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## A Study to Assess the Hemodynamic Responses in Different Types of Acute Myocardial Infarction.

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### ABSTRACT

Myocardial infarction commonly known as heart attack occurs when the blood supply to the heart is interrupted. This is most commonly due to occlusion of a coronary artery following the rupture of a atherosclerotic plaque, which is an unstable collection of lipids and white blood cells in the wall of an artery. The resulting ischemia, if left untreated can cause damage or death of heart muscle tissue or myocardium. The present study was undertaken to evaluate the hemodynamic responses in myocardial infarction and to compare the pulse & blood pressure changes in anterior wall MI & inferior wall MI. From the above study, I concluded that base line BP, pulse rate, mean BP, pulse pressure of patients with anterior wall myocardial infarction are higher when compared with patients having inferior wall myocardial infarction. A small groups of patients were included in the present study. Hence we recommend future study with larger population to confirm the results.

**Keywords:** Hemodynamic response, Myocardial infarction.

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## INTRODUCTION

Myocardial infarction commonly known as heart attack occurs when the blood supply to the heart is interrupted. This is most commonly due to occlusion of a coronary artery following the rupture of a atherosclerotic plaque, which is an unstable collection of lipids and white blood cells in the wall of an artery. The resulting ischemia, if left untreated can cause damage or death of heart muscle tissue or myocardium. Myocardial infarction is the rapid development of myocardial necrosis caused by a critical imbalance between oxygen supply and demand of the myocardium [1]. It was believed that plaque builds up slowly until it obstructs the lumen where blood flows, therefore causing a heart attack. However, recent imaging expertise revealed that the size of the plaque is not a predictor for the occurrence of a heart attack. Although one might think that a larger build up of plaque represents a greater risk, small plaque build ups are actually more prone to rupture and cause more heart attacks [2]. In US nearly 1,500,000 patients suffer from acute MI annually and one fourth of all death are due to MI. more than 60% of the death is associated with AMI occur within one hour of the event and are attributable to arrhythmias, most often ventricular fibrillation. Mortality is high when treatment is delayed; almost half of all sudden deaths due to an MI occur before hospitalization, within one hour of the onset of symptoms.

The prognosis improves if vigorous treatment begins immediately. Nearly 50 % of the population suffering from Inferior wall MI and others with Anterior wall MI. The diagnosis of acute MI is based on the history, the clinical findings, and an evaluation of ECG changes. There are many nonspecific signs which may be used as adjuncts [3]. Studies regarding heart attacks are very important nowadays. Different types of MI are there based on coronary arterial circulation.

Each coronary artery supplies to different parts of the heart, so hemodynamic like blood pressure and pulse may change based on different types of infarcts and it is very helpful in early Diagnosis of AMI. Treatment can start immediately based on this diagnosis. So my study to assess hemodynamic responses in myocardial infarction is significant. The present study was undertaken to evaluate the hemodynamic responses in myocardial infarction and to compare the pulse & blood pressure changes in anterior wall MI & inferior wall MI.

## MATERIALS AND METHODS

The present study has been approved by institute ethics committee for human studies. A total of 50 patients admitted with anterior wall MI, inferior wall MI, at coronary care unit, Little Flower Hospital, Angamaly, were included in the study, after explaining the study to the participants, written informed assent from the participants was obtained.

### Inclusion criteria

- ST elevation MI.
- Age above 25.
- Sex both male & female.

### Exclusion criteria

- Patients taking anti hypertensive drugs & having prior CAD.
- Complete heart block or other pre existing conducting system disorders or on pace makers or ICD.
- Patients who are having other associated chronic illness. Eg: Bronchial Asthma.

### Tool and Technique:

- Tool 1: Blood pressure to be taken by palpitory and auscultatory methods by using Mercury Sphygmomanometer & Stethoscope.
- Tool 2 : Pulse rate is recorded manually by palpitory method .
- Tool 3: The diagnosis and history of the patient taken from patient records.

## **Data analysis**

The collected data was coded and processed by using the statistical packages for social sciences software 20.0.

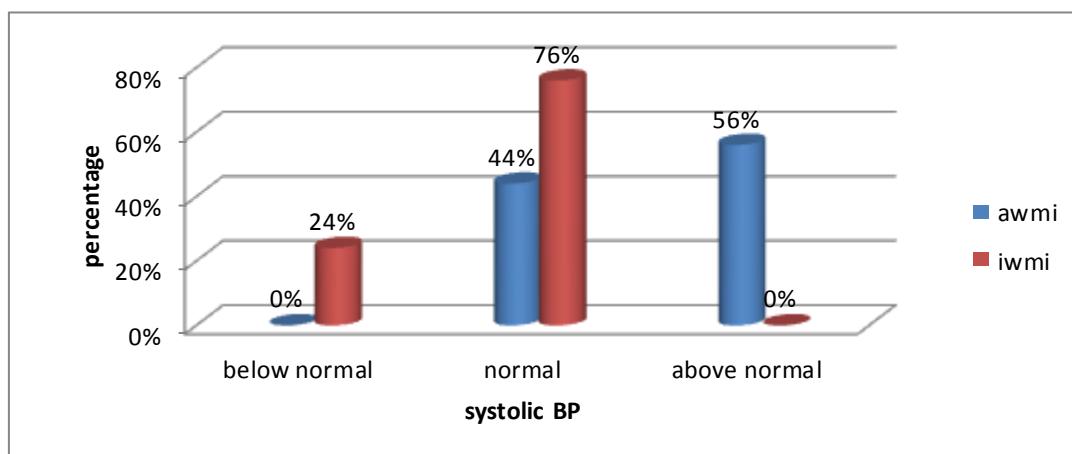
## **RESULTS**

Results are presented in table no 1 to table no 9 and figure no 1.

**Table 1: Frequency distribution and percentage of patients with AAMI and IWMI based on their PR. (n=50)**

Pulse Rate	AAMI		IWMI	
	Frequency	Percentage	Frequency	Percentage
Below Normal	0	0	8	32
normal	11	44	17	68
Above normal	14	56	0	0

**Figure 1: Percentage distribution of patients with AAMI and IWMI based on their systolic BP.**



**Table 2: Frequency distribution and percentage of patients with AAMI and IWMI based on their diastolic BP.(n=50)**

Diastolic pressure	AAMI		IWMI	
	Frequency	Percentage	Frequency	Percentage
Below Normal	0	0	7	28
normal	15	60	18	72
Above normal	10	40	0	0

**Table 3: Frequency distribution and percentage of patients with AAMI and IWMI based on their PP. (n=50)**

Pulse pressure	AAMI		IWMI	
	Frequency	Percentage	Frequency	Percentage
Below Normal	1	4	1	4
normal	11	44	21	84
Above normal	13	52	3	12

**Table 4: Frequency distribution and percentage of patients with AAMI and IWMI based on their mean BP. (n=50)**

Mean Blood pressure	AAMI		IWMI	
	Frequency	Percentage	Frequency	Percentage
Below Normal	0	0	7	28
normal	10	40	18	72
Above normal	15	60	0	0

**Table 5: Mean value of PR of patients with AWMI and IWMI (n=50)**

Pulse rate		t-Value
AWMI	79.6±8.1	5.4**
IWMI	64.1±11.6	

\*\* significant at 0.01 level of significance

**Table 6: Mean, standard deviation and t-value of systolic BP of patients with AWMI and IWMI. (n=50)**

Systolic BP		t-Value
AWMI	148.4±24.27	8.46**
IWMI	106.4±14.69	

\*\* significant at 0.01 level of significance

**Table 7: Mean, standard deviation and t-value of diastolic BP of patients with AWMI and IWMI. (n=50)**

Diastolic BP		t-Value
AWMI	94.4± 12.94	9.33**
IWMI	67.2±8.43	

\*\* significant at 0.01 level of significance

**Table 8: Mean, standard deviation and t-value of PP of patients with AWMI and IWMI. (n=50)**

Pulse Pressure		t-Value
AWMI	54.00± 17.32	4.75**
IWMI	38.00±10.41	

\*\* significant at 0.01 level of significance

**Table 9: Mean standard deviation and t-value of mean BP of patients with AWMI and IWMI**

Mean BP		t-Value
AWMI	111.96± 15.55	9.91**
IWMI	79.2±9.58	

\*\* significant at 0.01 level of significance

## DISCUSSION

Myocardial infarction (from Latin: *Infarctus myocardii*, MI) or acute myocardial infarction (AMI) is the medical term for an event commonly known as a heart attack. It happens when blood stops flowing properly to part of the heart and the heart muscle is injured due to not enough oxygen. Usually this is because one of the coronary arteries that supplies blood to the heart develops a blockage due to an unstable buildup of white blood cells, cholesterol and fat [4].

Myocardial infarction is the death or damage of the myocardium due to reduced blood flow through one of the coronary arteries results in myocardial ischemia and necrosis. Among the cardiovascular disease the leading cause of death is myocardial infarction and its complications. The aim of the study was to determine the changes in the pulse, blood pressure in different types of acute MI mainly AWMI and IWMI. Pulse and BP of 25 anterior wall MI patients were compared with 25 inferior wall MI patients. Activation of receptors within the atrial and ventricular myocardium by necrotic tissue may cause enhanced efferent sympathetic activity that may results tachycardia in patients with AWMI. Bradycardia is particularly frequent in patients with inferior infarction.

In the present study we have observed that in IWMI 32% of patients having bradycardia, others having normal pulse rate. 24% of patients having systolic BP below normal, others having normal systolic BP. 28% of patients having diastolic BP below normal, and others having normal diastolic BP.

## CONCLUSION

From the above study, I concluded that base line BP, pulse rate ,mean BP, pulse pressure of patients with anterior wall myocardial infarction are higher when compared with patients having inferior wall myocardial infarction.

### Limitations:

A small groups of patients were included in the present study. Hence we recommend future study with larger population to confirm the results.

### Conflicts of interest: nil

## REFERENCES

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