

FREQUENCY OF MALIGNANT VENTRICULAR ARRHYTHMIA IN NON- ST ELEVATION MYOCARDIAL INFARCTION (NSTEMI) DURING HOSPITALIZATION

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ABSTRACT

Background: The incidence of Non- St Elevation Myocardial Infarction NSTEMI is increasing. With the limited coronary care facilities, acute life-threatening arrhythmias is of major interest to guide the decision on the intensity of care at the time of admission. The objective of the study was to determine the frequency, time and outcome of ventricular arrhythmias in patients with NSTEMI during their hospital stay.

Material and Method: This descriptive cross-sectional study was done in Cardiac Care Unit (CCU) of District Headquarter Teaching Hospital, Dera Ismail Khan, Pakistan, from January 2, 2015 to October 10, 2015. Sample size was 450. Sampling technique was nonprobability, consecutive. Patients with NSTEMI admitted in CCU were included. Patients with STEMI were excluded from the study. After detailed history, clinical examination and baseline routine investigations, the patients were managed conservatively. Patients were monitored for malignant ventricular arrhythmia and ECG were done on routine basis to document VT/VF as long as patients remained in hospital. Collected data was analysed using SPSS version 10 software for descriptive analysis.

Result: Out of 450 patients, there were 260 (58%) males and 190 (42%) females with age ranging from 40 to 90 years and mean age of 60.47 ± 9.7 years. Frequency of malignant ventricular arrhythmias was 22(5%). Out of 22 patients, malignant VT/VF occurred within 48 hours after enrollment in 15(68%), while 7 patients (32%) had VT/VF after 48 hours. Thirteen (59%) patients died due to ventricular arrhythmia.

Conclusions: Frequency of malignant ventricular arrhythmias and mortality among patients with NSTEMI was high especially in males, between 51 to 75 years. Malignant VT/VF commonly occurred within 48 hours after admission.

KEY WORDS: Mortality; Arrhythmia; Ventricular Tachycardia; Ventricular Fibrillation.

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INTRODUCTION

Patients with non ST elevated myocardial infarction are at increased risk of heart rhythm disorders including ventricular arrhythmia. Therefore, in these patients admission to cardiac care unit (CCU) and cardiac monitoring is necessary to document arrhythmia and proper management of such patients if ventricular arrhythmia documented.^{1,2}

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In America more than 1.5 million people were suffered from acute coronary syndrome, majority of them were with NSTEMI.^{3,4} Similarly, findings from clinical trails of patients with NSTEMI showed that patients with ventricular arrhythmia within seven days of acute event were at high risk of sudden cardiac death.⁵⁻⁷

In patients with NSTEMI occurrence of VT/VF should be treated with beta blocker and re-vascularization whenever possible. Management of sustained VT/VF should be with cardioversion/defibrillation.^{8,9} Large studies failed to show improve survival following in hospital cardiac arrest despite interventions ,including use of AED.^{10,11} VT has many causes following ACS including ischemia, electrolyte imbalance,myocardial scar,enhanced automaticity in infarct border zone and increased sympathetic activity. Most of the time ventricular arrhythmia is caused by combination of these.¹²

The objective of the study was to determine the frequency, time and outcome of ventricular arrhythmias in patients with NSTEMI during their hospital stay.

MATERIAL AND METHOD

This descriptive cross-sectional study was done in Cardiac Care Unit (CCU) of District Headquarter Teaching Hospital, Dera Ismail Khan, Pakistan, from January 2, 2015 to October 10, 2015. Sample size was 450. Sampling technique was nonprobability, consecutive. Patients with NSTEMI admitted in CCU were included. Patients with STEMI were excluded from the study. Detailed history and clinical examination were performed and baseline routine investigations including cardiac enzymes were performed. Electrocardiography and echocardiography were done. Patients were managed conservatively as cardiac catheterization facility was not available in this district. Patients were monitored for malignant ventricular arrhythmia and ECG were done on routine basis to document VT/VF as long as patients remained in hospital.

Demographic variables were; gender, age in years, age-group with 40-50, 51-75 and >75. Research variables were; malignant ventricular arrhythmia, time of arrhythmia, outcome. Life threatening or malignant ventricular arrhythmia was defined as VT/VF with hemodynamic instability requiring cardioversion or defibrillation. Time of arrhythmia had two attributes; within 48 hours & after 48 hours.

Mean and standard deviation were calculated for quantitative variables like age in years. Frequencies and percentages were calculated for categorical variables like gender, arrhythmia, time of arrhythmia, outcome. Collected data was analysed using SPSS version 10 software for descriptive analysis.

RESULTS

Out of 450 patients, there were 260 (58%) males and 190 (42%) females, with age ranging from 40 to 90 years and mean age of 60.47 ± 9.7 years.

Frequency of malignant ventricular arrhythmias was 22(5%). (Table 1)

Table 1. Frequency / percentage of gender and malignant ventricular arrhythmias in NSTEMI patients (n=450).

S.No	Name of variable	Attributes	Frequency / percentage
1	Gender	Male	250(58%)
		Female	190(42%)
2	Malignant ventricular arrhythmias	Yes	22(5%)
		No	428(95%)

Out of 22 patients, malignant VT/VF occurred

within 48 hours after enrollment in 15 (68%), while 7 patients (32%) had VT/VF after 48 hours. Among these 22 patients 14 were male and 8 were female.

Out of 22 patients, 2(9%) patients were between 40 to 50 years, 12(55%) patients were between 51 to 75 and 8(36%) patients were above the age of 75 year. (Table 2)

Table 2. Frequency / percentage of categorical variables in NSTEMI patients with malignant ventricular arrhythmias (n=22).

S.No	Name of variable	Attributes	Frequency/ percentage
1	Age group	40-50 years	2(9%)
		51-75 years	12(55%)
		Above 75 years	8(36%)
2	Timing of malignant ventricular arrhythmias	Within 48 hours of admission	15(68%)
		After 48 hours of admissions	7(32%)
3	Outcome	Died	13(59%)
		Survived	9(41%)

Out of 22 patients 13(59%) patients died due to ventricular arrhythmia. Nine out of 13 deaths due to malignant arrhythmia occurred in 48 hours of admission with NSTEMI, while arrhythmia related mortality after 48 hours was seen in 4 patients.

DISCUSSION

Results of large clinical trials done in 1990, in patients with NSTEMI showed that incidence of sustained ventricular arrhythmia was 2%. Recent findings from clinical trials in patients with NSTEMI showed that ventricular arrhythmia in 7 days of acute event were associated with increased risk of mortality and sudden cardiac death and twofold increased risk of mortality in next year as well.^{13,14}

In our study mean age of the patients was 60.47 ± 9.79 years while study done by Piccini et al age was 60 to 70 with mean age was 65 years. In most patients malignant ventricular arrhythmia occurred in high age group, above 70 years of age and mostly treated with early invasive strategy.⁸

450 patients with NSTEMI were included in this study, while patients with STEMI were excluded. Frequency of malignant ventricular arrhythmias was 5% (n=22). Malignant VT/VF occurred within 48 hours after enrollment in 15 out of 22 patients (68%), while 7 out of 22 patients (32%) had VT/VF after 48 hours. Among these 22 patients 14 were male, and 8 were female. The frequency of malignant ventricular arrhythmia within 48 hours (68%) was doubled to malignant ventricular arrhythmia occurred after 48

hours (32%). In New York State Registry, patients with acute coronary syndrome underwent PCI were examined in which 5% of patients developed sustained VT/VF.¹⁵ In EARLY ACS trial¹⁶, high risk patients with NSTEMI were managed with early invasive strategy showed that one in sixty patients experienced sustained or malignant ventricular arrhythmia. In EARLY ACS, high risk patients were selected on the basis of age, changes in ECG, elevated Troponin, ischemic MR and GRACE risk score more than 40.

From the results of Metaqboloc Efficiency With Ranolazine for Less Ischemia in Non STEMI –TIMI 36 trail (MERLIN)-TIMI 36 trail was found that nonsustained ventricular arrhythmia was mostly observed 48 hours after admission in hospital for NSTEMI. In sub group analysis, when sustained VT/VF was compared with timing it was coted that arrhythmic death due to sustained VT/VF was 3 times greater with in 48 hours without sustained arrhythmia.¹⁷ In our study, out of 22 NSTEMI patients with malignant ventricular arrhythmia, 13(59%) patients died. Nine out of 13 deaths due to malignant arrhythmia occurred in 48 hours of admission with NSTEMI, while arrhythmia related mortality after 48 hours was seen in 4 patients. Mortality was high in NSTEMI patients with malignant arrhythmia, who had diabetes mellitus, heart failure, renal impairment, elevated Troponin and ejection fraction <40% on echocardiography. In study done by K.Rahimi et al, 588 patients with NSTEMI were included, mortality occurred in 21 patients. Mortality rate was 3.6% that was similar to our results.

A study by Zorzi and colleagues,¹⁸ noted that in hospital mortality was significantly high in patients who admitted with NSTEMI and developed life threatening ventricular arrhythmias during hospital course.¹⁸ Seven out of 20 patients who survived due to cardioversion/ defibrillation later on died due to heart attack. VT/VF was commonly seen in patients with large ischemia, significant ECG deviation or changes, elevated Troponin or raised cardiac biomarkers and low ejection fraction on Echocardiography (EF<40%).

In patientes with Non STEMI high mortality was seen due to malignamt ventricular arrhythmia. Increase in mortality in admitted patients with NSTEMI during hospital stay indicates that such patients should be managed aggressively with invasive strategy as well as with continuous monitoring to detect arrhythmia and to take immediate steps to prevent death due to malignant ventricular arrhythmia.

Several limitations were seen in our study, sample size was small, it was a single centre study as well as conservative management because lack of facility of cardiac catheterization laboratory in hospital and longer hospital stay.

CONCLUSION

Frequency of malignant ventricular arrhythmias

and mortality among patients with NSTEMI was high especially in males, between 51 to 75 years. Malignant VT/VF commonly occurred within 48 hours after admission.

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CONFLICT OF INTEREST

Authors declare no conflict of interest.
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AUTHORS' CONTRIBUTION

Conception and Design:	MRK, SAS
Data collection, analysis & interpretation:	MRK, SAS, BN , AA
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