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Original Research Article

A Study of Incidence and Clinical Profile of Cardiac Arrhythmias in Patients Presenting with Acute STEMI Admitted in Medicine Department, KMCH, Katihar, Bihar

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Abstract

Background: Tachycardias and other abnormally fast or slow heartbeats are examples of cardiac arrhythmias, which are disruptions in the heart's rhythm (bradycardias). Patients who notice these irregularities most frequently have palpitations, which some describe as feeling like "my heart is rolling around in my chest" or being aware of how quickly or slowly their hearts are pounding. Other signs and symptoms include fatigue, breathlessness, lightheadedness, dizziness, syncope, and, on rare occasions, chest pain. When the rate is higher, ventricular function is worse, or the arrhythmia is linked to anomalies in autonomic tone, the symptoms frequently become more severe. This study's goal was to determine the prevalence and clinical characteristics of cardiac arrhythmia in acute STEMI.

Methods: There were 100 acute MI patients in total who were investigated. Acute myocardial infarction symptoms, new ischemic ECG alterations, the development of pathological Q waves, imaging evidence of new loss of viable myocardium, or new regional wall motion abnormality in a pattern compatible with an ischaemic origin were used to make the diagnosis of MI. Arrhythmia in all patients was recorded using a Holter monitoring and multipara monitor for the first 48 hours.

Result: Out of 100 patients, 86 had some sort of arrhythmia. Out of 30 females and 70 males, 27 (90%) and 59 (84.2%), respectively, experienced arrhythmia.

Conclusion: The most common arrhythmia overall was VPC (80.23%), followed by AIVR and CHB (11.63% each), and VT (9.30%). As compared to Antero-lateral and Infero-lateral STEMI (<75%), the majority of patients with anterior, inferior, and infero-posterior wall STEMI have arrhythmia (>85%).

Keywords: Arrhythmia, Myocardial Infarction, Thrombolysis, VPCs.

Introduction

Acute Coronary Syndrome (ACS) is a global epidemic that is threateningly widespread and is impacting people all over the world, particularly in the subcontinent.

According to predictions, ACS will be among the top causes of death globally by the year 2020. The development of arrhythmias during episodes of myocardial infarction is

blamed for many of these fatalities. The efforts that must be taken to more effectively prevent premature fatalities from arrhythmias include looking for new methods for prediction, improving the present techniques, and starting well-designed intervention studies. Globally, CVDs are the leading cause of death, accounting for more deaths each year than all other causes combined.

In 2016, 17.9 million deaths worldwide were attributed to CVDs, or 31% of all fatalities. Heart attacks and strokes are to blame for 85% of these fatalities. The majority of CVD fatalities occur in low- and middle-income nations. In 2015, noncommunicable illnesses caused 17 million premature deaths (before the age of 70), 82% of which occurred in low- and middle-income countries and 37% of which were attributable to CVDs.

By addressing behavioural risk factors like cigarette use, unhealthy eating and obesity, inactivity, and problematic alcohol use with population-wide measures, the majority of cardiovascular illnesses can be avoided.

Early detection and therapy using counselling and medications, where necessary, are required for people who have cardiovascular disease or are at high cardiovascular risk (due to the existence of one or more risk factors such hypertension, diabetes, hyperlipidemia, or an already present disease). Most patients with acute myocardial infarction experience cardiac rhythm problems, and around 25% of patients experience cardiac conduction disturbances within 24 hours of the infarct starting.

Nearly any rhythm abnormality, such as bradyarrhythmias, supraventricular tachyarrhythmias, ventricular arrhythmias, and atrioventricular block, can be linked to acute myocardial infarction. Since the introduction of thrombolytic treatment, individuals with acute myocardial infarction have also had some rhythm abnormalities due to coronary reperfusion.

Material and Methods

From December 2021 to November 2022, the current study was carried out at Department of Medicine, Katihar Medical College and Hospital, Katihar, Bihar. At the time of admission to the intensive coronary care unit, 100 patients are recruited overall. Patients who meet the inclusion and exclusion criteria and have a verified diagnosis of acute myocardial infarction are included in the study group. The fourth universal Definition of Myocardial Infarction serves as the foundation for the diagnosis of acute myocardial infarction.

Detection of an increase or decrease in Cardiac Troponin levels that includes at least one value above the 99th percentile URL and at least one of the following: Acute myocardial ischemia symptoms, recent ischemic abnormalities in the electrocardiogram, the emergence of pathological Q waves, imaging evidence of recent loss of viable myocardium, or recent regional wall motion abnormality in a pattern compatible with an ischemic aetiology.

This study includes individuals over the age of 18 who have been recruited and are in the hyper-acute to acute phase of myocardial infarction within 48 hours of STEMI. Those individuals are eliminated who have been hospitalised with a prior history of myocardial infarction, known cases of valvular heart disease, known cases of thyroid problems, and patients with unidentified and unknown arrhythmias of known pre morbid conditions.

A thorough history is collected, paying particular attention to the cardiovascular system. The focus of a complete physical examination is the cardiovascular system. At the time of admission, 12-lead ECGs were obtained, and all patients underwent 24-hour Holter monitoring. The patients were observed using a multi parameter monitor for 48 hours, during which time the pattern of

any arrhythmias was noted. All patients had 2-D echocardiographic analysis within the first 48 hours of their hospital stay.

The current study is a descriptive study conducted at a hospital. The Chi square test was used to determine the significance of the relationships between various parameters.

The p value was evaluated for statistical significance, and a value less than 0.05 was regarded as significant. SPSS11.5 was used to analyse the data. + Suggestive significance (P value: 0.05<P<0.10), * Moderately significant (P value:0.01<P ≤ 0.05), **Strongly significant (P value: P≤0.01)

Result

Out of 100 patients, the majority (74% of patients) were over 50. 70 of the 100 patients were men, and 30 were women. More than half of the patients (62%) did not previously have hypertension. A history of diabetes was present in about one third (32%) of the individuals. Very Few (8%) of the 100 study participants were obese. Approximately 37% of patients smoked, and 21% of patients had used chewing tobacco in the past. Out of 100 patients, 86 had some sort of arrhythmia. Out of 30 females and 70 males, 27 (90%) and 59 (84.2%), respectively, experienced arrhythmia.

Table 1: Distribution of patients as per type of Arrhythmias (n=100)

Type Arrhythmia	No. of cases	Percentage
VPC	69	80.23%
AIVR	10	11.63%
CHB	10	11.63%
VT	9	9.30%
AF	3	3.49%
1st Degree AV Block	2	2.33%
2nd Degree AV Block	2	2.33%
APC	2	2.33%
LBBB	2	2.33%
RBBB	2	2.33%

VPC was the arrhythmia that occurred most frequently overall (80%). An inferior wall infarction occurred in eight out of ten CHB patients, which is statistically significant. (p=0.073). In contrast, the majority of VT patients exhibited anterior wall infarct (p=0.024).

Table 2: Arrhythmias versus Serum Electrolytes

Biochemistry	Arrhythmia Present	Total	Percentage
Low potassium (<3.50 meq/l)	11	12	91.7%
Low sodium (<130 meq/l)	47	57	82.5%
Low Magnesium (1.8 meq/l)	22	24	91.7%

Table 3: Site of infarction and its occurrence (n=100)

Site of Infraction	Percentage
Anterior wall	52%
Inferior wall	26%
Infero posterior and RV wall	10%
Antero lateral wall	8%
Infero lateral wall	4%
Total	100%

On the anterior wall, infarction was shown to occur most frequently. As compared to Antero-lateral and Infero-lateral STEMI (75%), the majority of patients with anterior, inferior, and infero-posterior wall STEMI have arrhythmia (>85%). 38 patients out of 100 did not have any revascularization procedures.

Table 4: Status of Revascularization and occurrence Arrhythmia

Status of Intervention	Arrhythmia	No Arrhythmia	Total
No Revascularization	32(84%)	6(16%)	38(100%)
Revascularization	54(87%)	8(13%)	66(100%)

On comparing status of revascularization with presence of Arrhythmia there is no statistical difference (p=0.68).

Table 5: Killip class and presence of Arrhythmia (n=100)

Killip Class	Arrhythmia	No Arrhythmia	Total
I, II	70(83.33%)	14(16.67%)	84
III, IV	16(100%)	0(0.00%)	16

Killip Classes III and IV patients all had arrhythmia (100%) whereas Killip Classes I and II patients exhibited arrhythmia in 70 out of 84 cases (83.33%). (p>0.05) This is not statistically significant.

Discussion

In the current investigation, 86% of the patients had an arrhythmia. 90% of patients with acute myocardial infarction had some type of cardiac rhythm abnormalities within the first 24 hours of the infarct starting, according to a study by Aufderheide TP.[1] Eighty percent of the patients in our research with acute MI had VPCs. This outcome is comparable to that of studies by Bigger JT *et al*. and Campbell RW *et al*. [2,3], which revealed that VPCs of varying frequency were seen in up to 90% of patients with MI. In the study conducted by Puneet P *et al*.[4], the anterior wall (50%) and inferior wall (34%) had the highest rates of myocardial infarction.

In our study, the anterior wall was implicated in 52% of patients, followed by the inferior wall (26%). Whether or whether patients have revascularization in the current study had no impact on the frequency of arrhythmia. Reperfusion may be to blame for this, which may initially cause arrhythmia, particularly AIVR, which was observed in 11.63% of patients. Patients with Killip classes III and IV demonstrated greater mortality in the study conducted by De Geare VS *et al*.[5] as a result of concomitant severe arrhythmias.

Killip Classes III and IV had a 100% likelihood of having arrhythmias, according to our study. 9.3% of the patients in the current study experienced VT. According to a research by Newby KH *et al*.,[6] persistent VT and VF can occur in as many as 6% of AMI patients and are linked to a poor outcome. In a research by Tofler GH *et al*. [7] sustained VT found in 2% of patients after 48 hours following MI is frequently temporary and has no long-term risk of sudden cardiac death.

First and second-degree heart blocks were each observed in 2.33% of the patients in the current study, while total heart blocks were discovered in 11.63% of the patients. 5.3% of MI patients had full heart block, according to Archbold RA *et al*.[8] According to a research by Goldberg RJ *et al*.,[9] anterior wall infarction with full cardiac block causes in-hospital mortality to be considerably higher than inferior wall myocardial

infarction. With inferior or posterior wall involvement, total heart block occurs twice as frequently as with anterior wall involvement. In the current study, 3.49% of the patients experienced atrial fibrillation.

According to a research by Jewitt DE, *et al* [10]. atrial fibrillation can develop up to 5% of the time after an infarction. According to the SPRINT Study Group, atrial fibrillation occurs in up to 15% of myocardial infarction patients, most frequently in those who have severe left ventricular dysfunction. Our research has some drawbacks.

First off, STEMI patients were not checked for arrhythmias after 48 hours of their initial presentation. Second, the occurrence and profile of arrhythmias in STEMI can be altered by a variety of aetiologies for their genesis, such as dyselectrolytemia. Last but not least, the clinical outcomes of the STEMI patients who had arrhythmias were not investigated [11-15].

Conclusion

100 patients with acute STEMI were included in our study. The majority (74%) of patients were over 50 years old. 30% of them were women, while 70% were men. Out of 100 patients, 86 had some sort of arrhythmia. The most common arrhythmia overall was VPC (80.23%), followed by AIVR and CHB (11.63% each), and VT (9.30%).

As compared to Antero-lateral and Infero-lateral STEMI (<75%), the majority of patients with anterior, inferior, and infero-posterior wall STEMI have arrhythmia (>85%). Killip Classes III and IV patients all had arrhythmia (100%) whereas Killip Classes I and II patients exhibited arrhythmia in 70 out of 84 cases (83.33%). ($p>0.05$) This is not statistically significant.

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