

## **Incidence of ventricular arrhythmias, brady-arrhythmias and sudden cardiac death in Sudanese Patients with acute Myocardial Infarction**

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### **Abstract:**

Ventricular arrhythmias (VAS), Including ventricular tachycardia (VT), ventricular fibrillation (VF) and Brady-arrhythmias, are life-threatening complications of acute myocardial infarction (MI).

### **Objective:**

To study the incidence of ventricular arrhythmias, brady-arrhythmias and Sudden Cardiac Death (SCD) in Sudanese patients with acute MI.

### **Methodology:**

This is a prospective cross sectional, hospital based study, conducted at Elshaab Teaching Hospital Khartoum Sudan. One Hundred Sudanese patients with acute MI were enrolled in the study in the period between August 2006 and December 2006. A questionnaire was constructed in sections to address the different aspect of the study group. ECG Monitor was used to confirm the complication in every patient.

### **Result:**

Of the study group forty seven (47%) patients were 55-65 years old, twenty eight (28%) were more than 65 years old and twenty five (25%) were less than 55 years old. Sixty nine (69%) were males. Twenty patients (20%) developed complications [ventricular arrhythmias (VAS), Brady-arrhythmias and SCD].

### **Conclusion:**

The incidence of ventricular arrhythmias, brady-arrhythmias and sudden cardiac death following acute myocardial infarction were significantly high in Sudanese patients. The increased incidence is even in all age groups. DM, smoking and past history of IHD are the commonest associated risk factors. Thrombolysis is under used and had no significant impact.

Key words: thrombolysis, fibrillation, ischemia, Dyslipidaemia

**A**cute Myocardial infarction (MI) is one of the leading causes of mortality and morbidity world wide despite advances in both diagnostic and treatment modalities<sup>1</sup>.

The diagnosis of established MI is confirmed by any of the following two criteria<sup>2</sup>:

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Development of pathologic Q wave on serial ECGs and or the presence of biochemical markers of MI in addition to ischemic symptoms.

Ventricular arrhythmias (VAS), including ventricular tachycardia (VT) and ventricular fibrillation (VF) are life threatening complications of acute MI, that may result in sudden cardiac death (SCD)<sup>3,4</sup>. The risk of SCD is increased two-to four folds in the presence of MI<sup>5-7</sup>. In addition SCD is the initial clinical manifestation of MI in approximately 15 %of patients<sup>8</sup>.

Prognosis after early sustained VT is associated with a higher in-hospital mortality



due to cardiac arrest and is possibly due to exacerbation of ischemia and extension of the infarct<sup>9, 10,12-15</sup>.

VF is the most frequent mechanism of SCD. Among patients with acute MI in the thrombolytic era, the incidence of VF has ranged from 3.7 to 6.7 % in large studies. The incidence is lower, about 1.3 %, in patients with a non-ST elevation MI or unstable angina. In addition, many cases of out-of-hospital SCD are due to very early VF due to acute MI<sup>9,12</sup>.

The majority of episodes of VF occur within the first 48 to 72 hours after the onset of symptoms<sup>9,11</sup>. It is presumably a manifestation of ischemia and is associated with lack of perfusion of the infarct-related artery<sup>13</sup>.

Brady-arrhythmias and conduction disturbances are well recognized complications of acute MI. They are induced by either autonomic imbalance or ischemia and necrosis of the conduction system. It is important to recognize which situations are transient and which are likely to progress to irreversible and symptomatic high-degree block<sup>14</sup>.

### Methodology:

The study period was four months from August 2006 to December 2006. All patients with acute myocardial infarction were enrolled in the study after taking informed consent. ECG Monitor and ECG Records were used for every patient. Data were collected using a questionnaire that was constructed in sections to address personal data, type of myocardial infarction, thrombolysis, risk factors for ischemic heart disease (IHD), past history of IHD, and the complications of MI

(Ventricular Arrhythmias, Brady-arrhythmias, Sudden Cardiac Death).

Data were analyzed using the SPSS. The results were expressed in number and percentage.

### Results:

Of the one hundred patients, 69 were males. Forty seven (47%) patients were 55-65 years old, twenty eight (28%) patients were more than 65 years old and twenty five (25%) patients were less than 55 years old (Table.1).

Table1. Age and sex Distribution of the study group.

Age in yrs	Male	Female
<55	18	7
55-65	34	13
>65	17	11
Total	69	31

Twenty three (23%) patients had diabetes mellitus, nineteen (19%) had hypertension, sixteen (16%) were smokers. Dyslipidaemia, diabetes mellitus with hypertension were seen each in seven (7%) patients. Smoking with diabetes mellitus was seen in five (5%) patients. 22 patients had no identifiable risk factor. Past history of IHD was shown on.

Sixty two (62%) patients had anterior MI, (twenty six of them had extensive MI) while 32% had inferior MI.

All the patients received conventional treatment of acute myocardial infarction. Twenty (20%) patients received streptokinase in less than six hours following chest pain; while seven (7%) patients received it in more than six hours while the rest of the patients did not received any thrombolytic therapy for different reasons.

Fourteen patients (14%) died (SCD), one patient (1%) developed sustained VT. Five patients (5%) developed Brady-arrhythmias. (Table2).

Table2. Characteristics of the study group.

Character	Patients%			
	All ages N=100	<55yrs N=25	55-65yrs N=47	>65yrs N=28
<b>Type of M.I</b>				
<b>Anterior</b>	62	14	29	19
EA	26	6	12	8
AL	10	2	7	1
AS	26	6	10	10
Inferior	32	8	16	8
Subendocardial	5	2	2	1
Posterior	1	1	0	0
<b>Thrombolysis</b>				
Yes	27	9	11	7
<6hrs	20	7	10	3
>6hrs	7	2	1	4
No	73			
<b>Risk Factor</b>				
Sex				
Male	69	18	34	17
Female	31	7	13	11
<b>Past.H.of.IHD</b>				
Yes	29	6	15	8
MI	12	3	6	3
Angina	17	3	9	5
No	71	19	32	20
<b>Complications</b>				
Death	14	3	8	3
Ventricular Arrhythmias	1	0	1	0
Brady arrhythmias	5	2	0	3

The correlation of the complications with the clinical and demographic data is shown on table 3. Of those patients who developed complications, sixteen (80%) had anterior

myocardial infarction (seven of them had extensive anterior, five had anteroseptal and four had anterolateral) while four patients (20%) had inferior myocardial infarction.(Table 3).

Table3: Characteristics of Patients who developed complications following acute myocardial infraction.

Character	Patients%			
	All ages N=20	<55yrs N=7	55-65yrs N=6	>65yrs N=7
<b>Type of M.I</b>				
<b>Anterior</b>	16	5	6	5
EA	7	2	3	2
AL	4	0	3	1
AS	5	3	0	2
<b>Inferior</b>	4	2	2	2
Sec	0	0	0	0
Posterior	0	0	0	0
<b>Thrombolysis</b>				
Yes	7	2	4	1
<6hrs	4	1	2	1
>6hrs	3	2	1	0
No	13	3	4	6
<b>Risk Factor</b>				
Sex				
Male	15	4	6	5
Female	5	1	2	2
DM	8	0	4	4
Smoking	5	3	1	1
DM&HTN	2	0	1	1
DM&Smoking	2	1	0	1
None	3	3	0	0
<b>Past.H.of.IHD</b>				
Yes	6	1	3	2
MI	1	0	1	0
Angina	5	1	2	2
No	14	5	8	7
<b>Complications</b>				
Death	14	3	8	3
Preceded by cardiogenic shock	4	0	3	1
Preceded by sustained VT	3	1	1	1
Preceded by bradyarrhythmias	2	0	2	0
Preceded by tachyarrhythmias	1	0	0	1
Preceded by acute mechanical complication	1	1	0	0
No documented antecedent complication	3	1	2	0
<b>Serious arrhythmia</b>	6	2	0	3
Sustained VT or VF	0	0	0	0
Any tachyarrhythmia terminated by D/C	1	0	1	0
Any bradyarrhythmias needs pacing	5	1	1	3

### Discussion:

Out of the one hundred (100) Sudanese patients presented with acute MI; males were about twice the females (69% vs. 31%). The sex gap tends to diminish with advanced age (above 65yrs), this finding is not different from other studies<sup>16-19</sup>.

In consistence with a study conducted by American Heart Association seventy five percent of our patients were above 55 years indicating the increased prevalence of acute MI with advancing age. However, we got less number of patients who were above 65 years of age which can be partially explained by the fact that survival rate is more in the developed countries or it may be due to lack of awareness or delay in seeking care or negligence of symptoms in our elderly patients<sup>19</sup>.

The majority of our patients [62%] had anterior MI where as non-Q MI is less frequent and only 1% had posterior MI. This in part, can be explained by under control of risk factors among Sudanese patients particularly DM hence the more exposure to the anterior type of MI<sup>20</sup>.

In keeping with other hospital based registries; fourteen (14%) of our patients died (SCD)<sup>21,22</sup>, six (6%) developed serious arrhythmias<sup>14,23</sup>.

Among patients who developed complications, five (20%) were females, which is different from other studies which show tendency towards higher percentage of female gender who develop complications compared with their percentage in the study group<sup>24</sup>.

Age distribution of patients with complications in this study showed more or less similar percentage of complications within each age group which is not consistent with the literature that emphasizes the age as the most important independent predictor of in-hospital mortality and this may indicate more severe pathology in younger patients in our study<sup>24-29</sup>.

The incidence of brady-arrhythmias in our study (5%) is similar to other studies<sup>14</sup>.

Concerning risk factors prevalence among patients who developed complications, eight of them had diabetes mellitus (40%), Six had past history of IHD (30% ), five were smokers(25%). Sub analysis of this group of patients to their percentage of the study group showed 32%of the smokers (5 out of 16), 35% of the diabetics (8 out of 23), and 21% of those with PH of IHD (6 out of 29) indicating diabetes, PH of IHD and smoking as the commonest risk factors in patients with complications. While the absolute number of smokers is low in our patients, smokers tend to have more complications. This correlates well with the worldwide study of patient from twenty five countries<sup>20,30</sup>.

Regarding thrombolytic therapy, seven (31.8%) patients who received Streptokinase developed complications but when compared with the percentage of the total patients of the study group who received streptokinase (27%), it shows no significant benefit, this may be due to the small study group and is not consistent with other studies<sup>31</sup>.

### Conclusion:

The incidence of ventricular arrhythmias, brady-arrhythmias and sudden cardiac death following acute myocardial infarction were significantly high in Sudanese patients. The increased incidence is even in all age groups. DM, smoking and PH of IHD are the commonest associated risk factors. While thrombolysis is under used and had no great impact.

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