International Journal Dental and Medical Sciences Research
Volume 5, Issue 2, Mar - Apr 2023 pp 439-440 www.ijdmsrjournal.com ISSN: 2582-6018

The aVR as an Orphan Lead in Acute Coronary Syndrome

Dr. Biswajit Das
Asso.prof, cardiology, scb medical college, cuttack.
Orissa

Date of Submission: 12-03-2023 Date of Acceptance: 22-03-2023

ABSTRACT
The aVR lead is a unipolar limb lead facing the right superior surface of the heart. The lead aVR, which is often neglected during interpretation, can convey important diagnostic and prognostic information in patients with acute coronary syndrome. ST segment elevation in lead aVR with ST segment depression in multiple leads often indicates left main coronary artery occlusion carrying severe adverse prognosis.

I. INTRODUCTION

In spite of striking advances in medical technology, the 12 leads electrocardiography still is the cornerstone for diagnosis of several cardiac ailments. The ECG findings provide clues to several diseases like acute myocardial infarction, arrhythmias, pericardial diseases and diseases with chamber enlargement. Out of 12 leads, the aVR is an unipolar limb lead where voltage is augmented by disconnecting the connection to right arm of central terminal of Wilson. During ECG interpretation, the aVR lead is often given a cursory glance only. But the lead can often provide valuable clue to a panoply of diseases especially ACS as discussed below.

ST segment deviation in LMCA occlusion –

Because the left coronary artery supplies 75% of the left ventricular myocardium, acute occlusion of Left Main Coronary Artery (LMCA) can cause life threatening hemodynamic compromise and malignant arrhythmias which can be fatal. [1] ST segment elevation >0.05 mv in lead aVR is more common in acute LMCA occlusion (88%) compared to acute LAD occlusion (43%) and acute RCA occlusion. [2] Magnitude of ST segment elevation in lead aVR greater than or equal to that of ST segment elevation in lead V 1 was found to havesensitivity of 81 % specificity of 80% for differentiating LMCA occlusion from LAD occlusion.

ST segment elevation in lead aVR observed in LMCA is caused by transmural ischemia in basal part of IVS through impaired coronary blood flow of the first major septal branch of LAD. The smaller ST segment elevation in lead V1 is due to counterbalance of injury currents produced by both anterior and posterior wall transmural ischemia.

The ECG findings of LMCA occlusion has been classified into following patterns [3] :

1. Widespread ST segment depression with maximal changes in lead V1-V4 with inverted T waves.
2. ST segment elevation in lead aVR.
3. Anterior ST segment elevation.

ST segment deviation in LAD occlusion –

Presence of ST segment depression in lead aVR in anterior wall STEMI reflects transmural ischemia extending to apical and inferolateral walls. [4] This reflects larger infarct size. Tamura et al found that ST segment depression was associated with distal LAD occlusion and long LAD, whereas ST segment elevation in lead aVR was associated with proximal LAD lesion. Acute occlusion of LAD proximal to origin of first septal branch causes ST segment elevation in lead aVR through transmural ischemia in basal portion of the IVS

Prognostic significance of ST segment elevation in lead aVR in NSTEACS –

In NSTEACS, segment elevation in lead aVR is independently associated with increased mortality because of severe CAD [5]. ST segment depression of $\geq$ 0.05 mv in any lead plus segment elevation $\geq$ 1mv in lead aVR is associated with LMCA disease and increased in-hospital and 1 year CV deaths. Global subendocardial ischemia produces ST segment elevation in lead aVR.

ST segment deviation in Inferior wall STEMI –

ST segment depression $\geq$ 0.1 mv in lead aVR has 80 % sensitivity and 96 % specificity to identify left circumflex artery occlusion. ST segment depression in lead aVR is more common in circumflex artery than right coronary artery occlusion. ST segment depression in lead aVR reflects transmural ischemia extending to inferolateral and apical walls. Thus, it relates to larger infarct size and diminished myocardial perfusion.

Significance of T wave abnormality in lead aVR –

The significance of T wave changes in lead aVR with or without concurrent ST segment shift has not been properly investigated. It has been observed that T wave of ≥ 0.1mv possible in patients with old myocardial infarction associated with higher pulmonary arterial, pulmonary capillary wedge and LV end-diastolic pressures, a lower cardiac index and lower ejection fraction, positive T wave in lead aVR is associated with increased CV mortality in patientswith prior MI.

II. SUMMARY AND CONCLUSION –

The lead aVR is often neglected while interpreting the 12 leads ECG in patients with acute coronary syndrome. However, the lead aVR can provide significant information related to the diagnosis and prognosis in patients with ACS. While ST segment elevation in lead aVR is associated with LMCA occlusion and triple vessel disease, the ST segment depression as well as tall T wave also carry adverse prognosis.

REFERENCES

[1]. Tamura A. Significance of lead aVR in acute coronary syndrome. World J Cardiol. 2014 Jul 26;6(7):630-7.

[2]. Yamaji H, Iwasaki K, Kusachi S, Murakami T, Hirami R, Hamamoto H, Hina K, Kita T, Sakakibara N, Tsuji T. Prediction of acute left main coronary artery obstruction by 12-lead electrocardiography. ST segment elevation in lead aVR with less ST segment elevation in lead V(1). J Am Coll Cardiol. 2001 Nov 1;38(5):1348-54

[3]. Nikus KC, Eskola MJ. Electrocardiogram patterns in acute left main coronary artery occlusion. J Electrocardiol. 2008 Nov-Dec;41(6):626-9.

[4]. Kosuge M, Kimura K, Ishikawa T, Endo T, Hongo Y, Shigemasa T, Iwasawa Y, Tochikubo O, Umemura S. ST-segment depression in lead aVR predicts predischarge left ventricular dysfunction in patients with reperfused anterior acute myocardial infarction with anterolateral ST-segment elevation. Am Heart J. 2001 Jul;142(1):51-7

[5]. Barrabés 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 Aug 19;108(7):814-9.