# *Factors Influence the Development of Dysrhythmia after Acute Myocardial Infarction in Patients Admitted to CCU of Alkindy Teaching Hospital*

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## Abstract

**Objective** The incidence of rhythm and conduction abnormalities during acute myocardial infarction may approaches 100%; most are seen during the pre-hospital and coronary care unit phases**,** leading to deleterious effect on morbidity and mortality, this study conducted to find important persistent dysrhythmia found during CCU admission of acute myocardial infarction patients**.**

**Method** A retrospective observational study of 553 patients who were admitted to the Coronary Care Unit of Alkindy Teaching Hospital during Year 2011 with diagnosis of acute myocardial infarction**,** Information and data extracted from case sheets and associated 12 leads daily ECGs

**Results** only 25% of our patients had dysrhythmia on examining the present 12 leads ECGs , the mean age are 64 years and 24% of female and 26% of male had dysrhythmias. Those with dysrhythmia had more shortness of breath and less chest and epigastric pain.. There is no relation of dysrhythmia to diabetes , hypertension or smoking. dysrhythmia associate inferolateral and anterolateral myocardial infarction more than anterior, lateral or inferior infarction.

**conclusion** dysrhythmia in acute myocardial infarction, old age people had more dyrhythmia but gender had no effect, chest pain and shortness of breath also associate dysrhythmia significantly. Hypertension, diabetes ,and site of infarction had no effect on development of dysrhythmias, while size of infarction had significant effect.

**Key words;** kindy, infarction, dysrhythmia

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## *Introduction*

In the years before coronary care units came into common use, the mortality of hospitalized patients with acute myocardial infarctions was approximately35%. This figure has since been reduced at hospitals with effective coronary care units by reducing the mortality from cardiac arrhythmias. Electrocardiographic monitoring of patients has shown an incidence of 70-90% of cardiac dysrhythmias in the first 48hours after acute myocardial infarction (1)

The incidence of rhythm and conduction abnormalities during acute myocardial infarction approaches 100%; most are seen during the pre-hospital and coronary care unit phases.(2).

Atrial arrhythmias have been reported in as many as20 percent of cases of acute myocardial infarction. They are most common in the later stages of myocardial infarction as a complication of pericarditis or heart failure. (3)

The incidence of both ventricular tachyarrhythmia and high degree atrio-ventricular (AV) blocks following AMI has been reported to be as high as 20% in several studies.(4)While most studies have suggested an association between inferior myocardial infarction8 and AV blocks, the data on the incidence of ventricular tachyarrhythmia have been controversial.(5)Premature ventricular contractions (PVCs) occur in approximately 90% of patients. The incidence of ventricular fibrillation is approximately 2% to 4%.(6)

**Aim of the study**

To evaluate some factors that associates acute myocardial infarction in relation to dysrhythmia.

## *Methods*

A retrospective observational study of 553 patients who were admitted to the Coronary Care Unit of Alkindy Teaching Hospital during Year 2011 with diagnosis of acute myocardial infarction depending on presence of two of either typical ECG changes, associated chest pain and positive cardiac enzymes.

Information and data extracted from case sheets and associated 12 leads daily ECGs only ,were

examined for the presence of any rhythm disturbance(any type excluding sinus tachycardia) in addition to detecting site of infarction (depending on specific lead ST-T changes). 25% of our patients found to have dysrhythmia .

Statistical analysis

Data was introduced to PC and MINITAB version 13 was used in statistical analysis , t test and Chi square test were used to findout statistical difference between related data, 0.05 was considered as cutoff point for significant differences.

## *Results*

Table 1show that only 25% of our patients had dysrhythmia on examining the present 12 leads ECGs , the mean age of them are 64.2 years(SD12.8), and 24% of them were female and 26% of male had dysrhythmias.

**Table 1 Relation of dysrhythmia to gender and age**

| | | Dysrhythmia | | |
|---|---|---|---|---|
| | | Positive | Negative | |
| Total | | 139(25%) | 414(75%) | 553(100%) |
| Gender | Female | 62(24%) | 194(76%) | P=0.644 |
| | Male | 77(26%) | 220(74%) | |
| Age | Mean | 64.2 | 60.1 | P=0.001 |
| | SD | 11.7 | 12.8 | |

Table 2 show that our patients with acute myocardial infarction and dysrhythmia had more shortness of breath and less chest and epigastric pain.

**Table 2 Relation of dysrhythmia to symptoms**

| Associated Symptoms | | Dysrhythmia | | P Value |
|---|---|---|---|---|
| | | Positive | Negative | |
| Shortness of Breath | Positive | 95(36%) | 166(64%) | P=0.001 |
| | Negative | 44(15%) | 248(85%) | |
| Chest pain | Positive | 52(16%) | 268(84%) | P=0.001 |
| | negative | 87(26%) | 164(74%) | |
| Epigastric Pain | Positive | 13(18%) | 58(82%) | P=0.156 |
| | Negative | 126(26%) | 356(74%) | |

Table 3 show that there is negative association of hypertension, diabetes mellitus and smoking with dysrhythmia associated acute myocardial infarction which is not significant statistically.

**Table 3 Relation of dysrhythmia to atherosclerosis risk factors**

| Risk Factor | | Dysrhythmia | | P Value |
|---|---|---|---|---|
| | | Positive | Negative | |
| Hypertension | Positive | 68(24%) | 211(76%) | P=0.676 |
| | Negative | 71(26%) | 203(74%) | |
| Diabetes Mellitus | Positive | 41(22%) | 149(78%) | P=0.163 |
| | Negative | 98(27%) | 265(73%) | |
| Smoking | Positive | 44(22%) | 159(78%) | P=0.153 |
| | Negative | 95(27%) | 255(73%) | |

Table 4 show that dysrhythmia associate inferolateral and anterolateral myocardial infarctions (above 30%) more likely than anterior or lateral or inferior infarctions (below 25%) with just significant P value.

**Table 4 Relation of dysrhythmia to site of infarction**

| Site of Infarction | Dysrhythmia | | total |
|---|---|---|---|
| | Positive | Negative | |
| Anterior | 27(20%) | 112(80%) | 139 |
| Inferior | 35(25%) | 104(75%) | 139 |
| Lateral | 31(22%) | 112(78%) | 143 |
| Inferolateral | 30(36%) | 54(64%) | 84 |
| Anterolateral | 16(33%) | 32(67%) | 48 |
| Total | 139(25%) | 414(75%) | 553 |
| | P= 0.04 | | |

## *Discussion*

As this study show, about 25% of patients with acute myocardial infarction had dysrhythmias while literatures usually indicate that more than 70% had dysrhythmias(1),and this difference may be because detection of dysrhythmias in these studies usually done by continuous monitoring rather than examining daily ECG where most of them may go undetected because they are transient(7).

Increasing age is associated with increase possibility of having dysrhythmia significantly (P=0.001) as had been shown in this study. The resting heart rate decreases with ageing in normal healthy human beings, and it is associated with an increased prevalence of atrial dysrhythmias (8).Total Incidence of dysrhythmia are more in old but serious dysrhythmia are same in old and younger(9).

Although acute myocardial infarction occur more in males(10), our study show no significant difference(P=0.644) in incidence of dysrhythmia in both gender.

Chest pain has been reported as cardinal clinical feature among patients who presented as acute myocardial infarction.(11). Chest pain occur in 45% and shortness of breath in 33% of acute myocardial infarction patients (12).chest pain occur in only 16% of our dysrhythmic patients in this study which is less than expected while shortness of breath occur in 36% of our patient which is in agreement with other studies(12), although both had significant association with dysrhythmia(P=0.001) epigastric pain had not(P=0.156).

Susceptibility to dysrhythmias and electrical instability in diabetic patients are underestimated. However, the majority of studies with a long-term follow-up support this link. The role of hyperglycemia, autonomic neuropathy and anti-diabetic agents as predisposing factors deserve more attention to fortify the clinical judgment (13) .Incidence of complications such as malignant arrhythmias, conduction abnormalities are several fold more common in diabetic compared to nondiabetic subjects with AMI (14).while in our sudy there is insignificant association with dysrhythmia (P=0.163).

ventricular hypertrophy (LVH) is the adaptive mechanism of the heart to systolic overload of the left ventricle. Nevertheless, LVH plays a role in some complications, such as cardiac arrhythmias. Patients with LVH are more likely to develop ventricular arrhythmias than the hypertensive population without LVH. Further, the relation between left ventricular mass and ventricular arrhythmias is graded and continuous. The arrhythmias described in hypertensive patients with LVH are usually isolated premature ventricular contractions. The presence of electrocardiographic criteria of LVH represents a risk of higher incidence of sudden death, especially in men. The risk is even greater in the presence of ventricular arrhythmias. The presence of late potentials has been recently characterized as more related to ventricular arrhythmias than LVH. Antihypertensive drugs that can reduce LVH also have a beneficial effect on cardiovascular morbidity and mortality.(15) our study do not support positive relation of dysrhythmia to hypertension in acute myocardial infarction(P=0.676).

Nicotin is sympothomimitic chemical that promotes the release of caticholamines and other neurotransmitters acting centrally and peripherally in addition to its cardiovascular effects such as elevated heart rate , blood pressure and cardiac output.(16). Smoking increase dysrhythmia ( 17). This study reveal no significant association of dysrhythmia with smoking in acute myocardial infarction(P=0.0153)

Patients with an inferior or posterior AMI are more likely to develop conduction system abnormalities when compared to patients with an anterior or lateral AMI (10) . In addition, there is significant relationships between enzymatic estimates of infarct size and both survival and ventricular dysrhythmias early and late after infarction (18). On the other hand, there is no consensus in the literature on the association between AMI location and ventricular tachyarrhythmia. While Henriques et al data have shown an association between ventricular fibrillation and anterior or lateral AMI, which may be explained on the basis of the larger myocardial mass involved with these AMI locations(19).this study data show that although there is slight difference in inscidence of dysrhythmia which was more in inferolateral and anterolateral myocardial infarction with only slight significance (P<0.05), may be because of size of infarction, but inferior infarction show no overall increase of incidence of dysrhythmias noting that some dysrhythmia associate inferior MI are only transient and may escape detection by daily 12 leads ECG.

## *Conclusion*

This study limitation by looking for dysrhythmia only by examining daily ECGs during the first few days of admission led to detection of only some of dysrhythmia and only 25% of acute myocardial infarction in our study have dysrhythmia, old age people had more dyrhythmia but gender had no effect. Chest pain and shortness of breath had significant association with dysrhythmia in acute infarction while epigastric pain had not. In addition while risk factors for ischemia as hypertension, diabetes and smoking are well known to participate itself in development of dysrhythmia , our findings show no significant effect of the presence of these risk factors on dysrhythmia in acute myocardial infarction. It seems that development of dysrhythmia in acute infarction were related to size rather than the location of infarction

## *References*


1- Julian D: Coronary care units: Current policies and results, in Acute Myocardial Infarction, Edinburgh, E & S Livingstone, 1968, pp 34-36.

2- Meltzer LE, Kitchell JB. The incidence of arrhythmias associated with acute myocardial infarction. Prog Cardiovasc Dis1966;9:50-63.

3- Liberthson RR, Salisbury KW, Hutter AM Jr. De Sanctis RW. Atrial tachyarrhythmias in acute myocardial infarction. Am J Med 1976; 60:956-60.

4- Rathore SS, Gersh BJ, Berger PB, et al. Acute myocardial infarction complicated by heart block in the elderly: Prevalence and outcomes. Am Heart J. 2001;141(1):47–54.

5- Gomez JF, Zareba W, Moss AJ, McNitt S, Hall WJ. Prognostic value of location and type of myocardial infarction in the setting of advanced left ventricular dysfunction. Am J Cardiol. 2007;99(5):642–646.

6- Cardiogenic shock complicating acute coronary syndromes. Lancet. 356: 2000; 749-756.

7- George S. Kurland and D. Pressman. The Incidence of Arrhythmias in Acute Myocardial Infarction Studied with a Constant Monitoring System Circulation. 1965;31:834-841.

8- Jose, AD and Collison, D (1970). The normal range and determinants of the intrinsic heart rate in man. Cardiovasc. Res., 4: 160-167.

9- Milton Hurwitz and Robert S. Eliot.Arrhythmias in Acute Myocardial Infarction. Dis Chest 1964;45;616-626.

10- Haitham Hreybe, MD; Samir Saba, MD. Location of Acute Myocardial Infarction and Associated Arrhythmias and Outcome .Clin. Cardiol. 32, 5, 274–277 (2009)

11- Braunwald E. Heart diseases 4th edition WB Saunders Co. 1992; 1214-1215.

12- Mona L.,Ingela J.,Torestien H.,Berit S., Early warning signs of acute myocardial infarction and their influence on symptoms during acute phase with comparisons by gender. Gender medicine vol.6, iss3, sept 2009 p 444-453.

13- El-Menyar AA. Dysrhythmia and electrocardiographic changes in diabetes mellitus: pathophysiology and impact on the incidence of sudden cardiac death. J Cardiovasc Med (Hagerstown). 2006 Aug;7(8):580-5.

14- Savage MP, Krolewski AS, Kenien GG et al. Acute myocardial infarction in diabetes mellitus and significance of congestive heart failure as a prognostic factor. Am J Cardiol 1988; 62 : 665-9.

15- Bayés-Genís A, Guindo J, Viñolas X, Tomás L, Elosua R, Duran I, Bayés de Luna A. Cardiac arrhythmias and left ventricular hypertrophy in systemic hypertension and their influences on prognosis. Am J Cardiol. 1995 Nov 2;76(13):54D-59D

16- Ambrose JA, Barua RS. The pathophysiology of cigarette smoking and cardiovascular diseases, an update. J.Am.Coll.Cardiol 43(10) 1731-1737 (2004).

17- Bellet S, De Guzman NT, Kostis JB, et al. The effect of inhalation of cigarette smoke on ventricular fibrillation threshold in normal dogs and dogs with acute myocardial infarction. Am Heart J 1972; 83:67–76)

18- Sobel BE, Bresnahan GF, Shell WE, Yoder RD: Estimation of infarct size in man and its relation to prognosis. Circulation 46:610, 1972

19- Henriques JP, Gheeraert PJ, Ottervanger JP, et al. Ventricular fibrillation in acute myocardial infarction before and during primary PCI. Int J Cardiol. 2005;105(3):262–266.

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**Features Associate Acute Myocardial Infarction Dysrhythmia in Alkindy Teaching Hospital CCU Patients**