



CLINICAL PRESENTATION OF PATIENTS WITH SIGNIFICANT LEFT MAIN STENOSIS.

1. MBBS, FCPS (Card)
Assistant Professor of Cardiology,
Faisalabad Institute of Cardiology
Faisalabad.
2. MBBS, FCPS (Med), FCPS (Card).
Associate Professor Cardiology,
Faisalabad Institute of Cardiology
Faisalabad.
3. MBBS, FCPS (Card)
Consultant Cardiologist
DHQ. Jhang.
4. MBBS, MCPS (Med), FCPS (Card)
Associate Professor of Cardiology,
Faisalabad Institute of Cardiology
Faisalabad.
5. MBBS, FCPS (Card)
Assistant Professor of Cardiology,
Faisalabad Institute of Cardiology
Faisalabad.

Correspondence Address:

Dr. Rehan Riaz
Assistant Professor of Cardiology,
Faisalabad Institute of Cardiology,
Faisalabad.
rehanriazdab@gmail.com

Article received on:

06/05/2019

Accepted for publication:

22/10/2019

INTRODUCTION

Left Main Coronary Artery (LMCA) originates from the aorta just above the left cusp of the aortic valve. It runs for 1 to 25mm and then divides into left anterior descending artery and the left circumflex artery.¹ LMCA disease was reported first time by Herrick in 1912.² LMCA stenosis is a relatively uncommon presentation of symptomatic coronary artery disease.³ Multiple studies have emphasized the importance of LMCA stenosis being an independent predictor of increased morbidity and mortality among patients with coronary artery disease.³

Prevalence of left main coronary artery (LMCA) stenosis varies from 2.5 to 10%,⁴ and prevalence of LMCA stenosis in our population is similar to that reported in the international studies.⁵ Significant (>50%) LMCA stenosis is usually accompanied with disease in two or three of the major epicardial arteries, and middle or distal segments are more commonly involved. Isolated lesions, mostly

Rehan Riaz¹, M. Hamid Saeed², Kamran Sohail³, Shahid Abbas⁴, Ali Ehsan⁵

ABSTRACT... Objectives: Our objective was to evaluate the frequency of clinical presentation in patients with angiographically documented significant LMCA stenosis. **Study Design:** Cross sectional study. **Setting:** Department of Cardiac Catheterization and Interventional Cardiology, Punjab Institute of Cardiology Lahore. **Period:** Six Months from July to December 2018. **Results:** The mean age of presentation of disease was 59.78 ± 5.76 year, 100 being males (58.82%) and 70 females (41.18%). Regarding frequency of distribution of symptoms, the most common symptom was chest pain. ST segment depression was most common finding (52.94%) on ECG. 50% of patients presented with stable angina, 29.41% with unstable angina, 8.82% with NSTEMI and 11.76% with STEMI. 40% had pulmonary edema at initial presentation. **Conclusion:** LMCA stenosis is more common in males associated with severe disease in other coronary arteries. Isolated left main disease is rare and is more common in females as compared to males. Atherosclerosis was the major cause LMCA stenosis in the studied population. Severe forms of angina along with diffuse ST depression in multiple ECG leads are common findings in patients with LMCA stenosis.

Key words: Acute Coronary Syndromes, Atherosclerosis, Left main coronary artery stenosis, Risk factors of coronary artery disease.

Article Citation: Riaz R, Saeed MH, Sohail K, Abbas S, Ehsan A. Clinical presentation of patients with significant left main stenosis. Professional Med J 2020; 27(4):772-778. DOI: 10.29309/TPMJ/2020.27.04.3679

ostial, are rare coronary angiographic findings.⁶

Although Left Main Coronary Artery has certain anatomic and histologic characteristics, which distinguish it from the distal coronary arterial tree, when it comes to causes, atherosclerosis remains the most important cause of severe coronary artery stenosis. Other causes of LMCA stenosis are embolus from vegetations, dissection, spasm, tumors, thrombi, inflammation, syphilis, damage following aortic valve replacement and iatrogenic insult to the artery caused by angioplasty of the proximal LAD.⁶

Clinically significant LMCA stenosis usually presents with severe forms of angina; especially crescendo angina and unstable angina of shorter duration are frequent findings. It has been documented that clinical features and angiographic findings are important in risk stratification of patients with significant left main coronary artery stenosis into low or high

risk groups, as severity of symptoms is a useful prognostic marker in conjunction with arteriographic findings.⁷ Chest pain at rest, ST changes on resting ECG, cardiomegaly on chest X-ray, a history of heart failure and finding of left ventricular dysfunction at cardiac catheterization, are documented predictors of poor prognosis in patients with significant left main coronary artery stenosis.⁸

Medical management, without revascularization in patients with significant LMCA stenosis has poor prognosis. Therefore in most centers, the significant LMCA stenosis is regarded as life threatening condition and urgent revascularization is recommended.⁹ Angioplasty of unprotected LMCA stenosis is controversial, although recently, in some centers performing large number of interventions, angioplasty & stenting of unprotected LMCA stenosis has shown acceptably good results.^{10,11} However on account of survival benefits with surgery, Coronary Artery Bypass Grafting remains the therapy of choice for patients with significant LMCA stenosis.¹²

The purpose of the study was to evaluate the frequency of clinical presentation in patients with angiographically documented significant LMCA stenosis.

Angina Pectoris

Is term used to describe the syndrome of chest discomfort resulting from myocardial ischemia. Clinically patient presents with chest pain or angina like symptoms e.g. palpitations, shortness of breath or presyncope.

Stable Angina

Is no substantial change in anginal or angina like symptoms over several weeks, we term it as stable angina.

Unstable Angina

Is when symptoms pattern worsen abruptly, increase in frequency and distribution.

Myocardial Infarction

Non-ST Segment Elevation MI (NSTEMI)

In it increasing ischemic symptoms are associated

with T-wave inversion and or ST segment depression. It is distinguished from unstable angina by the presence of elevated serum levels of cardiac biomarkers.

ST Segment Elevation MI (STEMI)

It is diagnosed when ischemic symptoms are associated with new ST segment elevation in two or more contiguous leads, or new onset LBBB with elevated levels of cardiac biomarkers.

Pulmonary Oedema

Pulmonary rales due to accumulation of fluid in pulmonary interstitium and alveoli from high left atrial pressures. Clinically patient presents with severe shortness of breath and orthopnea. On auscultation there will be gallop rhythm and basal crackles in the chest.

MATERIAL AND METHODS

The study was conducted at department of Cardiac Catheterization and Interventional Cardiology, Punjab Institute of Cardiology Lahore. Cardiac Catheterization and Interventional Cardiology Department of Punjab Institute of Cardiology comprises of four catheterization laboratories well equipped with latest apparatus.

It was a hospital based Cross-sectional survey. Duration of study was 6 month. The calculated sample size was 170 cases with Non-probability purposive sampling.

All patients having more than 50% stenosis of LMCA during coronary angiography. Patients having age more than 25-years. Patients of both sexes.

Those who already had undergone Coronary Artery Bypass Grafting or Angioplasty.

Patients presented at Department of Cardiac Catheterization and Interventional Cardiology of Punjab Institute of Cardiology for coronary angiography, after ruling out any contraindication to the procedure, were subjected to detailed coronary angiographic study.

Coronary Angiography was performed from

femoral or radial approach under local anesthesia (lignocain 2%). 6 French left judkins catheter was used for left coronary artery, while 6 French right judkins catheter was used for right coronary artery. Left ventriculography was done with 6 French Pigtail catheter. 75% urographin was used as contrast media.

Patient's electrocardiogram and arterial pressure were monitored during whole procedure.

Before cannulation of LMCA ostium, a non-selective injection was given in left aortic sinus in antero- posterior projection to evaluate the LMCA.

Pressure damping on pressure tracing was carefully recorded on engagement of LMCA ostium.

After diagnosis of LMCA stenosis was made, additional angiographic views were limited, usually LAO cranial and RAO caudal views were sufficient to illustrate completely the extent of disease in left coronary system and LAO for right coronary system.

50% or more narrowing of LMCA was regarded as significant stenosis.

Patient having LMCA stenosis, after homeostasis of puncture site, were shifted to coronary care unit and were monitored closely for next 12-hours for any complications.

Patients with more than 50% stenosis of LMCA were included in the study.

170 patients included in the study which were selected from 500 patients undergoing coronary angiography during the study period. They were evaluated in detail for their clinical presentations after coronary angiography by the researcher. Patients were asked for chest pain (onset, character, duration and severity), shortness of breath, palpitations and presyncope and they were subjected to precordial and chest auscultation. ECG of these patients were taken to see for ST and T wave changes.

Data was be entered into a computer using

Statistical Package for Social Sciences (SPSS) version 10.0 for windows. Categorical variables (stable angina, unstable angina, STEMI, NSTEMI and Pulmonary oedema) were mentioned as frequencies and percentages. Continues variables (age) were expressed as mean \pm standard deviation (SD). As this was an observational study, so no test of significance was applied.

RESULTS

The study composed of 170 consecutive patients with significant left main coronary artery stenosis, which were selected from 500 patients undergoing coronary angiography during the study period.

All patients were of age above 25 years. There were 6 (3.52%) patients in the age range of 25-35 years, 33 (19.41%) patients in the age range of 36-45 years, 70 (41.17%) patients in the age range of 46-55 years, 43 (25.29%) patients in the age range of 56-65 years, 24 (14.12%) patients in the age range of 66-75 years. The mean age of the patients was 59.78 ± 5.76 years (Table-I).

There were 100 males (58.82%) and 70 females (41.18%) (Table-II). Regarding frequency of distribution of symptoms, most common symptom was chest pain (86.47%). Next most common complaint was shortness of breath (52.94%). followed by palpitations (24.70%) and presyncope (19.41%). (Table-III)

Frequency of clinical findings showed that crepitations were present in 19.41%, rhonchi in 14.70%, gallop in 29.41% and murmur in 17.64% of patients. (Table-IV)

Most common ECG finding was ST depression (52.94%) followed by ST elevation (14.70%), T wave inversion (12.94%), Q waves (7.05%), while normal ECG was observed in 18 (10.58%) of patients. (Table-V)

50% presented with stable angina, 29.41% with unstable angina, 8.82% with NSTEMI and 11.76% with STEMI. 40% had pulmonary oedema at initial presentation. (Table-VI)

Age (Years)	No.	Percentage
25-35	6	3.52
36-45	33	19.41
46-55	70	41.17
56-65	43	25.29
66-75	24	14.12
Total	170	100
Mean±SD	59.78±5.76	

Table-I. Distribution of patients by age. (n=170).

SEX	No.	Percentage
Male	100	58.82
Female	70	41.18
Total	170	100.0

Table-II. Distribution of patients by sex. (n=170).

Symptoms	No. of Patients	Percentage
Chest Pain	147	86.47%
Shortness of breath	90	52.94%
Palpitations	42	24.70%
Presyncope	33	19.41%

Table-III. Distribution of patients by symptoms. (n=170).

Clinical findings	No.	Percentage
1. Chest auscultation		
Crepitations	33	19.41%
Rhonchi	25	14.70%
2.precordium auscultation		
Gallop rhythm	50	29.41%
Murmur	30	17.64%

Table-IV. Distribution by clinical findings. (n=170).

ECG Findings	No. of Patients	Percentage
Normal ECG	18	10.58%
ST depression	90	52.94%
ST elevation	25	14.70%
T wave inversion	22	12.94%
Q waves	12	7.05%
Conduction defects	3	1.76%

Table-V. Frequency of distribution of ECG findings in patients with significant LMCA stenosis.

LMCA = Left Main Coronary Artery

Clinical Presentation	No. of Patients	Percentage
Stable Angina	85	50
Unstable Angina	50	29.41
NSTEMI	15	8.82
STEMI	20	11.76
Pulmonary Oedema	68	40

Table-VI. Distribution by main clinical presentation. (n=170).

DISCUSSION

Prevalence of LMCA stenosis ranges from 2.5 to 10%⁴. Significant LMCA disease is defined as greater than 50% stenosis. When present it is associated with multi-vessel CAD over 70% of time⁵. Patients with unprotected LMCA stenosis treated medically have three years mortality rate of approximately 50%⁹.

There is no age limit for clinical presentation of LMCA stenosis. Prasad SB et al¹³ in their study established that mean age of presentation of this disease was 68±14 year. In our study, we included patients above age 25 year and found 59.78±5.76 year to be mean age of disease presentation. Prasad SB¹³ also observed higher incidence of disease in male population. In their study 76% males had significant LMCA stenosis. In present study, out of total 170 patients, 100 (58.82%) were male and 70 (41.18%) were females.

Clinically significant LMCA stenosis if present is usually associated with severe forms of angina (NYHA class III-IV).⁷ Although there are no clinical features described that should invariably suggest the diagnosis of LMCA stenosis,^{14,15} however some reports delineate the presence of severe form of angina¹⁶ or crescendo angina pectoris, a strongly positive exercise test and calcification in the area of left main coronary artery may indicate the presence of LMCA disease.¹⁷ Similar to report by Lavin et al,¹⁷ Topaz O et al⁶ and Banim SO et al,¹⁵ moderate to severe angina(class III-IV) was a predominant finding in all patients of the study. In contrast to Topaz et al⁶ who described angina of relatively short duration as an important finding in patients with LMCA stenosis, in the present study more than 60% of the patients were having

anginal symptoms for more than 6 months. This finding may be due to general ignorant behavior of our population. In our study the most common symptom was also chest pain (86.47%), followed by shortness of breath (52.94%), palpitation (24.70%) and presyncope (19.41%). 54% of the patients have ST depression in resting ECG and ECG is found to be normal in 19% patients.⁷ It has been reported that the resting ECG can be normal or can show variable forms of ischemia in patients with LMCA stenosis.^{15,18} In a recent report, Sclarovsky et al¹⁹ has described that left main coronary artery stenosis often manifests as diffuse ST depression in inferior precordial leads on resting ECG. In the present study we also found ST depression as a commonest finding on resting ECG. Out of 170 patients included in the study, 90 (52.94%) patients were found to have ST depression in multiple leads, T wave inversion and Q waves was found in 22 (12.94%) and 12 (7.05%) patients respectively. Strikingly 18 (10.58%) patients showed normal resting ECG and 25 (14.70%) patients were those with ST elevation ECG changes.

Patients with LMCA stenosis are at a risk of having an unexplained high incidence of complications during diagnostic catheterization and coronary angiography,²⁰ Lavine P et al¹⁷ and Conhon et al²⁸ has described 10% and 16% mortality rate respectively, which is strikingly high. The Registry of the Society for Cardiac angiography and Interventions²¹ have indicated 0.55% mortality for coronary angiography in the presence of more than 50% LMCA stenosis. However, Samad et al⁵ in his study of 81 patients with left main disease has reported no mortality. In the present study all patients underwent coronary angiography without any major complications i.e. dissection, myocardial infarction, cerebrovascular accident, bleeding or death. This low complication rate is due mainly to adaptation of careful technique, early management of ischemia, bradycardia and hypotension during the procedure. Therefore, in the view of recent literature which suggests that if non-invasive investigations with good predictive value for left main coronary disease, the best safe guard is careful technique.

The main interest of our study lies in widespread clinical presentation of LMCA stenosis. According to international study²² 51.3% usually present with stable angina, 33.11% with unstable angina, and 15.6% with acute myocardial infarction²². 52% may have pulmonary oedema at initial presentation.²³ In our study 50% presented with stable angina, 29.41% with unstable angina, 8.82% with NSTEMI and 11.76% with STEMI. 40% had pulmonary oedema at initial presentation.

The CASS²⁴ registry found that 3.6 percent with left main disease were without any symptoms. Compared to symptomatic patients, the asymptomatic patients on medical treatment, although had similar severity (67 versus 70 percent) and extent of disease, appeared to have the same survival benefit with CABG. The five years' survival rate after coronary artery bypass surgery was 84% for the symptomatic patients and 88% for the asymptomatic patients. On medical treatment, 57% asymptomatic patients survived for five years compared to 58% symptomatic patients. But now recent studies show that Stenosis of LMCA is associated with poor prognosis on medical management and is an indication for early revascularization.²⁵ The studies have shown improved survival in patients with LMCA stenosis who underwent CABG up till about 10 years follow up.²⁶ The authors agree with the 2004 ACC/AHA task force on bypass surgery, which recommended CABG even with mild chest pain who have left main or left main equivalent disease. Percutaneous coronary intervention (PCI) can be offered in patients who are candidates for revascularization but are not suitable for CABG. Similar recommendations for CABG and PCI were made for patients with a non-ST elevation acute coronary syndrome. Therefore, the presence of LMCA stenosis is important to identify, as undetected LMCA disease may jeopardize the chances of revascularization therapy.²⁷

CONCLUSION

LMCA stenosis is more common in males associated with severe disease in other coronary arteries. Isolated left main disease is rare and is more common in females as compared to males.

Atherosclerosis was the major cause LMCA stenosis in the studied population. Severe forms of angina along with diffuse ST depression are common findings in patients with LMCA stenosis.

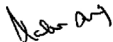

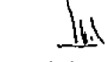

Copyright© 22 Oct, 2019.

REFERENCES

1. Fuster V, Alexander RW, O'Rourke RA (2001). **Hurst's the Heart (10th ed.)** McGraw-Hill. p. 53.
2. Hrrrick J. **Clinical features of sudden obstruction of the coronary arteries.** JAMA 1912; 59:2015-20.
3. Takaro T, Pifarre R, Fish R. **Veterans Administration Cooperative Study of medical versus surgical treatment for stable angina progress report. Section 3. Left main coronary artery disease.** Prog Cardiovasc Dis 1985; 28:229-34.
4. Kapadia SR, Ellis SG. **Non-surgical management of left main coronary artery disease.** Indian Heart J 1998; 50(Supp 1):67-73.
5. Samad A, Rasheed SZ, Ajmal H, Rehman M. **Prevalence of left main coronary artery disease in 1000 consecutive patients undergoing coronary angiography.** Pak J Cardiol 1992; 2: 70-6.
6. Topaz O, Wanner M, Lanter P, Soffer A, Burns C, Disciascio G. **Isolated significant left main coronary artery stenosis: Angiographic, Haemodynamic, and Clinical Findings in 16 patients.** Am Heart J 1991; 122: 1308-14.
7. Conley MJ, Ely RL, Kisslo J, Lee KL, McNeer F, Rosati RA. **The prognostic spectrum of left main stenosis.** Circulation 1978; 57:947-52.
8. Gerish BJ, Braunwald E, Rutherford JD. **Coronary Artery Disease. In: Braunwald E. Heart disease. 5th ed.** Philadelphia: Saunders, 1997: 1289-1365.
9. Gottlieb C, Friesinger II, Hurst JW. **The natural history of atherosclerotic coronary heart disease. A historical prospective.** In: Alexander RW, Schlan RC, Fuster V. The heart. 9th ed. New York: McGraw Hill, 1998:1127-38.
10. Kosuga K, Tamas H, Ueda K, Hsu YS, Kawashima A, Tanaka S et al. **Initial and long term results of angioplasty in unprotected left main coronary artery.** Am J Cardiol 1999; 83:32 -7.
11. Silvestri M, Barragan P, Sainsous J, Bayet G, Smeoni JB, Roquebert PO. **Unprotected left main coronary stenting, immediate and medium term outcomes of 140 elective procedures.** J Am Coll Cardiol 2000; 35: 1543-50.
12. Ellis SG, Hill CM, Lytle BW. **Spectrum of surgical risk for left main coronary stenosis; benchmark for potentially competing percutaneous therapies.** Am Heart J 1998; 135:335-38.
13. SB Prasad, R Whitbourn, Y Malaiapan. **Primary percutaneous coronary intervention for acute myocardial infarction caused by left main stem thrombosis.** Catheter Cardiovasc Interv 2009 Feb 15; 73(3):301-7.
14. Chaitman BR, Fishr LD, Baurassa MG, Davis K, Rogers WJ, Maynard C. **Effects of coronary artery bypass surgery on survival patterns in subsets of patients with left main coronary artery disease; a report of the collaborative study in coronary artery surgery (CASS).** Am J Cardiol 1981; 48:765-77.
15. Banim SO, Donaldson RM, Russel DC, Sturridge MF, Wright JE, Honey M. **Clinical experience with left main coronary artery stenosis.** Br Heart J 1976; 38: 71-76.
16. Miller G, Honey M, El- syed H. **Isolated coronary ostial stenosis.** Cathet Cardiovasc Diag 1986; 12: 30-34.
17. Lavine P, Kimbris D, Segal BL, Linheart JW. **Left main coronary artery disease. Clinical, arteriographic and haemodynamic appraisal.** Am J Cardiol 1972; 30; 791-96.
18. Chia BL, Ee B, Tan A, Tan L. **U wave inversion in unstable angina due to left main coronary artery stenosis.** Cardiology 1987; 74: 151-55.
19. Sclerovisky S, Kjell N, Birnbaum Y. **Manifestations of left main coronary artery stenosis is diffuse ST depression in inferior and precordial leads on ECG.** J Am Coll Cardiol 2002; 40: 575-76.
20. Picano E, Smonettic I, Masini M, Marzilli M, Lattanzi F, Distante A. **Transient myocardial dysfunction during pharmacologic vasodilation as an index of reduced coronary reserve: a coronary heamodynamic and echocardiography study.** J Am Coll Cardiol 1986; 8: 84-90.
21. el Fawal MA, Berg GA, Whiatly DJ, Harland WA. **Sudden coronary death in Glasgow: the severity and distribution of chronic coronary atherosclerotic stenosis.** Br Heart J 1987; 52: 420-26.
22. Valgimigli M, Malagutti P, Polad J, Tsuchida K, Regar E, et al. **Distal left main coronary disease is a major predictor of outcome in patients undergoing percutaneous intervention in the drug eluting stent era.** J Am Coll Cardiol 2006; 47: 1530 - 7.

23. Malaiapan Y, Ahmer W, Whitbourn R, MacIsaac A. **Primary percutaneous coronary intervention for acute myocardial infarction caused by unprotected left main stem thrombosis.** S Cardiol J.2008; 73: 301 – 7.
24. Taylor HA, Deumite NJ, Chaitman BR, Davis KB, Killip T, Rogers WJ. **Asymptomatic left main coronary artery disease in the Coronary Artery Surgery Study (CASS) registry.** Circulation 1989; 79:1171-9.
25. Webster JS, Moberg C, Rincon G. **Natural history of severe proximal coronary artery disease as documented by cine angiography.** Am J Cardiol 1974; 33:195.
26. Farranka JB, Kaplan MA, Harris CN, Dunne EF, Garlish RA, Kay JH, Brooks S. **Disease of left main coronary artery: surgical treatment and long term follow up in 267 patients.** Am J Cardiol 1978; 42: 124-28.
27. Smith, SC Jr, Feldman, TE, Hirshfeld, JW Jr. **ACC/AHA/SCAI 2005 guideline update for percutaneous coronary intervention a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (ACC/AHA/SCAI Writing Committee to Update the 2001 Guidelines for Percutaneous Coronary Intervention).** J Am Coll Cardiol 2006; 47:e1.
28. Cohn MV, Cohn PF, Herman MV, Gorlin R. **Diagnosis and prognosis of left main coronary artery obstruction.** Circulation 1972; 45: 57-65.

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Rehan Riaz	1st Author	
2	M. Hamid Saeed	2nd Author	
3	Kamran Sohail	3rd Author	
4	Shahid Abbas	4th Author	
5	Ali Ehsan	5th Author	