



CODEN [USA]: IAJPBB

ISSN : 2349-7750

**INDO AMERICAN JOURNAL OF  
PHARMACEUTICAL SCIENCES**

SJIF Impact Factor: 7.187

Available online at: <http://www.iajps.com>

Research Article

**TO DETERMINE THE FREQUENCY OF LEFT MAIN  
ARTERY DISEASE THROUGH ECG IN PATIENTS WITH  
ACUTE CORONARY SYNDROME**<sup>1</sup>Dr Muhammad Usman,<sup>2</sup>Dr Afsheen Nigar,<sup>3</sup>Dr Hafiz Ehtisham Ul Haq<sup>1</sup>PGR, Punjab Institute of Cardiology.<sup>2</sup>MO, Liaquat University of Medical and Health Sciences, Jamshoro<sup>3</sup>Allied Hospital, Faisalabad.**Article Received:** July 2020**Accepted:** August 2020**Published:** September 2020**Abstract:**

**Introduction:** For the diagnosis of acute coronary syndrome, electrocardiography (ECG) is an easy, fast, and economic investigation. Its applicability in predicting left main coronary artery/3 vessel coronary disease can be very useful in saving precious time in coronary patients' critical treatment. **Objective:** Electrocardiography changes in patients with Non-ST segment elevation acute coronary syndrome as an indicator of left main coronary artery / 3 vessel coronary diseases. **Methods:** This cross-sectional study was conducted at Mumtaz Bakhtawar Hospital Lahore from May 2019 to April 2020, taking 112 consecutive patients > 20 years of age, either gender, with Non-ST segment elevation MI symptoms or with ECG changes in lead aVR. The immediate family members of the patients received informed written consent for the study. Approval was taken from hospital ethics judiciary committee. Analyzing data done through SPSS. Descriptive statistics were presented (mean  $\pm$  standard deviation for continuous & frequencies, and percentages for categorical variables). **Results:** Median  $\pm$ SD age for patients was 54.65  $\pm$ 16.44 years. The ratio Male to Female was 3.4:1. About half of these patients suffered from Left Main (LM)/3 Vessel diseases. About another quarter had 2 vessels and others had single-vessel disease ( $P$  value < 0.0001). In lead aVR, patients with ST elevation were associated with increased risk of developing LM/3 vessel disease ( $P$  value < 0.0001). **Conclusion:** In lead II, III, and aVF, ST elevation in lead aVR and ST depression can be basically used for assessment of the NSTEMI-ACS patients left main/3 vessel disease.

**Corresponding author:****Dr. Muhammad Usman,**

PGR, Punjab Institute of Cardiology.

QR code



Please cite this article in press Muhammad Usman et al, To Determine The Frequency Of Left Main Artery Disease Through ECG In Patients With Acute Coronary Syndrome., Indo Am. J. P. Sci, 2020; 07(09).

**INTRODUCTION:**

Annually acute myocardial infarction in the USA causes around 1.5 million deaths (1). Earlier the developed nation's dilemma was thought but the present situation is contradictory to this idea. It is a remarkable fact that in two South Asian countries, i.e., > 75% of all cardiovascular deaths in the world occurs, India and that of Pakistan. About 11 per cent of deaths in all ages are attributed to IHD in Pakistan, being the second most common cause of mortality (2).

Diagnosis of acute coronary syndrome is made when patients present with symptoms indicative of myocardial infarction (MI) with no proof of ST elevation on ECG (3). Non-ST Elevation Myocardial Infarction (NSTEMI) is the most common presentation of patient relationships in coronary emergencies. Most deaths can be averted if those patients can be recognized early (4). STEMI in these patients is due to complete coronary artery blockage & partial or subtotal occlusion results in unstable angina pectoris (UAP), also known as NSTEMI. The later appearance is never the same and may differ from no sign of ECG to ST depression, T wave flattening, or T wave inversion (5).

Occlusion of the Left Main Coronary Artery (LMCA) is typically the most frequent and fatal myocardial infarction. This is because, at the LMCA bifurcation, that provides most of the heart, the two major branches of the coronary artery are left anterior descending (LAD) and left circumflex (LCX) (6).

NSTEMI patients have a significantly higher case fatality risk. The vital stenosis of left main coronary artery results in high death rates in the absence of adequate treatment of PTCA or CABGs. It is therefore very necessary that the essential LMCA stenosis is easily detected. Studies show that left or three-vessel diseases can be predicted and monitored more reliably if they are prompt or fast identification is made possible (7). The disease of LMCA/3 vessels was considered predictable through ECG.

As a cost-effective and easy-to-access electrocardiogram (ECG) is important to recognizing NSTEMI patients who are not able to have a successful prognosis and is quick and free of any complication (8). Thus, even in modern times with advanced diagnostic methods it plays a key part in the early provision of significant prognostic knowledge. Different studies have been carried out, but there has still been no scientific consensus about left main coronary artery (LCMA) prediction via ECG. To classify it as the left main/3 vessel disease, a certain ST height of the ST-Segment of

0.5 mm or depression of 2 mm is appropriate in a VR of ECG (9).

The research was performed to determine the changes from the Electrocardiogram in patients with an acute coronary artery syndrome in Mumtaz, Bakhtawar hospital for left coronary artery / 3 vessel disease in order to further rationalize these patients and to treat them appropriately, based on the results from our research.

**MATERIAL AND METHODS:**

This prospective observational study was conducted from May 2019 to April 2020 at Mumtaz Bakhtawar hospital Lahore, through convenience sampling technique.

**Inclusion Criteria:**

All patients with NST-ACS along with ECG findings of ST segment elevation in leads aVR along with ST segment depression in leads II, III, and aVF having age >20 - 80 years of either gender were included in our study.

**Exclusion criteria:**

All patients with a left bundle branch block, transient or persistent elevation of the ST segment in the chest or lead aVR were removed. Likewise, bacterial, inflammatory or hematologic disorders were also removed from Q-wave acute MI, PCI or CABG in six months past this year.

We used (12 leads ECG machine) to collect the patients' initial ECG that was presented in the coronary care unit (CCU).

Once stabilized, these patients were transferred to the cardiology ward and then regularly monitored for three days, followed by serial ECGs to determine the occurrence of acute STEMI or arrhythmias. Data were collected on a proforma about variable linked to demographics and disease. Analysis of the data was performed using version 21 of SPSS.

The immediate family member of patients was given informed written consent for the study. It has also received approval from the hospital's ethics review committee. All patients were treated under the supervision of the experienced consultant cardiologist as per globally approved & institutionally followed protocols. An angiography confirmed presence of LM/3VD. The coronary to combat researcher's bias, two independent interventional cardiologists who were blinded to the analysis and patients tested the angiography of all the patients. They classified serious lesions if the left occlusion of the main coronary artery was > 50% or all other arteries were > 70%.

Age & other continuous variables were displayed as mean  $\pm$  standard deviation, while categorical data such as gender, co-morbidity & LM/3VCAD frequency were presented as frequencies and percentages. Association of ECG shifts with LM/3VCAD frequency was checked by taking chi square, and a p value  $< 0.05$  was taken as statistically important.

### RESULTS:

Patients had a mean  $\pm$ SD age of  $54.65 \pm 16.44$  (Range: 20-89 years). It was 54 years of average age. The population samples were typically distributed in accordance with the young and young ages. The ratio of men and women was 3.4:1. Many were mid-aging patients.

At both ends of age there were fewer patients. All patients (n=112) who had ACS non-TS elevation were monitored for left main / 3 vessel disease. Over a half (52%) of such patients, however, have LM/3 vessels (P  $< 0.0001$ ) disease. Around another quarter (25%) had 2 vessels and 22% had suffer single ship disease. The risk of development of LM/3 vessel disease is higher for patients who have ST elevation in lead aVR. (P-value less than 0.0001)

### DISCUSSION:

Owing to the rapid adoption of sedentary lifestyles, a sharp increase in cases of cardiac disorders is widespread in our population as well as elsewhere in Asia, including acute coronary disease (10). The most popular prognosis is for patients suffering from NSTEMI in the left main / 3 vessel coronary artery (11). This creates a need for early and accurate clinical expertise in predicting important diseases of the left main / 3 vessel coronary artery based on simple, fast and non-invasive diagnostic measures such as ECG (12).

The first diagnostic diagnostics of acute myocardial infarction in first-aid, ECG also makes a significant contribution to the early diagnosis of seriousness of the disease via ECG changes which imply severe stenosis of the main left coronary artery (13). The ECG immediately needs a cardiologist to send the patient to emergency / temporary coronary angiography for an angioplasty. In this respect, a lead aVR which provides a usually opposite picture of the chest leads aVL is the most critical but often overlooked path (14).

The current study found that more than half (52.63%) patients presented with NSTEMI had left main / 3 vessel disease (P value = 0.0001). Our study finding is comparable with the other contemporary studies. Hussein A, et al, reported that in their series 44.7% patients presented with significant LM/ 3 vessels disease while another study by Masami et al reported that as much as

31% patients presented with NSTEMI and had left main / 3 vessel disease (15). Barrabes JA, et al. analyzed the initial ECG in patients of MI presenting without ST-segment elevation & found that in such patients, prognosis with severity of disease can be more correctly predicted using lead aVR (16). Thus the patients presenting with NSTEMI should be treated with rapid coronary interventions like PTCA or CABG. ST-segment elevation in lead aVR  $> 0.5$  mm and QRS duration  $> 90$  ms were found to be good ECG predictors of left main or three vessel disease in patients with NSTEMI (17).

In a study the elevation of ST in lead aVR and positive troponin T also  $> 1.0$  mm were found to be good predictors of a serious LM / 3 vessel disease (18). In the current study, we have also noted that the elevation of the ST segment in lead aVR  $> 0.5$  mm has been identified as having a relation to serious left coronary disease (P value  $< 0.0001$ ). Summaries can be found to indicate that the findings of these trials provide adequate evidence to enhance the efficacy of the ECG by looking at the extent or distribution of ST segment depression to predict clinical outcomes in NSTEMI patients.

### Limitations of the study:

Presentation and the predictive value of ECG for assessing disease severity can also affect the presence of a range of co-morbid conditions, like hypertension, smoking & diabetes, which could be potentially risk factors for an acute coronary syndrome. But the scope of this study was beyond that. As it is done in a single tertiary treatment setup, the results of the present study cannot be generalized.

### CONCLUSION:

The current study found that ECG analysis can be practically used to evaluate left main/3 vessel disease among NSTEMI-ACS patients, especially ST elevation in lead aVR and ST depression in lead II, III, and aVF.

### REFERENCES:

1. Watanabe N, Akasaka T, Yamaura Y, Akiyama M, Koyama Y, Kamiyama N, et al. Noninvasive detection of total occlusion of the left anterior descending coronary artery with transthoracic Doppler echocardiography. *J Am Coll Cardiol* 2001;38(5):1328-32.
2. AlFaleh H, Elafar AA, Ullah A, AlHabib KF, Hersi A, Mimish L, et al. Acute heart failure with and without acute coronary syndrome: clinical correlates and prognostic impact (From the HEARTS registry). *BMC Cardiovasc Disord* 2016;16(1):98.
3. Kueh SH, Devlin G, Lee M, Doughty RN, Kerr AJ. Management and Long-Term Outcome of Acute Coronary Syndrome Patients Presenting

- with Heart Failure in a Contemporary New Zealand Cohort (ANZACS-QI 4). *Heart Lung Circ* 2015 Oct 26; pii: S1443-9506(15)01436-5.
4. Pajak A. A new model of secondary prevention of cardiovascular disease in patients after acute coronary syndrome. *Kardiol Pol* 2016;74(4):399-402.
  5. Ostojic MM, Potpara TS, Polovina MM, Ostojic MM, Ostojic MC. Typical chest pain and precordial leads ST-elevation in patients with pacemakers--are we always looking at an acute myocardial infarction? *Vojnosanit Pregl* 2015 Sep;72(9):837-40.
  6. Levis JT. ECG Diagnosis: Hyperacute T Waves. *Perm J* 2015;19(3):79.
  7. Hwang C, Levis JT. ECG diagnosis: ST-elevation myocardial infarction. *Perm J* 2014;18(2):e133.
  8. Nabati M, Emadi M, Mollaalipour M, Bagheri B, Nouraei M. ST-segment elevation in lead aVR in the setting of acute coronary syndrome. *Acta Cardiol* 2016 Feb;71(1):47-54.
  9. Misumida N, Kobayashi A, Fox JT, Hanon S, Schweitzer P, Kanei Y. Predictive Value of ST Segment Elevation in Lead aVR for Left Main and/or Three-Vessel Disease in Non-ST-Segment Elevation Myocardial Infarction. *Ann Noninvasive Electrocardiol* 2016;21(1):91-7.
  10. Barrabes JA, Figueras J, Moure C, Cortadellas J, Soler-Soler J. Prognostic value of lead aVR in patients with a first non-ST-segment elevation acute myocardial infarction. *Circulation* 2003;108(7):814-9.
  11. Kossaify A. ST Segment Elevation in aVR: Clinical Significance in Acute Coronary Syndrome. *Clin Med Insights Case Rep* 2013;6:41-5.
  12. Tanindi A, Cemri M. Troponin elevation in conditions other than acute coronary syndromes. *Vasc Health Risk Manag* 2011;7:597-603.
  13. Heldeweg ML, Liu N, Koh ZX, Fook-Chong S, Lye WK, Harms M, et al. A novel cardiovascular risk stratification model incorporating ECG and heart rate variability for patients presenting to the emergency department with chest pain. *Crit Care* 2016;20(1):179.
  14. Carr MJ, O'Shea JT, Hinfey PB. Identification of the STEMI-equivalent de Winter Electrocardiogram Pattern After Ventricular Fibrillation Cardiac Arrest: A Case Report. *J Emerg Med* 2016 May 14; pii: S0736-4679(16)30023-3.
  15. Shibutani H, Akita Y, Yutaka K, Yamamoto S, Matsui Y, Yoshinaga M, et al. Acute myocardial infarction with "wrap around" right coronary artery mimicking Takotsubo cardiomyopathy: a case report. *BMC Cardiovasc Disord* 2016;16(1):71.
  16. Hashemian AM, Ahmadi K, Taherinia A, Sharifi MD, Ramezani J, Jazayeri SB, et al. ECG changes of cardiac origin in elderly patients with traumatic brain injury. *Med J Islam Repub Iran* 2015;29:306.
  17. Abeysuriya V, Chandrasena LG, Kasturiratne A, Hettiarachchi VS, Wickremasinghe AR. Outcome of patients with ST segment elevation myocardial infarction (STEMI) following percutaneous transluminal coronary angioplasty: a retrospective study. *Ceylon Med J* 2014 Dec;59(4):118-23.
  18. Ilija R, Weinstein JM, Wolak A, Gilutz H, Cafri C. Length of left anterior descending coronary artery determines prognosis in acute anterior wall myocardial infarction. *Catheter Cardiovasc Interv* 2014 Aug 1;84(2):316-20.