ORIGINAL RESEARCH

Incidence and various patterns of conduction blocks occurring In Acute ST Segment Elevation Myocardial Infarction in VIMS Bellary

Ramlingareddy[1], M MallikarjunaReddy[2], Vijayalaxmi I Khot[3], Veena T[4]

[1]Senior Resident, Department of General Medicine GIMS Gulbarga India.
[2]Professor and Unit Chief, [3,4]Senior Resident, Department of General Medicine, VIMS Ballari India.

Corresponding Author: Dr. Veena T, Senior Resident, Department of General Medicine, VIMS Ballari India.

ABSTRACT

Background: Myocardial Infarction is a part of a spectrum referred to as Acute Coronary Syndrome (ACS). Electrolyte imbalance and ongoing ischemia which results in hypoxia of the conduction system further contribute to the development of conduction blocks and cardiac arrhythmia. Objective: To study the incidence of conduction block in Acute Myocardial Infarction. 2. To study various patterns of conduction blocks occurring in Acute Myocardial.

Methods: This is a Prospective Observational Study done at Vijayanagara Institute of Medical Sciences, Ballari, Karnataka. It is a Hospital Based Study done on Myocardial Infarction patients admitted at Vijayanagara Institute of Medical Sciences, Ballari during the period October 2019 to September 2021.

Results: There were 76% males and 24% were females in this study. Smoking was the most common risk factor as 60% of the study participants smoked followed by hypertension (48%), 44% were Diabetic, 42% consumed Alcohol. Major type of MI was anterior wall MI. 26 out of 50 participants were having anterior wall MI which accounts 52% followed by Inferior wall MI seen in 24 (48%) 32% of the participants under the study had conduction blocks, AV Blocks was major type. 58% of the study participants were having AV Block and 42% were having IV Conduction Blocks. First degree block was higher amongst AV blocks, 12% had firstdegree AV Block, 6% second degree,2% had Complete Heart Block. Among IV conduction block, RBBB was higher in number as 8 % of them had RBBB Type followed by LBBB which was 4%

Conclusion:32% of participants under this study had conduction Blocks. AV Blocks were major type of conduction blocks. There was 4% mortality in patients with MI who had conduction Blocks.

Keywords: ACS; AV BLOCKS; RBBB; LBBB

INTRODUCTION

Cardiovascular disease cause approximately one third of deaths worldwide.[1]Amoung cardiovascular illnesses, ischemic heart disease (IHD) ranks as the most prevalent.[2] Indeed, IHD is acknowledged as an important threat to sustainable development in 21st century.[3] Also referred to as coronary artery disease (CAD) and atherosclerotic cardiovascular disease (ACD), IHD manifests clinically as myocardial infarction and ischemic cardiomyopathy .the primary pathological process that leads to IHD is atherosclerosis, an inflammatory disease of arteries

associated with lipid deposition and metabolic alterations due to multiple risk factors for IHD. Myocardial infarction is the leading cause of deaths due to CVD.[4]

Myocardial infarction happens when one or more areas of the heart muscle don't get enough oxygen. It occurs when blood flow to the heart muscle gets jeopardised. It is the necrosis of heart muscle secondary to ischemia.[5]Myocardial infarction is the end result of either acute or chronic myocardial ischemia. 4.MI is usually caused by thrombus formation followed by plaque

Myocardial Infarction is a part of a spectrum referred to as Acute Coronary Syndrome (ACS). The ACS consisting of myocardial ischemia consists of Unstable Angina (USA), Non-ST Elevation MI (NSTEMI), ST Elevation MI (STEMI).[6,7] Acute Myocardial Infarction is characterized by generalized autonomic dysfunction that results in enhanced automaticity of the myocardium and conduction system. Electrolyte imbalance and on going ischemia which results in hypoxia of the conduction system further contribute to the development of conduction blocks and cardiac arrhythmia.

Conduction delay and block is the most common complications of acute infarction of myocardium.[6.8] Atrioventricular (AV) and intraventricular blocks, are among the most important electrical disturbances which occur following acute myocardial infarction (AMI).[7,9] MI complicated with conduction blocks are associated with higher morbidity and mortatlity.[7,10] Worldwide, more than 3 million people suffer from STEMIs11.Delayed conduction may occur because of physiological phenomenon i.e increased vagal tone or pathological process with varying incidence rates in different populations. 8. It may be a delay in AV nodal conduction (or) block which may be of II, III-degree AV block depending on the site of abnormality in the conducting system.

It is important to anticipate particular type of conduction abnormality in specific type of lesion in the coronary arteries, as fatal abnormalities can be managed promptly.

Incidence and clinical implications cannot be determined accurately in myocardial infarction as,

1. Most of the studies are retrospective in nature,

2. Low incidence in studies done before reperfusion studies.

3. There will be transition from one type of block pattern to another and various factors other than the infarction of myocardium, leading to conduction blocks.

But still patterns of blocks in different types of myocardial infarction (based on site of lesion) can guide in anticipating the risk and assessing the Prognosis there by planning treatment accordingly. Knowledge in anatomy of conducting system and its blood supply is important in understanding the clinical significance of Block in myocardial infarction.

There are various studies on Incidence of conduction block amongst acute MI In Pre PCI era. In PCI Era only few studies are available (where PCI was available), Which showed that the incidence of conduction abnormality is Low compared to Pre PCI era.

MATERIALS AND METHODS

This hospital based prospective observational study was conducted among Myocardial Infarction patients admitted at Vijayanagara Institute of Medical Sciences, Ballari. Sample size was 50. Duration of study was October 2019 to September 2021 i.e two Years. Convenience sampling was used.

Inclusion Criteria

1) Patients with Acute ST segment elevation myocardial infarction.

2) Age group >18years.

Exclusion Criteria

1. Patients with cardiomyopathy.
2. Patients with congenital or rheumatic heart disease.
3. Patients with history of intake of drugs causing conduction blocks like methyl dopa, verapamil, digoxin etc.
4. Patients with old conduction block.

Ethical Clearance

Ethical clearance was obtained from Institutional Ethical Committee, Vijayanagara Institute Of Medical Sciences, Ballari

Informed Consent

Written informed consent was taken from all the study participants after explaining briefly about the study in their own language

Permissions

Required permissions were taken from higher authority and head of the Medicine Department of Vijayanagara Institute of Medical Sciences, Ballari

Study Tool: Structured questionnaire and printed ECG, Clinical, LAB reports.

Variables

1. Socio Demographic Variables: Age, sex, smoking habits, Alcohol
2. Comorbidities: Diabetes, Hypertension
3. Type of MI, Type of blocks,

Investigations considered under the study

1. Complete blood count
2. Random blood sugar level
3. Urine analysis
4. Renal function test
5. Liver function test
6. Lipid profile
7. Chest X ray
8. ECG
9. Cardiac markers
10. 2D ECHO

Methodology

In patients admitted with acute myocardial infarction in Vijayanagar Institute of Medical Sciences, Ballari. Data was collected after taking written informed consent. Diagnosis of Acute MI was based on ECG changes, cardiac enzyme and presence of typical angina pain lasting at least 30 minutes, ST segment elevation >1 mm in two or more consecutive leads, and an increase in CKMB of double the normal values (190 U/L).

Patients were subjected to ECG; Socio demographic data was collected using structured questionnaire. After obtaining a detailed history, a complete general physical and systemic Examination was performed. The patients were monitored for serial changes in ECG for 24 hours by trained medical personnel. ECG was done twice daily printout was taken to look for any changes, changes in type of conduction block throughout the hospital stay done under the supervision, blood investigations and urine sample analysis were done after collecting the sample under aseptic precautions by trained personnel. ECHO Cardiogram was done for all the patients under the study

Data Entry

The data was recorded in a specially designed Case Recording Form. The data collected was entered in Microsoft excel by double checking method to minimize the errors.

Data Analysis

Descriptive statistics was used to explain the socio demographic, clinical and outcome variables. Data was presented in the form of mean; SD, Chi square tests were used to measure the association between different variables. Statistical analyses were performed using Statistical Package for Social Sciences (SPSS) Statistics for Windows, Version21.0 (IBM Corp., USA, 2011).

RESULT

Out of 50 Study participants 76% (38) were male where as 24% (12)were female. Majority of them 19 out of 50 (38%) belonged to 51-60 years followed by 61-70 years (13, 26%), 8 of them belonged to 40-50 years age group, 3(6%) of them belonged to age group > 70 years. Mean age was 51. The youngest age was 26 who was a female and oldest being male of 78 years.

Out of 50,22 (44%) were diabetic 28 (56%) were non diabetic.

Table 1: Distribution of patients with respect to Hypertension

Sl no	Hypertension	Number(%)
1	Present	24(48)
2	Absent	26(52)

In the current study 24 out of the 50 study participants were hypertensives and 26 were non hypertensive So, 48% under the study were hypertensive and 52% were non hypertensive.

42% of the study participants consumed alcohol i.e 21 out of 50 participants consumed alcohol

In this study smoking was high as thirty out of 50 participants smoked, so 60% was the prevalence of smoking among study participants.

Table 2: Distribution of Patients with respect to type of MI

Sl.no	MI type	Frequency(%)
1	AWMI[*]	26(52)
2	IWMI[**]	24(48)

*- AWMI – anterior wall MI, **IWMI – inferior wall MI

Type of MI- 26 out of 50 participants were having anterior wall MI which accounts 52% followed by Inferior wall MI seen in 24, 48% of the population as we majorly categorised them in to anterior, inferior and posterior wall MI.

Table 3: Distribution of patients with respect to conduction blocks

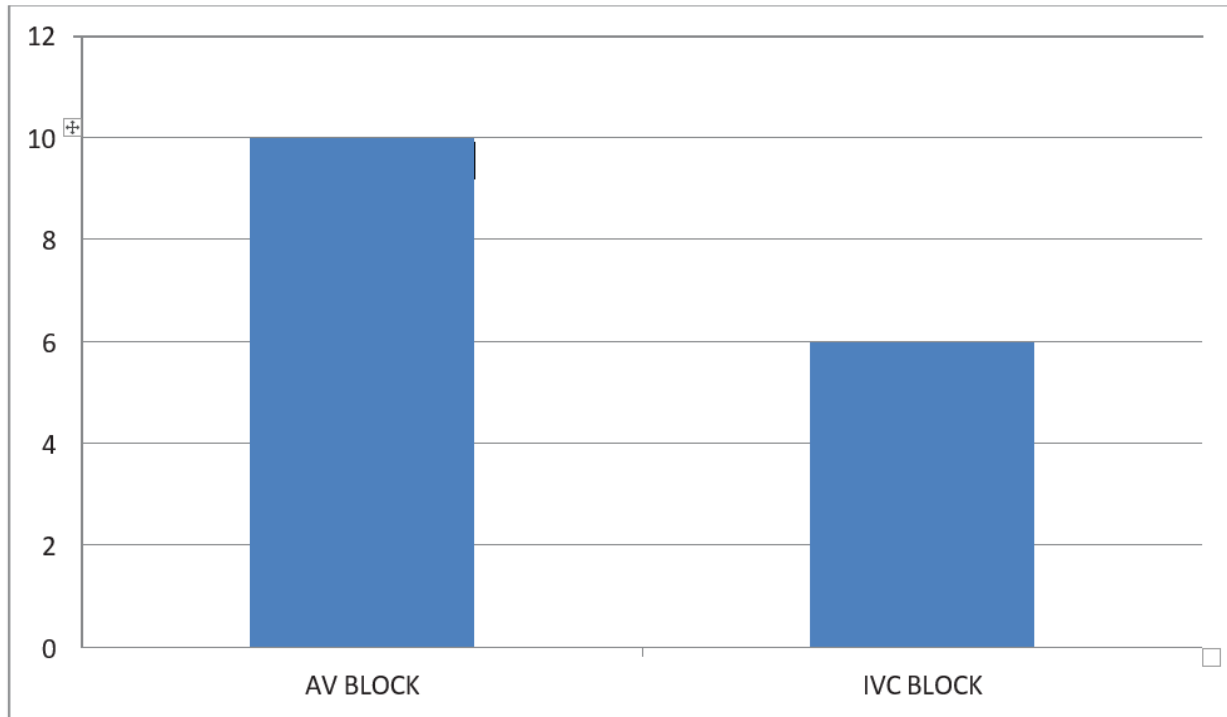| Sl no	Type of conduction block	Frequency (%)
1	AVBLOCK	10(20)
2	IVCBLOCK	6(12)

Figure 17: Bar diagram showing Distribution of conduction block among patients

16 out of 50 patients were have conduction block among which 20% had AV conduction block and 12% have IVC blocks.

AV Blocks

Table 4: Distribution of types of AV Blocks

Sl.no	AV Block	Frequency(%)
1	I degree	6(12)
2	II degree	3(6)
3	III degree	1(2)

Blocks AV Blocks
First degree block was among 6 study participants (12%), second degree AV Block was seen in 3 study participants (6%) and complete heart block was found in one of the participants (2%)

Table5: Distribution of patients with respect to IVC blocks

Sl.no	LVCD	Frequency(%)
1	LBBB	2(4%)
2	RBBB	4(8%)

Left branch bundle block (LBBB) 4% was seen in 2 patients under the study whereas 4 of the study participants (8%) had Right branch bundle block (RBBB).

DISCUSSION

Mean age of the study participants is 51 years which is similar to many studies where mean age was 57.3 in a study done at Imphal by Ram R, et al[11], 58.6 in a study done at Guwahati by Dabu R, et al[12], in a study done at Warangal by Chandrashekar G,et al[13] the mean age was 54 ± 7. Majority of them 38% belonged to 51-60 years The finding is similar to many studies done in different settings. The youngest age was 26 who was a female and oldest being male of 78 years.

In this study that included 50 patients of acute myocardial infarction, 76% (38) were male where as 24% (12) were females which is in consistent with other studies like study done in Kolar by Reddy NS, et al[14] where 77.8% were males,22% were females, another study done in Warangal where almost 70% were males. It is also consistent with many other studies.

In this study 60% of them smoked which is more compared to study at Warangal which had 40.3% and 29.2% of them smoked in a study done at Dev Raj Urs Medical College by Reddy NS, et al[14]. Smoking was a significant risk factor in most of the studies but in certain studies it is found to be insignificant.

42% of the study participants consumed alcohol i.e 21 out of 50 participants consumed alcohol which is quite high compared to a study conducted in Kolar by Reddy NS, et al. Karnataka where 18% of the study population consumed alcohol. [14]

26 out of 50 participants were having anterior wall MI which accounts 52% followed by Inferior wall MI seen in 24, 48% of the population as we majorly categorised them in to anterior, inferior and posterior wall MI. Similar findings were seen in many studies, in a study done at Warangal where Anterior and lateral wall MI were seen in 57% followed by Inferior wall MI which was 43%.

In other studies, slightly lower prevalence of anterior MI was seen, in studies done in Imphal and Guwahati anterior all MI were found to be 44%. Higher levels of Anterior wall MI were seen a study done at Chennai where 63% of the MI ANTERIOR MI where as 34.4% was inferior wall MI.

Higher involvement of inferior wall as high as 52% was seen in a study setting. Involvement of inferior and posterior wall was 43% in study done at Warangal ,34.4% at Chennai,32% in Guwahati and it was as low as 26% in Imphal.

Total 38 % of the study participants had conduction blocks, which is high compared to other studies where he occurrence of conduction block was15.8% in study conducted at Teheran,15.5% in a study done at Warangal. Similar findings were seen in studies conducted in Imphal and Kolkata.19% and 21 % were the occurrence in two studies conducted at a tertiary care centre in Chennai during 2015-16

Both AV Block and IV conduction blocks were seen in this study about 58% were AV Block and 42% was IV conduction block. So, the major the major type was AV Block (20%) and IV Conduction Blocks were 12% among total study participants. Similarly higher number of AV blocks (14%) followed by IV conduction blocks (5%) Were found in a study at Chennai, AV Blocks was 14% and 3% was IV blocks in a study conducted in Imphal where as equal number of AV Blocks and IV Conduction Blocks were seen in a study done at Kolar. Conversely higher number of IV conduction blocks (76.5%) were seen followed by AV Blocks in a study done at Chennai

20% of the blocks were AV Blocks, out of which first degree block was commonest (12%) followed by second degree (6%). Similarly in a study conducted by Arun Prasath in Chennai out of 14%, 7% were first degree conduction blocks and 3% was second degree and in a study done

at Imphal out of 14% same number of first- and seconddegree AV blocks were found. First degree AV Blocks (25%) were commonest of heart blocks in a study conducted at Warangal

1 out of 32 patients who had conduction blocks had CHB. CHB was 2% in the study. Slightly higher percentage 3% was seen in two studies done in Imphal and Chennai. 5.5% of CHB was seen in Warangal study. In other studies, high percentage of CHB was seen 9.1% was seen in a study conducted in Chennai, 7.3% was seen in a study conducted in Pakistan.

RBBB (8%) was the commonest type of IVCB, followed by LBBB (4%) in our study but in a study done at Warangal LBBB (19.4%) was the most common type of IV Conduction Block. Similar to our study a greater number of RBBB cases were seen followed by LBBB in a study conducted by Arun Prasath in Chennai during 2015 -16.

CONCLUSION

There were 76% males and 24% were females in this study. Major type of MI was anterior wall MI. 32% of the participants under the study had conduction blocks. AV Blocks were major type of conduction blocks. 4% of the participant under study died.

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