Original Article

Frequency of Ventricular Arrhythmias during First 24 hours of Acute Myocardial Infarction in Patient Thrombolysed with Streptokinase

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ABSTRACT

Objectives: To asses the frequency of ventricular arrhythmias during first 24 hours complicating first episode of Acute Myocardial Infarction in patients thrombolysed with Streptokinase.

Study Design: Cross-sectional, prospective, observational & quatitative study.

Place and Duration of Study: This study was conducted at Sialkot Medical Complex for six months from March 2010 to August 2010.

Patients and Methods: 200 consecutive patients with acute myocardial infarction who received streptokinase were assessed for ventricular arrhythmias. Monitoring of the patients for ventricular arrhythmias for 24 hours from the time of admission was done. Arrhythmias from the cardiac monitor's memory noted & documented. Ventricular arrhythmias studied were ventricular fibrillation (VF), sustained ventricular tachycardia, accelerated idioventricular rhythm, non-sustained ventricular tachycardia & premature ventricular beats > 10 beats per hour. Findings were recorded on a specially designed proforma. The data were then entered in the computer for analysis & conclusions were drawn.

Results: Reperfusion arrhythmias were observed in 20% of the patients (40/200) in first 24 hours after thrombolytic therapy presenting with first acute myocardial infarction. All the patients included in the study showed the ECG criteria of STEMI and positive quantitatively Troponin T test. Inferior Wall MI was the most common type of acute MI. All the patients received IV streptokinase as thrombolytic agent. The patients with Sustained VT (33%) received cardioversion & IV amiodarone. Non-sustained VT were managed by observation only (77%). A total of 35 patients survived in first 24 hours, five died.

Conclusions: Reperfusing arrhythmias are commonly observed in first 24 hours after streptokinase therapy for acute myocardial infarctions. Most of the non-sustained reperfusion arrhythmias are left untreated and requires observation only but sustained ventricular arrhythmias (VF, VT) can be life-threatening and therefore must be considered for treatment. Electrical cardioversion is preferred over pharmacological treatment in case of sustained ventricular arrhythmias. Survival can be maximized if these arrhythmias are recognized and managed efficiently.

Key Words: ventricular arrhythmias, cardioversion, acute myocardial infarction.

INTRODUCTION

Coronary artery disease (CAD) is the leading cause of death woldwide[1]. World health organization (WHO) predicts that the current figure of 7.1 millions deaths from CAD globally will jump to 11.1 millions in 2020. At least 50% of these deaths will occur in South Asian counries[2] like India, Pakistan, Sri Lanka and Bangladesh. Clinical manifestations of CAD include acute coronary syndromes and chronic stable angina. Acute coronary syndrome (ACS) representing acute myocardial ischemia is further categorized on the basis of index ECG and cardiac biochemical markers into ST elevation myocardial infarction (STEMI), non-ST elevation myocardial infarction (NSTEMI) and unstable angina (UA)[3]. STEMI is not only prevalent but also associated with higher mortality than the other two subsets (NSTEMI and UA) of the ACS. In the US, one million new myocardial infarctions are added to the existing pool of more than 70 million prior infarctions[4]. One third of the patients who experience STEMI die and about half of them do so within first four hours of the onset of symptoms.

Advancements in the management of STEMI with optical medical treatment like aspirin, beta blockers and ACE inhibitors as well as reperfusion therapies like fibrinolysis and primary percutaneous coronary intervention (PCI) has undoubtedly contributed to the decline in mortality over the last 30 years. Nevertheless, early mortality rates are still unacceptably high[5]. Majority of early deaths after STEMI are caused by ventricular arrhythmia. In order to make a significant impact on the early Post MI mortality, early recognition and prompt treatment (electrical or pharmacological) of ventricular arrhythmias are mandatory. Several studies

have been performed to know the frequency of ventricular arrhythmias and their subsequent relation with mortality in patients recovering from myocardial infarction[6,7]. But such studies in South Asian patients who are the main victims of CAD globally are very few. The mainstay of the management of STEMI in Pakistan is fibrinolysis with streptokinase as tissue plasminogen activator (TPA) and primary PCI are not preferred choices due to economic reasons. The aim of this study is to establish the frequency of ventricular arrhythmias, the most important cause of early mortality, in post myocardial infarction patients treated with streptokinase during the first 24 hours.

PATIENTS AND METHODS

200 consecutive patients with acute myocardial infarction who received streptokinase were assessed for ventricular arrhythmias. Monitoring of the patients for ventricular arrhythmias for 24 hours from the time of admission was done. Arrhythmias from the cardiac monitor's memory noted & documented. Ventricular arrhythmias studied were ventricular fibrillation (VF), sustained ventricular tachycardia, accelerated idioventricular rhythm, non-sustained ventricular tachycardia & premature ventricular beats > 10 beats per hour. Findings were recorded on a specially designed proforma. The data were then entered in the computer for analysis & conclusions were drawn.

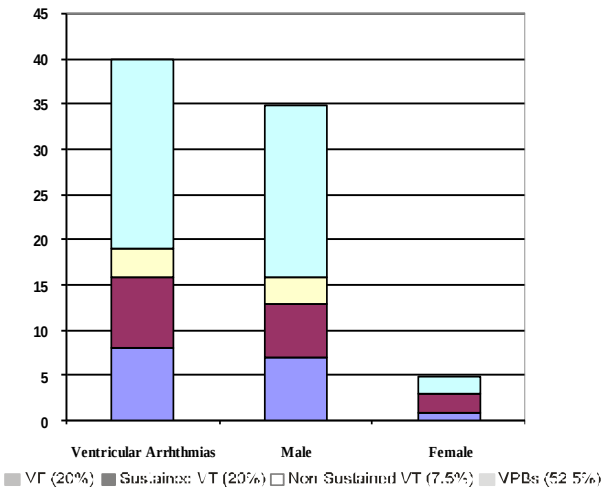
Study design: It was a prospective cross-sectional, observational study done at Cardiology Department, Sialkot Medical Complex Sialkot from March 2010 to August 2010. Ethical approval was taken from Board of Governors of Heart Care Society Sialkot and ethical committee of Sialkot Medical Complex before the commencement of study.

Inclusion Criteria: All the patient with myocardial ischemia and time of onset of symptoms to therapy is ≤12 hours, ST segment elevation ≥1mm in contagious limb leads or ≥2mm in contagious chest leads, presumably new-onset LBBB & with first myocardial infarction were included in the study.

RESULTS

Figure 1 show the characteristics of ventricular arrhythmias in first 24 hours in those patients thrombolysed with streptokinase at our centre. In our study, four types of ventricular arrhythmias were seen in those patients receiving streptokinase as thrombolytic agent for acute myocardial infarction in first 24 hours. The most common ventricular arrhythmias were VPBs (52.5 %) followed by VF (20%), Sustained VT (20%), and Non-sustained VT (7.5%) respectively.

Figure 1 showing post MI vent. arrhythmias



The mean age for all the ventricular arrhythmias was found to be 53.4 years with slightly younger age for males than females (M: F, 52.9: 57 years). On the other hand, VF occurred in patients with comparatively older age (65.3 years) than other ventricular arrhythmias (non-sustained VT 55 years, VPBs 52.8 years, and sustained VT 49.4 years). There were striking findings related to sex distribution that most of those ventricular arrhythmias were in male group (M: F, 87%: 13%). The ventricular arrhythmias were also recorded more in patients with cardiovascular risk factors (75%) than those with no risk factors (25%). Quantitative Troponin T was positive in all patients during the course of the disease progression.

Table 1: Characteristics of ventricular arrhythmias in patient's thrombolysed with streptokinase

Characteristics	**VF (n=8)**	**Sustain-ed VT (n= 8)**	**Non-sustained VT(n= 3)**	**VPBs (n= 21)**
Age (Mean) 53.4 yrs (M=52.9yrs, F=57yrs)	65.3 yrs	49.4 yrs	55 yrs	52.8 yrs
Sex				
Male (n=35, 87%)	7 (17%)	6 (15%)	3 (7%)	19(47%)
Female (n=5, 13%)	1 (2%)	2 (5%)	-	2 (5%)
Risk factor profile				
DM (n=15)	4	3	1	5
HTN (n=9)	1	1	-	6
DM+HTN (n=6)	1	1	-	4
No HTN/DM (n=10)	2	3	2	6

Type of Acute Myocardial Infarction on presenting ECG				
Antero Septal (n=6)	1	3	-	2
Anterior Wall (n=7)	1	1	-	5
Inferior Wall (n=14)	2	3	-	9
Infero Posterior (n=2)	-	-	1	1
Antero Lateral (n=2)	-	-	-	2
Postero Lateral (n=1)	-	-	1	-
Extensive (n=5)	2	1	1	1
Global (n=3)	2	-	-	1
Quantitative Troponin T	All positive	All positive	All positive	All positive

Reperfusion arrhythmias are frequently observed in patients receiving thrombolytic therapy for acute MIs and many of them need simple observation but sustained arrhythmias can become life-threatening and must be treated. All the patients with VPBs (n= 21) were simply observed. Patients with VF (n=8) were defibrillated immediately. Patients with sustained VT received electrical therapy (62.5%), drug therapy (25%), and observation only (12.5%) respectively. In general most of our patients (54%) with ventricular arrhythmias in post-thrombolysis period were observed as the most common rhythm was VPBs (52.5%). Electrical therapy (33%) was offered to lethal and sustained arrhythmias and some stable patient were also managed with drug therapy (13%). Majority (87.5%) of the patients survived and the mortality rate in first 24 hours after admission was 12.5%. VF was the most common cause of death (80%), followed by Sustained VT (20%). Unfortunately two of the patients develop embolism in the lower limbs which were successfully removed under local by the surgeons.

Table 2: Treatment of ventricular arrhythmias in 24 hours post-thrombolysis period

Treatment Option	**VF (n=8)**	**Sustained VT (n= 8)**	**Non-sustained VT (n= 3)**	**VPBs (n=21)**
Observation (22/40) 55%	-	1	1	20
Drug Therapy (5/40) 13 %	-	2	2	1
Electricity (13/40)32%	8	5	-	-

DISCUSSION

Reperfusion arrhythmias are seen more than 25% of the patients after thrombolytic therapy for acute myocardial infarction[8]. In our study 20% of the patients suffered ventricular arrhythmias in first 24 hours which is very much similar to most of the studies in the literature[9]. It is documented that accelerated idioventricular rhythm is frequently seen as reperfusion arrhythmia after thrombolytic therapy[10, 11]. In our study, VPBs were the most common ventricular arrhythmias seen after streptokinase therapy, followed by VF, sustained VT, and non-sustained VT respectively. Inferior wall MI was the most common type of acute MI seen in our patient but most of the life-threatening arrhythmias like VF were seen more commonly in extensive MI or global MI than any regional myocardial infarction. This explains that more extensive the myocardial damage, more lethal the arrhythmias are and more chances of sudden cardiac arrest[12]. One of the limitations in our study is lack of follow-up for most of the patients. But we believe that our study opens the doors to search for the long term mortality at 30 days and one year in patients with post-thrombolysis ventricular arrhythmias[13]. Additionally, it is not clear that sustained ventricular arrhythmias were either associated with acute myocardial infarctions or related to reperfusion state after streptokinase therapy. Few studies where patients were randomized to streptokinase and placebo reveals that incidence of arrhythmias were same in two groups[14].

CONCLUSION

Reperfusion arrhythmias are commonly observed in first 24 hours after streptokinase therapy for acute myocardial infarctions. Most of the non-sustained reperfusion arrhythmias are left untreated and requires observation only but sustained ventricular arrhythmias (VF, VT) can be life-threatening and therefore must be considered for treatment. Electrical therapy is preferred over pharmacological treatment in case of sustained ventricular arrhythmias. Ventricular arrhythmias are directly related to infarct size, extensive the infarct, fatal the arrhythmias and vice versa. Survival can be maximized if these arrhythmias are recognized and managed efficiently.

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