevation myocardial infarction, ST elevation myocardial infarction, and other conditions were among the patient's modes of presentation. The clinical characteristics, risk factors, and symptoms were all carefully documented. Comorbidities such diabetes, hypertension, hyperlipidemia, smoking, alcohol use, and family history were all thoroughly examined.

### Clinical Examination

Blood tests, electrocardiograms, echocardiograms, chest X-rays, and routine clinical exams were performed. The study of the coronary angiography included the following: the path, pressures, views, features of the left major coronary artery, lesions, bifurcations, trifurcations, calcifications, and collateral circulation.

### Intra and Post-procedural Observations

Chest discomfort, hypotension, and ECG abnormalities were among the intraprocedural

problems that were observed. Patients were monitored for problems such as arrhythmias, hypotension, heart failure, anginal episodes, and sudden death following a coronary angiography.

### Follow-up and Treatment Options:

Throughout their hospital stays, patients were monitored to look for any issues. Patients who qualified for surgery were referred for surgery, and treatment choices were presented based on current standards and comorbidities.

### Ethical Considerations

The CMCH Hospital's Institutional Review Board (IRB) approved the study. Throughout the investigation, patient confidentiality was rigorously preserved, guaranteeing adherence to ethical standards and laws.

## RESULTS

The mean age of the study of participant was  $55.89 \pm 7.49$ . 68% of the study participants were males. 71%, 23% and 6% had unstable, stable angina and STEMI respectively. Obstructive lesions were seen among 34 study participants. Clinical presentation of cardiogenic shock was seen among 15% of the study participants. All those 15 patients had obstructive lesions.

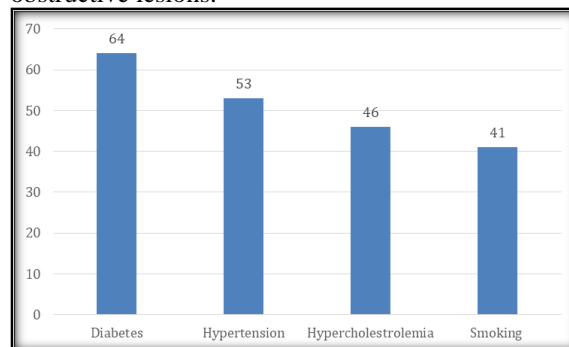


Figure 1: Risk factors distribution

Furthermore, the cardiac troponin release (CTR) was identified in 18% of the cases. In cases of ST segment elevation in lead avR, the prevalence was 6% for both stable angina and STEMI, but notably higher at 22% for unstable angina, with a statistically significant p-value of 0.002. Similarly, for ST segment changes (ST depression/T wave inversion), a prevalence of 6% was noted in both stable angina and STEMI, whereas unstable angina exhibited a substantially higher incidence of 65%, with a highly significant p-value of <0.001.

Regional wall motion abnormality showed a distinct pattern, being absent instable angina, present in 6% of STEMI cases, and notably higher at 22% in unstable angina, with a p-value of <0.001. The cardiac troponin release (CTR) also demonstrated variation, with no occurrences instable angina, a 6% incidence in STEMI, and a 12% incidence in unstable angina, with a statistically significant p-value of <0.001. Hypokinesia related to LAD/LCX territory was seen among 4 patients with unstable angina.

Reduced ejection fraction was seen among 6 patients with STEMI and 1 patient with unstable angina. All the 7 patients with reduced ejection

fraction had obstructive lesions. Those with non-obstructive lesions have ejection fraction more than 45%. [Table 2]

**Table 1: Association between risk factors and obstructive lesions**

Risk factors	Obstructive disease	Non-obstructive disease	P value
Diabetes Mellitus	27	37	0.021
Hypertension	21	32	0.208
Smoking	20	26	0.065
Hypercholesterolemia	17	24	0.189

**Table 2: ECG findings**

Variable	Frequency	Percentage
ST segment elevation in lead avR	34	34
ST segment changes (ST depression/ T wave inversion)	77	77

**Table 3: Echocardiogram findings**

Variable	Frequency	Percentage
Regional wall motion abnormality	28	28
<b>Ejection fraction</b>		
45 – 55%	82	82
30 – 45%	11	11
<30%	7	7

Of the 100 patients, x-ray findings of cardiomegaly were incident in 6 patients with unstable angina who had heart failure.

**Table 4: Coronary angiogram**

Site of lesion	Frequency	Percentage
Distal bifurcation	79	79
Distal non-bifurcation	3	3
Ostial	6	6
Shaft	12	12

Among the 79 patients with distal bifurcation, 60% exhibit left anterior coronary artery involvement while 40% show left circumflex artery involvement.

**Table 5: Coexisting vessel disease**

Variable	Frequency	Percentage
Single vessel disease	9	9
Double vessel disease	19	19
Triple vessel disease	63	63
None	9	9

None of the study participants had complications following treatment. There was no mortality. Those who had severe left main disease were all recommended for coronary artery bypass surgery. Treatment for patients with non-obstructive left main stenosis was based on the involvement of other vessels.

## DISCUSSION

This study offers a thorough understanding of the angiographic results, clinical manifestations, and demographic traits of one hundred individuals with lesions at the distal bifurcation. The participants' average age was  $55.89 \pm 7.49$  years, and 68% of them were men. In earlier research conducted by Askari et al a comparable pattern was noted, with the mean age of LMCAD patients being  $59.8 \pm 8.7$  years. Furthermore, Rao et al,<sup>[7]</sup> showed that the prevalence of LMCAD was higher in men (78.8%) than in women (21.2%). It was in fact believed that being a man increased the risk of LMCAD. Seventy-one percentage of the subjects had unstable angina, twenty-three percentage had stable angina,

and six percentage had ST-segment elevation myocardial infarction (STEMI). This finding was consistent with the findings of the earlier study conducted by Rao MS,<sup>[7]</sup> which indicated that the rates of STEMI, NSTEMI, and chronic stable angina were 23%, 38.9%, and 23%, respectively. Thirty-four patients had obstructive lesions, and fifteen percentage of the patients experienced cardiogenic shock, a significant consequence.

After a distribution of risk variables was examined, it was found that diabetes mellitus and obstructive disease had significant connections ( $P = 0.021$ ), but there were no statistically significant relationships found for hypertension, smoking, or hypercholesterolemia. According to a research by Shaikh MY et al,<sup>[8]</sup> the three main risk factors for LMCAD are smoking (41.6%), hypertension (50%), and diabetes (67.2%). According to a research by Askari B et al,<sup>[6]</sup> smoking (61.4%) and dyslipidemia (46.9%) are the two most common risk factors for LMCAD.

The results of the electrocardiogram (ECG) demonstrated the frequency of ST segment elevation in lead avR (34%) and ST segment alterations

(77%) in the subjects, with various patterns seen under various clinical circumstances.

According to the angiographic findings, distal bifurcation lesions were very common (79%), affecting the left anterior coronary artery (60%) and the left circumflex artery (40%) in substantial proportions. Similarly, ostial LCX (14.4%) and ostial LAD (25.3%) were identified in a research by Rao MS.<sup>[7]</sup> Triple vascular illness was more common among the patients, accounting for 63% of cases, according to coexisting vessel disease analysis. Similarly, 72.4% TVD, 13.1% DVD, and 14.5% SVD were observed in a research by Askari B et al.<sup>[6]</sup>

The results of the echocardiogram showed decreased ejection fraction and regional wall motion abnormalities, which were observed in 28% of patients. These findings were mostly found in 6 patients with STEMI and 1 patient with unstable angina, all of whom had obstructive lesions. Cardiomegaly was found on X-rays in six individuals who also had heart failure and unstable angina.

Positive results include the absence of complications and death after therapy, and patients with severe left main disease were suitably advised to have coronary artery bypass surgery.

## CONCLUSION

In conclusion, this study provides a detailed understanding of the clinical and angiographic characteristics of patients with distal bifurcation lesions, shedding light on the prevalence of risk factors, ECG findings, and coexisting vessel

diseases. The absence of complications and mortality post-treatment suggests effective management strategies, and the study underscores the importance of tailored treatment approaches based on individual patient characteristics and lesion involvement.

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