

## COMPARING THE FREQUENCY OF LEFT MAIN STEM DISEASE AMONG PATIENTS WITH ST ELEVATION IN aVR LEAD

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### Abstract

**Background:** Coronary artery disease (CAD) is one of the leading causes of mortality worldwide with similar prevalence in Pakistan. The main objective of the study is to compare the frequency of left main stem disease among patients with ST elevation in aVR.

**Methods:** This cross-sectional study was conducted in Department of cardiology, Punjab institute of cardiology, Lahore. Sample size of 151 cases is calculated with 95% confidence level, 7% margin of error and taking expected percentage of LMS is 74.2%. The data was collected through non probability consecutive sampling technique.

**Results:** Mean age of the study population was 55.54±10.1 years. Majority of the cases were male 117(77.5%) and 34(22.5%) were female which were less in quantity. Mean body mass index was 28.61±2.58.

**Conclusion:** Majority of the cases developed left mainstem disease who have been diagnosed with ST elevation in aVR. A significant difference of the diabetic versus non diabetic was observed who have been noted for LMS disease.

**How to cite:** Siddiqi MT, Ahmed KD, Bhatti MI, Hameed S, Liaqat R, Usama KM. Comparing the frequency of left main stem disease among patients with ST elevation in aVR. *JAIMC* 2023; 21(2): 97-100

Coronary artery disease (CAD) is one of the leading causes of mortality worldwide with similar prevalence in Pakistan.<sup>1,2</sup> Due to increased prevalence of diabetes mellitus and obesity, incidence of CAD will continue to rise.<sup>3</sup> Patients suffering from left main stem (LMS) disease in acute coronary syndrome (ACS) setting had a very bad prognosis.<sup>4</sup> To have a best treatment option for these patients early identification of these patients by bed side electrocardiography is important.<sup>5</sup>

The left main coronary artery (LMCA) supplies the largest area of myocardium, so patients with the disease of this artery are at very high risk for myocardial infarction and its related complications.<sup>6</sup> ECG rapidly interprets the manifestations of ACS in emergency

department; however, ECG findings in lead aVR are mostly neglected. These findings are related to LMCA stenosis in ACS. The most common ECG findings related to LMCA stenosis are ST segment elevation in lead aVR.<sup>7</sup> The ST segment elevation of 0.1 mV or more in lead aVR on ECG suggests high probability of left main coronary artery disease or severe CAD with associated worse prognosis.<sup>8</sup> An acute obstruction of left main coronary artery (LMCA) is encountered approximately in only 0.5% of acute myocardial infarction (AMI) cases.<sup>9</sup> The ECG predicting an acute obstruction of the LMCA, thus the simple non-invasive, inexpensive, easily available ECG can help us earlier prediction of the deadly lesion in LMCA, so that we can proceed further to confirm the diagnosis and can take prompt, appropriate treatment strategy to reduce the mortality in acute coronary syndrome.<sup>10</sup>

Many a trial have been conducted under different circumstance concerning the prevalence of left main stem disease in diabetics and non diabetics patients. In a study by Ali Let al, 74.2% patients with ACS had significant LMS disease and this significant LMS

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Submission Date: 09-04-2023

1st Revision Date: 08-05-2023

Acceptance Date: 15-06-2023

disease was observed in 50% diabetics and 50% non diabetics. This study concluded that prevalence of LMS is equal in both diabetics and non diabetics.<sup>(11)</sup> In a study by Ashraf M et al, out of 693 patients with acute coronary syndrome, 54.83% patient had diabetes and 45.16 % patient were non diabetics.<sup>(12)</sup> In another study by Parvin T et al, left main stem disease was more prevalent in diabetic patients than in non diabetics.

### OBJECTIVES

The main objective of the study is to compare the frequency of left main stem disease among patients with ST elevation in aVR.

### METHODS

This cross-sectional study was conducted in Department of cardiology, Punjab institute of cardiology, Lahore. Sample size of 151 cases is calculated with 95% confidence level, 7% margin of error and taking expected percentage of LMS is 74.2%. The data was collected through non probability consecutive sampling technique.

#### Inclusion Criteria

- Gender: both male and female
- Age: 30 - 80 years
- Left main stem disease in patients presenting with ST elevation in aVR of > 1mm on ECG.

#### Exclusion Criteria

- Inability to provide informed consent.
- ACS due to substance abuse.
- On ECG patients having LBBB, RBBB pattern.

### DATA COLLECTION

After approval from the hospital ethical committee, all patients who will present in the department of medical emergency and fulfil the selection criteria, was included in the study. A valid informed consent was taken after counselling the patients regarding the procedure & objective of the study. The demographic information (age, sex etc.) was recorded. Demographic characteristics of all patients was obtained. Detailed medical history including past history was taken. A detailed physical examination with special emphasis

on CVS was performed. ECG of all patients was evaluated followed by angiography for detection of patients with left main stem disease. The patients was labelled as yes if they are found to have left main stem disease.

### DATA ANALYSIS

All the collected data was entered into SPSS version 22 and analyzed. Quantitative data like age (in years) was presented as means and standard deviations. The qualitative data like demographics (sex; male or female) and number of patients was presented as frequency and percentage.

### RESULTS

Mean age of the study population was 55.54±10.1 years. Majority of the cases were male 117(77.5%) and 34(22.5%) were female which were less in quantity. Mean body mass index was 28.61±2.58.

It was noted that left main stem disease was in 96(63.6%) of cases while 55(36.4%) were without this disease. Diabetes mellitus was present in 33(21.9%) cases while 118(78.1%) were not diagnosed with the diabetes.

**Table 1:** Distribution of the Mean Age and BMI of the Study Population

Age	
Mean	55.54
Std. Deviation	10.10
BMI	
Mean	28.61
Std. Deviation	2.58

**Table 2:** Distribution of the Gender in the Study Population

	Frequency	Percent
Male	117	77.5
Female	34	22.5
Total	151	100.0

When data was stratified, it was noted that left main stem disease was in 42(77.8%) cases with age 30-50 years and in 54(55.7% in age group of >50 years with a significant difference (P-value<0.05).

**Table 3:** Distribution of the Left Main Stem Disease in the Study Population

	Frequency	%
Yes	96	63.6
No	55	36.4
Total	151	100.0

**Table 4:** Comparison of the Left Main Stem Disease in Diabetes versus non- Diabetes Cases

		Left main stem disease		Total
		Yes	No	
Diabetes Mellitus	Yes	26 73.7%	9 27.3%	0.04
	No	70 59.0%	46 39.0%	

**DISCUSSION**

The left main coronary artery (LMCA) supplies up to 75–100% of left ventricular mass depending on the dominance type. For that reason acute non-ST-segment elevation (NSTEMI) or ST-segment elevation (STEMI) myocardial infarction due to critical stenosis or abrupt occlusion of the LMCA is a catastrophic situation with a very high in-hospital and long-term mortality.<sup>13</sup> Many cases are never reported because of pre-hospital death. Although coronary artery bypass grafting (CABG) remains a class I recommendation for LM revascularization in European and American guidelines, percutaneous coronary intervention (PCI) is becoming an attractive option in patients with acute myocardial infarction and LMCA as an infarct-related artery, especially when in cardiogenic shock. Advances in devices and adjunctive pharmacotherapy make PCI of the LMCA feasible and with at least non-inferior results to CABG.<sup>14</sup>

Although electrocardiography is not a highly specific method for the diagnosis of myocardial infarction due to ULMCA disease, the primary results of our registry suggest that STEMI (vs. NSTEMI) remains an independent predictor of in-hospital and 12-month mortality. Several lines of evidence indicate that not all patients with severe ULMCA disease develop ECG changes before a hemodynamic collapse.<sup>15</sup> In those who present with ST-segment abnormalities an aVR lead is one of high specificity and sensitivity for

ULMCA disease, especially when ST-elevation is higher than in the V1 lead, which correlates with mortality and hemodynamic deterioration. Mahajan et al. reported that differences in ST-segment deviations in the V1 and V6 leads are even more specific for predicting ULMCA disease than the aVR lead itself.<sup>16</sup>

Despite well-documented female sex-related discrepancies in the presentation, management, clinical course and outcomes in patients with STEMI in the general population, in the elderly and in the young, in the present study we did not find any significant male-favoring difference. This is a surprising finding, leading to the conclusion that the deleterious impact of the LMCA-related myocardial infarction on mortality is the greatest of all known risk factors.<sup>17</sup>

**CONCLUSION**

Majority of the cases developed left main stem disease who have been diagnosed with ST elevation in aVR. A significant difference of the diabetic versus non diabetic was observed who have been noted for LMS disease.

**REFERENCES**

1. Basra SS, Virani SS, Paniagua D, Kar B, Jneid H. Acute Coronary Syndromes. Heart Fail Clin 2016; 12(1): 31-48.
2. Lashari NA, Lakho NI, Memon SA, Ahmed A, Waseem MF. ACUTE CORONARY SYNDROME. TPMJ 2017;24(3):409-13.
3. Roffi M, Patrono C, Collet JP, Mueller C, Valgimigli M, Andreotti F, Bax JJ, Borger MA, Brotons C, Chew DP, Gencer B. 2015 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation: Task Force for the Management of Acute Coronary Syndromes in Patients Presenting without Persistent ST-Segment Elevation of the European Society of Cardiology (ESC). Eur Heart J 2016;37(3):267-315.
4. Kotecha T, Rakhit RD. Acute coronary syndromes. Clin Med 2016;16(6):43-8.
5. Pfeiffer MA, Claggett B, Diaz R, Dickstein K, Gerstein HC, Køber LV, Lawson FC, Ping L, Wei X, Lewis EF, Maggioni AP. Lixisenatide in patients with type 2 diabetes and acute coronary syndrome. N Engl J Med 2015;373(23):2247-57.
6. Celano CM, Beale EE, Beach SR, Belcher AM, Suarez L, Motiwala SR, Gandhi PU, Gaggin H, Januzzi Jr

- JL, Healy BC, Huffman JC. Associations Between Psychological Constructs and Cardiac Biomarkers After Acute Coronary Syndrome. *Psychosom Med* 2017; 79(3):318-26.
7. Liu HL, Jin ZG, Yang SL, Han W, Jing QM, Zhang L, Luo JP, Ma DX, Liu Y, Yang LX, Jiang TM. Five-year outcomes of ST-elevation myocardial infarction versus non- ST-elevation acute coronary syndrome treated with biodegradable polymer-coated sirolimus-eluting stents: Insights from the CREATE trial. *JC* 2017; 69(1):149-55.
  8. Nishida T, Takayama T, Hiro T, Fukamachi D, Haruta H, Iida K, Kougo T, Mineki T, Akutsu N, Murata N, Ooshima T. A Case of Residual Thrombi in the Acute Phase in Drug-eluting and Bare-metal Stents Implanted in a Patient with Acute Coronary Syndrome. *Angioscopy* 2016;2(1):6-9.
  9. Murphy SA, Cannon CP, Blazing MA, Giugliano RP, White JA, Lokhnygina Y, Reist C, Im K, Bohula EA, Isaza D, Lopez-Sendon, J. Reduction in total cardiovascular events with ezetimibe/simvastatin post-acute coronary syndrome: the IMPROVE-IT trial. *J Am Coll Cardiol* 2016;67(4):353-61.
  10. Bagai A, Bhatt DL, Verma S, Mehta SR. Response by Bagai et al to Letter Regarding Article, "Individualizing Duration of Dual Antiplatelet Therapy After Acute Coronary Syndrome or Percutaneous Coronary Intervention". *Circulation* 2016;134(15):334-5.
  11. Ali L, Asghar N, Hussain A, Shah M. ST Segment Elevation in Lead aVR: Clinical Significance in Acute Coronary Syndrome. *Ann Pak Inst Med Sci* 2016; 12(4):203-8
  12. Ashraf M, Sharma S, Rashid A, Ismail M, Tanvir M, Sharma P, Banday AZ. Prevalence of Undiagnosed Diabetes Mellitus in Acute Coronary Syndrome Patients: A Hospital-based Study. *IJSS* 2016;4(2):179-84.
  13. Parvin T, Haque KS, Siddique MA, Habib SA, Rahman M, Rahman MH, Sultan MA, Hoque MH. Angiographic Severity of Coronary Artery Disease in Diabetic and Non-Diabetic Patients in a Tertiary Care Centre. *University Heart Journal* 2015;10(1):13-7.
  14. Hussain C, Hassan M, Shah B, Shahab S, Awan ZA. Frequency of Left Main Coronary Artery Disease in Patient Presenting for Coronary Angiography to Cardiac Cath. Lab, Hayatabad Medical Complex Peshawar. *Ann Pak Inst Med Sci* 2017; 13(1):79-82
  15. Levine GN, Bates ER, Blankenship JC, Bailey SR, Bittl JA, Cercek B, Chambers CE, Ellis SG, Guyton RA, Hollenberg SM, Khot UN, Lange RA, Mauri L, Mehran R, Moussa ID, Mukherjee D, Nallamothu BK, Ting HH. 2011 ACCF/AHA/SCAI guideline for percutaneous coronary intervention: executive summary: a report of the American College of Cardiology Foundation/American Heart Association Task Force on Practice Guidelines and the Society for Cardiovascular Angiography and Interventions. *Circulation*. 2011; 124:2574–2609.
  16. Boden WE, O'Rourke RA, Teo KK, Hartigan PM, Maron DJ, Kostuk WJ, Knudtson M, Dada M, Casperson P, Harris CL, Chaitman BR, Shaw L, Gosselin G, Nawaz S, Title LM, Gau G, Blaustein AS, Booth DC, Bates ER, Spertus JA, Berman DS, Mancini GB, Weintraub WS. Optimal medical therapy with or without PCI for stable coronary disease. *N Engl J Med*. 2007;356:1503–1516.
  17. Veterans Administration Coronary Artery Bypass Surgery Cooperative Study Group. Eleven-year survival in the Veterans Administration randomized trial of coronary bypass surgery for stable angina. *N Engl J Med*. 1984;311:1333–1339.