ORIGINAL ARTICLE

FREQUENCY OF VENTRICULAR TACHYCARDIA IN PATIENTS WITH ACUTE CORONARY SYNDROME DURING THE FIRST 24 HOURS OF ADMISSION

Atif Kamal, Muhammad Faheem

[1]Department of Cardiology, Khyber Teaching Hospital, Peshawar - Pakistan

ABSTRACT

Objective: To determine the frequency of ventricular tachycardia in patients with acute coronary syndrome (ACS) during the first 24 hours of admission

Material And Methods: This descriptive study was conducted at the coronary care unit of Khyber Teaching Hospital Peshawar from July 2020 to January 2021. Using a non-probability consecutive sampling technique, 169 patients of either gender aged between 30 and 70 years with ACS were included. Patients were monitored for any arrhythmias e.g., Ventricular tachycardia by a monitor (Nihon Kohden) and on 12 lead ECG (Cardio flex II) when needed. All the data was noted in a proforma.

Results: A total of 169 patients comprising of male 121 (71.6%) and 48 (28.4%) female patients were included in this study. The mean age was 57.45±7.69 years. Patients in the age group 30-50 years were 45 (26.6%) while 124 (73.4%) patients were in the age group 51-70 years. The mean duration of symptoms was 8.99 ± 4.740 hours. Out of 169 patients, 48 (28.4%) patients presented with unstable angina, 91 (53.8%) patients had NSTEMI and 30 (17.8%) patients with STEMI. A total of 22 (13.0%) patients were found to have hypokalemia and 23 (13.6%) patients with hypoglycemia. Patients who were diagnosed to have ventricular tachycardia were 12 (7.1%).

Conclusion: In our study, ventricular tachycardia occurred in 7% of patients in the first 24 hours of admission who presented with Acute Coronary Syndrome.

Keywords: Ventricular tachycardia, Acute coronary syndrome.

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INTRODUCTION

Acute Coronary Syndrome, including Unstable angina, STEMI, and NSTEMI can lead to different electrical or mechanical complications. The electrical complications range from premature ventricular depolarization, and accelerated idioventricular rhythm, to non-sustained ventricular tachycardia, sustained V.T., and even ventricular Fibrillation. [1] Sustained VT occurs in 20% of myocardial infarctions and is associated with higher mortality. [2]

Different mechanisms are involved in the generation of these arrhythmias, including the changes in electrophysiological properties of myocardial cells, reentry, increased automaticity, and reperfusion arrhythmias. Acute myocardial ischemia leads to cellular hypoxia that badly affects cellular ion channels. It results in disruption in the normal balance of potassium, sodium, and calcium across cell membranes.

This can lead to alteration in conduction, refractoriness, and automaticity. The Resting membrane potential increases from -80 mv to -60 mv. [3] Another mechanism of VT development is reentry circuits within the ischemic myocardium. Because of the reduction in conduction velocity and delayed recovery of excitability in myocardial cells, transient reentry circuits develop, which serve as foci for ventricular tachycardia.[4]

Reperfusion arrhythmias are also common in acute Myocardial ischemia. The changes in Potassium, sodium, and calcium across cell membranes due to ischemia, are normalized after reperfusion. [5]

But this occurs in-homogeneously, because of the heterogenicity of regional blood flow restoration within the ischemic zone, leading to the development of transient re-

Correspondence
Dr. Muhammad Faheem
Department of Cardiology, Khyber Teaching Hospital, Peshawar - Pakistan
Cell: +92-333-9202002
Email: drfaheem@live.com
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entrant circuits. Other factors like increased levels of CRP and uric acid have also been associated with high incidences of cardiac arrhythmias. [6]

VT in ACS can often lead to hemodynamic compromise and may be fatal.[7] They must be managed promptly by DC Cardioversion.

For recurrent episodes of V.T. strategies include urgent revascularization, drug therapy (Beta-Blockers, amiodarone, and lignocaine), Catheter ablation, and implantable cardioverter defibrillator. The rationale of this study is to provide recent local data on the frequency of ventricular tachycardia in patients with acute coronary syndrome during the first 24 hours of admission.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted from 24 July 2020 to 24 January 2021 at the coronary care unit (CCU), Department of Cardiology of Khyber Teaching Hospital, after approval from the hospital's ethical committee (Vide no. 466/DME/KMC dated 25/02/2020) using a nonprobability consecutive sampling technique and taking the frequency of VT in ACS of 5.7% (ref 5) with a margin of error of 3.5% and a confidence level of 95%, 169 patients of either gender aged between 30 to 70 years.

with ACS were included. Informed consent was taken from all the patients. ACS was defined per ACC criteria and included patients with Unstable angina, Non-ST elevation Myocardial Infarction (NSTEMI), and ST elevation Myocardial Infarction (STEMI). Ventricular tachycardia was defined as ECG showing QRS wider than >180 msec (>3 small squares) at the rate of 120 beats per minute or more with AV dissociation (no regular rhythm with absent P wave) on a standard ECG.

Detailed history and physical examination of each patient were performed. Data like name, gender, and age were noted. All the patients were managed according to hospital protocol. Baseline investigations, such as blood sugar, potassium, and ECG, were done. Patients admitted to CCU with ACS were monitored for any arrhythmias e.g., Ventricular tachycardia by monitor (Nihon Kohden) and on 12 lead ECG (Cardio flex II) when needed. All the data was collected and noted on a proforma.

Patients with a documented history of ischemic heart disease, cardiomyopathies, heart failure, or congenital heart diseases were excluded from the study. patients with other arrhythmias like, atrial fibrillation, Bundle Branch block, or permanent pacemaker rhythm were also excluded. Statistical Package for Social Sciences version 23 was used for data analysis.

Mean ± SD was calculated for quantitative variables like age and duration of symptoms. Frequency and percentages were presented for categorical variables like type of Acute Coronary Syndrome, Ventricular tachycardia, hypoglycemia (<60mg/dl), and hypokalemia (<3.5 m Eq/L). Post-stratification Chi-square test was applied and a p-value of ≤0.05 was taken as significant. All the results were presented using graphs and tables.

RESULTS

A total of 169 patients comprising 121 (71.6%) male and 48 (28.4%) female patients were included in this study. The mean and SDs for age were 57.45+/-7.69 years. Patients in the age group 30-50 years were 45 (26.6%) while 124 (73.4%) patients were in the age group 51-70 years. Mean and SDs for the duration of symptoms were 8.99+/-4.740 hours.

Out of 169 patients, 48 (28.4%) patients presented with unstable angina, 91 (53.8%) patients had NSTEMI and 30 (17.8%) patients with STEMI. Out of 169 patients, 22 (13.0%) patients were found to have hypokalemia, and 23 (13.6%) patients with hypoglycemia.

Patients who were diagnosed to have ventricular tachycardia were 12 (7.1%) Patients were stratified according to age, gender, hypokalemia, hypoglycemia, and type of ACS based on the presence/absence of ventricular tachycardia is shown in Table No. 1 to 5 respectively. There was no statistical difference between the groups.

DISCUSSION

Among many other complications of ACS, VT carries a high mortality risk and shall be promptly diagnosed

Table No 1. Stratification of Ventricular Tachycardia with Age Groups (n=169)

		Age Groups		Total	P Value
		30-50 Years	51-70 Years		
Ventricular Tachycardia	Yes	5	7	12	0.221
		11.1%	5.6%	7.1%	
	No	40	117	157	
		88.9%	94.4%	92.9%	
Total		45	124	169	
		100.0%	100.0%	100.0%	

Table No 2: Stratification of Ventricular Tachycardia with Gender (n=169)

		Gender		Total	P Value
		Male	Female		
Ventricular Tachycardia	Yes	9	3	12	0.786
		7.4%	6.3%	7.1%	
	No	112	45	157	
		92.6%	93.8%	92.9%	
Total		121	48	169	
		100.0%	100.0%	100.0%	

Table No 3: Stratification of Ventricular Tachycardia with Hypokalemia (n=169)

		Hypokalemia (mEq/L)		Total	P Value
		Yes	No		
Ventricular Tachycardia	Yes	1	11	12	0.617
		4.5%	7.5%	7.1%	
	No	21	136	157	
		95.5%	92.5%	92.9%	
Total		22	147	169	
		100.0%	100.0%	100.0%	

Table No 4: Stratification of Ventricular Tachycardia with Hypoglycemia (n=169)

		Type of ACS			Total	P Value
		Unstable Angina	NSTEMI	STEMI		
Ventricular Tachycardia	Yes	6	4	2	12	0.580
		12.5%	4.4%	6.7%	7.1%	
	No	42	87	28	157	
		87.5%	95.6%	93.3%	92.9%	
Total		48	91	30	169	
		100.0%	100.0%	100.0%	100.0%	

Table No 5: Stratification of Ventricular Tachycardia Type of ACS (n=169)

		Type of ACS			Total	P Value
		Unstable Angina	NSTEMI	STEMI		
Ventricular Tachycardia	Yes	6	4	2	12	0.208
		12.5%	4.4%	6.7%	7.1%	
	No	42	87	28	157	
		87.5%	95.6%	93.3%	92.9%	
Total		48	91	30	169	
		100.0%	100.0%	100.0%	100.0%	

and treated. Many international and national studies have previously been done to find the occurrence of VT in the setting of ACS. OUR study will add to the data already available at the national level. In our study, the mean age was inconsistent with the findings of Gabet A and Danchin N and Khani QZ et al. [8, 9] However, our findings are consistent with a study by Lashari NA, and Lakho NI. [10] The Mean and SDs for the duration of symptoms were 8.99±4.74 hours. This is in agreement with findings from Allana S et al. [11] They also showed that in women, the presentation of ACS is more delayed than in men.

In our study, 22 (13.0%) patients were recorded with hypokalemia, and 23 (13.6%) patients were recorded with hypoglycemia. These findings are consistent with the findings of Jabbari R & Engstrøm Regarding the type of ACS, our findings are consistent with the findings are

comparable to the findings of Ahmadi A, Soori H. [13]. In another local study it was o served that 131/280 (46.8%) of patients with chest pain had Acute coronary syndrome, out of these 131 patients, 55% had NSTMI, 28.2% had Unstable angina and 16.8% had STEMI. [10,14]

As per our main outcome variable, 12 (7.1%) patients with ACS were recorded with ventricular tachycardia in the first 24 hours of their admission, which is almost in comparison to the findings of Almani B also similar to the findings of an Iranian population where the incidence of VT in ACS patients was 5.7%. [13, 15]

However, these findings were in contrast to the findings concluded by Bhar-Amato J, Davies W.[16] and by Wilmé V. [17] Similarly in another study Jonathan P et al. monitored patients for 48 hours but still showed a low incidence of VT (0.9 %). [18] It has been shown that among 3,602 patients with STEMI, 108 patients (3.0%) had early VT/VF. [19] On the other, Hanada K studied STEMI patients undergoing primary PCI and followed them for 3.7 years. [20] They found the occurrence of VT/VF during hospitalization did not affect the mid-term clinical outcomes.

Previous studies show that ventricular tachycardia after ACS is more common in men, in higher age groups, and in patients with STEMI. [21] We did stratification of VT according to age, gender, and type of ACS, but the difference between groups was not statistically significant. This may be due to the low sample size of our study.

CONCLUSION

In our study, Ventricular tachycardia occurred in 7% of patients with acute coronary syndrome in the first 24 hours of admission into a CCU. As it carries high mortality, all those patients admitted with ACS should be evaluated and monitored properly for timely diagnosis and management of arrhythmic complications to avoid poor outcomes.

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Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Kamal A,	✓	✓	×	×	✓	×
Faheem M	✓	✓	×	✓	✓	×

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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