

**ANGIOGRAPHIC PROFILE OF LEFT MAIN CORONARY ARTERY (LMCA) STENOSIS**Malladi Srinivasa Rao<sup>1</sup>**HOW TO CITE THIS ARTICLE:**

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**ABSTRACT:** Among patients with coronary artery disease, left coronary artery (LMCA) stenosis is the dangerous form of coronary arterial involvement, associated with increased mortality and morbidity unless immediate intervention is done. The gold standard treatment for left main coronary artery (LMCA) stenosis is the emergency coronary artery bypass grafting to its branches, left anterior descending artery (LAD), and left circumflex artery (LCX). Of percutaneous intervention in the form of angioplasty and stenting of left main coronary artery are increasingly done. The anatomy and the site of stenosis in the left main coronary artery determine the management option. In this context, the involvement of left main coronary artery and its anatomical pattern are important in deciding management options. **AIM:** To study the angiographic profile of significant Left main coronary artery (LMCA) stenosis among the patients who underwent coronary angiography. **METHODS:** A total of 1911 cases of significant coronary arterial disease, who underwent coronary angiography at King George Hospital, Visakhapatnam were studied in the present study and their coronary angiograms were analysed with respect to the pattern of involvement. **RESULTS:** of the 1911 cases of coronary artery disease, 118 patients have left main coronary artery disease. M/F ratio is 93/25. Of them 68.4% are hypertensive, 41.5 % are diabetics, 34.7% are smokers. Mean age of presentation was 59 yrs. Isolated LMCA involvement is seen in 5, associated with single vessel disease in 9, double vessel disease in 12 and triple vessel diseases in 93. Ostio-proximal involvement is seen in 21, mid segment involvement in 13, distal –bifurcation involvement in 93 and total occlusion of LMCA in 1 case. **CONCLUSION:** Significant LMCA involvement is seen in 6.1%. In majority of cases, it is associated with triple vessel disease and distal bifurcation is the commonest site involved.

**KEYWORDS:** Left main coronary artery (LMCA), Left anterior descending artery (LAD), Left circumflex coronary artery (LCx), Bifurcation stenosis.

**INTRODUCTION:** Among patients with coronary artery disease, left coronary artery (LMCA) stenosis is the dangerous form of coronary arterial involvement, associated with increased mortality and morbidity unless immediate intervention is done. The gold standard treatment for left main coronary artery (LMCA) stenosis is the emergency coronary artery bypass grafting to its branches, left anterior descending artery (LAD), and left circumflex artery (LCX). Of late percutaneous intervention in the form of angioplasty and stenting of left main coronary artery are increasingly done.<sup>1</sup>

The LMCA refers to the proximal segment of the left coronary artery that arises from the left aortic sinus just below the sino tubular junction to its bifurcation into the left anterior descending (LAD) and left circumflex (LCx) arteries. The LMCA is responsible for supplying about 75% of the left ventricular (LV) cardiac mass in patients with right dominant type or balanced type and 100% in the case of left dominant type, and as a result, severe LMCA disease will reduce flow to a large portion of the myocardium, placing the patient at high risk for life-threatening events of LV dysfunction and arrhythmias.

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The LMCA is generally divided into three anatomic regions: the ostium or origin of the LMCA from the aorta, a mid-portion, and the distal portion.<sup>2</sup> The LMCA differs from the other coronary arteries by its relatively greater elastic tissue content which can explain elastic recoil and high restenosis rate following balloon angioplasty.<sup>3</sup> The segment of the LMCA which extends beyond the aorta displays the same layered architecture as that of the other coronary arteries. Most of the time, there is a continuous involvement of atheroma from the distal LMCA into the proximal LAD.<sup>4</sup>

**AIM:** To analyze the cases of significant left main coronary (LMCA) stenosis who underwent coronary angiography at King George Hospital, Visakhapatnam from Jan 2007 to June 2009.

**METHODOLOGY:** Retrospective analysis of the data of patients who underwent coronary angiography at King George Hospital, Visakhapatnam between Jan2007 to June 2009 was done. Only the cases with significant LMCA disease, with stenosis of  $\geq 50$  % diameter stenosis were included. Cases with mild plaquing, cases who underwent previous coronary artery bypass surgery or coronary stenting were excluded.

### RESULTS:

#### Age distribution:

Age	Number
21-30	1 (0.84%)
31-40	4 (3.4%)
41-50	30 (25.4%)
51-60	47 (39.8%)
61-70	28 (23.7%)
71- 80	7 (5.9%)
81-90	1 (0.84%)

**Table 1: Age distribution of study group**

Mean age of presentation is 59 yrs (23-80).

Males constituted 93(78.8%), females 25 (21.2%)

#### Risk factors for CAD:

Sl. No	Risk Factors	Number (percentage)
1	Hypertension	73 (61.8%)
2	Diabetes	45 (38.1%)
3	Smoking	65 (55.08%)

**Table 2: Risk factors for CAD**

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### Clinical presentation:

Sl. NO	Presentation	Number (Percentage)
1	STEMI	27 22.8%
	- Anterior MI	15
	- Inferior MI	12
2	NSTEMI/Unstable angina	46 (38.9%)
3	Old MI with angina	17 (14.4%)
4	Chronic stable angina	28 (23.7%)

**Table 3: Clinical presentation of LMCA disease**

### Pattern of coronary artery involvement:

Sl. No.	Coronary artery involvement	Number (Percentage)
1	Isolated LMCA	4 (3.3%)
2	Single vessel disease	9 (7.6%)
3	Double vessel disease	12 (10.1%)
4	Triple vessel disease	92 (78.8%)
	Total occlusion	1 (0.8%)

**Table 4: Pattern of coronary artery involvement**

Isolated involvement was seen in 3.3% and majority was associated with triple vessel disease.

### Pattern of LMCA involvement:

Lesion location	Number (percentage)
Ostial-proximal	21 (17.8%)
Mid shaft	13 (11%)
Distal:	83 (70.3%)
Distal not involving bifurcation	9 (10.8% of all distal involvement)
Involving both ostia	41 (49.8% of all distal involvement)
Involving ostium of LAD alone	21 (25.3% of distal involvement)
Involving ostium of LCX alone	12 (14.4% of all distal involvement)
Total occlusion	1 (0.84%)

**Table 5: Anatomical site of LMCA involvement**

When the anatomical site of involvement in left main coronary artery was in majority of cases distal disease was seen (70.3%) of them bifurcation disease was seen in 74 cases, in approximately half of the cases ostia of both LAD and LCX were involved.

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**DISCUSSION:** In the present study, the mean age of presentation is 59 yrs. Similar findings were noted in other studies. In the study by Muhammad Yousuf Shaik et al,<sup>5</sup> mean age of presentation was 58.9 yrs and in the studies by Ibrahim Shah et al,<sup>6</sup> 56.32 yrs and in the study by Michel V Cohen et al<sup>7</sup> mean age of presentation was 53.4 yrs.

In the present study, LMCA disease was found to be more common in men (78.8%) when compared to women (21.2%). Similar findings were noted in other studies by Ibrahim Shah et al (M/F ratio, 68%/31%); Muhammad Yousuf Shaik et al (M/F ratio 73.3%/26.7%) and Michel V Cohen et al (M/F ratio 83.5%/16.5%).

When risk factors were analysed, in the present study, Hypertension was seen in 61.8%, diabetes in 38.1%, smoking in 55%. In the study by Muhammad Yousuf Shaik et al hypertension, smoking and diabetes were found in 50 %, 67.2% and 41.6% respectively. In the study by Ibrahim Shah et al, hypertension, diabetes and smoking were noted in 62.8%, 33.9% and 36.9%, respectively.

When clinical presentation of these patients was analyzed, majority presented with Non elevation MI & Unstable angina: 38.9% and around 23% presented with acute MI and chronic stable angina. 14% presented with past history of myocardial infarction and again presented with angina. In the study by Muhammad Yousuf Shaik et al patients with LMCA disease presented with acute MI in 6.83%, unstable angina and non Q MI in 71.9% and stable angina in 16.8%.

When the coronary involvement was analysed, 4 patients presented with isolated left main stenosis with sparing of the rest of coronary arteries. All of them have ostial involvement. 7.6% have single vessel disease, 10.1% had double vessel disease, and 7.8% had triple vessel disease. Total occlusion of LMCA was seen in one patient. In other studies also, triple vessel involvement is more common found in 50- 80% in various series.<sup>8</sup>

When the anatomical site of involvement in left main coronary artery was analysed, 17% had ostio-proximal involvement and 11% had mid shaft disease and in majority of cases distal disease was seen (70.3%) of them bifurcation disease was seen in 74 cases, ostia of both LAD and LCX was involved in 41 cases and ostium of LAD alone in 21 cases and ostium of LCX alone in 12 cases. Total occlusion was noted in one case. In the study by Shah Ibrahim et al, ostial involvement was seen in 20.9%, mid shaft in 11.1% and distal bifurcation involvement in 67.4%. In A Jonsson et al <sup>9</sup> series of 384 patients, complete occlusion was found in 2%, ostial stenosis in 9%, mid shaft stenosis in 24%, circular stenosis in 25%, and distal bifurcation stenosis in 40%.

**CONCLUSIONS:** Significant LMCA stenosis is seen in 6.1% in the present series .It is more common in males when compared to females, with ratio of approximately 3:1.Majority presented with unstable angina / Non ST elevation MI (NSTEMI).Isolated involvement is seen in rare and commonly found in the form of ostial involvement. Majority of the patients have either double vessel disease or triple vessel disease in addition to LMCA stenosis. Distal stenosis including is theg most common type of anatomical involvement.

### REFERENCES:

1. Jean Fajadet1\* and Alaide Chieffo. Frontiers in cardiovascular medicine. Current management of left main coronary artery disease, European Heart Journal (2012) 33, 36–50.
2. Farinha JB, Kaplan MA, Harris CN, Dunne EF, Carlsh RA, Kay JH, Brooks S. Disease of the left main coronary artery. Surgical treatment and long-term follow up in 267 patients. Am J Cardiol 1978; 42: 124–128.

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3. Macaya C, Alfonso F, Iniguez A, Goicolea J, Hernandez R, Zarco P. Stenting for elastic recoil during coronary angioplasty of the left main coronary artery. *Am J Cardiol* 1992; 70: 105–107.
4. Oviedo C, Maehara A, Mintz GS, Araki H, Choi SY, Tsujita K, Kubo T, Doi H, Templin B, Lansky AJ, Dangas G, Leon MB, Mehran R, Tahk SJ, Stone GW, Ochiai M, Moses JW. Intravascular ultrasound classification of plaque distribution in left main coronary artery bifurcations: where is the plaque really located? *Circ Cardiovasc Interv* 2010; 3: 105–112.
5. Muhammad Yousuf Shaik, Mansoor Ahmada Rasheed et al Left main disease — Patient Profile. *Pakistan Heart Journal* Vol. 40 No. 1—2 Jan - Jun 2007.
6. Ibrahim Shah, Mohammad Faheem Left Main Coronary Disease; Clinical Profile and Angiographic Characteristics *Journal of Rawalpindi Medical College (JRMC)*; 2012; 16(2): 84-86.
7. Micheal V. Cohen, M.D., AND Richard Gorlin, M. D. Main Left Coronary Artery Disease Clinical Experience from 1964-1974 *Circulation*, Volume 52, August 1975.
8. Martin J. Conley, M.D., Ralph L. Ely, M.D., The Prognostic Spectrum of Left Main Stenosis *Circulation* Vol. 57, No 5, May 1978.
9. A. Jonsson et al Classification of Left Main Coronary Obstruction—Feasibility of Surgical Angioplasty and Survival after Coronary Artery Bypass Surgery 9. *Vascular* December 2003 vol. 11 no. 6 497-505.



**Ostial LMCA disease**



**Mid shaft LMCA disease**



**Distal bifurcation LMCA disease**

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**COMPETING INTERESTS:** None

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