# Value of the lead aVR in predicting acute occlusion of proximal left anterior descending coronary artery and in-hospital outcome in ST- elevation myocardial infarction : an electrocardiographic predictor of poor prognosis .

# Thesis

**Submitted in partial fulfillment of master degree in cardiovascular medicine**

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# INTRODUCTION

The Prognosis of anterior STEMI varies according to the site of occlusion of coronary artery .

Anterior STEMI due to acute obstruction of left main coronary artery ( LMCA ) or proximal left anterior descending coronary artery ( LAD) , both of which have worse prognosis, causes severe hemodynamic instability as a consequence of greater infarction area ***. ( Wong etal., 2000 ), (Elsman etal., 2006), ( Zeymer et al., 2004 ) .***

The use of lead aVR for risk stratification in acute coronary syndromes has been a subject of great interest . Recently significant lesions in ( LMCA ) or proximal ( LAD ) lead to ischemia in the basal part of the septum , which results in ST elevation in lead a VR . ( ST ↑ aVR ) .***( Engelen et al ., 1999)***

It was reported that ST elevation in lead aVR may be suggestive of ( LMCA ) or proximal ( LAD ) occlusion in patients with ***STEMI. ( Nazif et al., 2008 ) .***

# AIM OF THE WORK

**Is to investigate the value of ( ST elevation in the lead aVR ) in Acute anterior STEMI in predicting :**

1) Proximal ( LAD ) occlusion or left main coronary artery occlusion .

2) In hospital mortality in patient with acute anterior STEMI .

3) 3 months mortality.

# PATIENT AND METHODS

The study will include ( 75 ) who are admitted to Ain Shams University Hospitals with the diagnosis of anterior STEMI undergoing coronary angiography & primary intervention .

# Inclusion Criteria :

1) Typical chest pain lasting 30 minutes more .

2) Typical anterior STEMI (≥1 mm in at least 2 contiguous leads).

## Exclusion criteria :

1) LBBB .

2) History of CABG.

3) Severe valvular heart disease .

4) Congenital cardiac anomaly .

5) LVH .

6) Complete heart block .

## History taking and Examination :

Meticulous history taking including :

1) Age .
2) Sex .
3) Occupation .
4) Body weight .
5) Drug therapy .
6) History of diabetes mellitus .
7) Dyslipidemia .
8) Smoking .
9) Hostory of ischemic heart diseases .
10) Chest pain, typical and a typical .
11) Peripheral vascular disease, evidenced by absent pulses or arterial bruits .

## Investigations :

1) ECG .
2) Markers of myocardial injury .
3) Echocardiography .
4) Investigation of risk factors :
   - Total cholesterol
     - LDL.
     - HDL .
   - Blood sugar .
   - Serum creatinine concentration .
   - Blood urea nitrogene level .

# CORONARY ANGIOGRAPHY

1) Coronary angiography will be performed for the patients within the first six hours .

2) Angiographic images will be assessed by two independent cardiologists .

3) Infarct – related artery will be determined angiographically .

4) ECG with the highest ST elevation obtained in acute phase before reperfusion therapy will be evaluated .

5) The time interval between the onset of chest pain and the ECG ( 15-440 minutes ) .

6) Follow up of the patients for three months.

# REFRENCES


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# ACUTE MYOCARDIAL INFARCTION

Acute myocardial infarction (AMI or MI), commonly known as a heart attack, is a disease state that occurs when the blood supply to a part of the heart is interrupted. The resulting ischemia or oxygen shortage causes damage and potential death of heart tissue. It is a medical emergency, and the leading cause of death for both men and women all over the world.

## Definition:

Detection of rise and/or fall of cardiac biomarkers with at least one value above the 99$^{th}$ percentile of the upper reference limit (URL) together with evidence of myocardial ischemia with at least one of the following:

- Any symptom of ischemia.
- Electrocardiographic (ECG) changes indicative of new ischemia (new ST-T changes or new left bundle branch block (LBBB)).
- Development of pathological Q waves in the ECG.
- Imaging evidence of new loss of viable myocardium or new regional wall motion abnormality.
- Sudden, unexpected cardiac death, involving cardiac arrest often with symptoms suggestive of myocardial

ischemia and accompanied by presumably new ST elevation, or new LBBB and/or evidence of fresh thrombus by coronary angiography and/or at autopsy.

- For PCI elevation of cardiac biomarkers > than 3 times $99^{th}$ percentile URL have been designated as defining PCI-related myocardial infarction.
- For coronary artery bypass grafting (CABG) elevation of cardiac biomarkers >than 5 times $99^{th}$ percentile URL plus either new pathological Q waves or new LBBB, or angiographic documented new graft or native coronary artery occlusion, or imaging evidence of new loss of viable myocardium have been designated as defining CABG-related myocardial infarction [7] .

## *Clinical classification of different types of myocardial infarction*

**Type 1**: spontaneous myocardial infarction related to ischemia caused by a primary coronary event, such as plaque fissuring or rupture.

**Type 2**: myocardial infarction secondary to ischemia resulting from an imbalance between oxygen supply and demand.

**Type 3**: sudden death from cardiac disease with symptoms of myocardial ischemia, accompanied by new ST-elevation or LBBB, or verified coronary thrombus at angiography and/or autopsy.

**Type 4**: myocardial infarction associated with PCI.

**Type 5**: myocardial infarction associated with CABG **(8).**

## *Epidemiology:*

Myocardial infarction is a common presentation of ischemic heart disease. Ischemic heart disease is the leading cause of death in developed countries, but third to AIDS and lower respiratory infections in developing countries **(9)**

In the United States, diseases of the heart are the leading cause of death, causing a higher mortality than cancer (malignant neoplasms) (10). Coronary heart disease is responsible for 1 in 5 deaths in the U.S. 1,200,000 people suffer a (new or recurrent) coronary attack every year, and about 40% of them die as a result of the attack (11 ) This means that roughly every 65 seconds, an American dies of a coronary event (12) CHD is responsible for the deaths of approximately one in five men, and one in six women. The average incidence of myocardial infarction for those aged between 30 and 69 years is about 600 per 100,000 for men, and 200 per 100,000 for women (13) .

A male predominance in incidence exists up to approximately age 70 years, when the sexes converge to equal incidence.Pre-menopausal women appear to be protected from atherosclerosis Incidence increases with age and elderly people also tend to have higher rates of morbidity and mortality from their infarcts.

## Risk factors:

Risk factors for atherosclerosis are generally risk factors for myocardial infarction:

- Older age
- Male gender[14]
- Cigarette smoking
- Dyslipidemia (especially high Low Density Lipoprotein and low High Density Lipoprotein)
- Diabetes (with or without insulin resistance)
- High blood pressure
- Obesity (defined by a body mass index of more than 30 $kg/m^2$, or alternatively by waist circumference (>102 cm in men and > 88 cm in women) or waist-hip ratio) [15]

Many of these risk factors are modifiable; so many heart attacks can be prevented by maintaining a healthier lifestyle. Physical activity, for example, is