

Clinical Characteristics Of Acute Myocardial Infarction: Comparison Between Type-2 Diabetics And Non-Diabetic Patients AT A Saudi Teaching Hospital

Daad H. Akbar, FRCP (U.K), Arab Board, Saudi Board*

ملخص

استهدفت هذه الدراسة مقارنة الخواص السريرية لجلطة القلب الحادة لدى مرضى السكري وغير مصابين بالسكري. واشتملت على دراسة جميع المرضى الذين تم تشخيصهم بجلطة القلب الحادة والذين تم تنويمهم في مستشفى جامعة الملك عبد العزيز بجدة - المملكة العربية السعودية - في الفترة بين يناير ١٩٩٥ م إلى مايو ١٩٩٩ م. تم تقسيم المرضى إلى مجموعتين حسب وجود السكري أو عدمه وتم تكوين الخواص السريرية لكل من المجموعتين. وكان مجموع المرضى الذين تم دراستهم ١٦٦ منهم ٥١.٨٪ كانوا مصابين بالسكري بمتوسط أعمار ٥٧ سنة و ٤٨.٢٪ كانوا غير مصابين بالسكري بمتوسط أعمار ٥٢ سنة. وكانت نسبة الذكور للإناث ١:٢.٨ لمرضى السكري و ١:٨.٩ للمرضى الغير مصابين بالسكري. وقد وجد ارتفاع نسبة حدوث جلطة القلب في الفترة ما بين إبريل ويونيو. وقد وجدت جلطة القلب اللاعرضي عند ١٨.٦٪ من مرضى السكري و ٢.٨٪ عند المرضى الغير مصابين بالسكري. حدث هبوط القلب بسبب جلطة القلب عند ٢٦.٧٪ من مرضى السكري مقارنة بـ ١٠٪ عند المرضى الغير مصابين بالسكري. استخدمت الأدوية المحللة للجلطة عند ٤٤.٢٪ من مرضى السكري و ٦٠٪ من المرضى الغير مصابين بالسكري. مدة التنويم كانت أكبر عند مرضى السكري بمتوسط ١٢ يوم مقارنة بـ ١٠ أيام عند المرضى الغير مصابين بالسكري وكانت نسبة الوفاة مرتفعة لدى مرضى السكري (خصوصاً عند الإناث) ١٨٪ مقارنة بـ ١.٢٪ عند المرضى الغير مصابين بالسكري. وقد كانت نتائجنا موافقة لنتائج الأبحاث الأخرى المنشورة.

Abstract

This study aimed at comparing the clinical characteristics of diabetic and non-diabetic patients presenting with acute myocardial infarction, and to describe any variations from those reported in the literature.

Patients admitted to King Abdul Aziz University Hospital, Jeddah, Saudi Arabia between January 1995 and May 1999 were included in the study. They were divided into two groups according to the presence or absence of diabetes mellitus.

A total of 166 patients were studied, 51.8% were diabetics versus 48.2% non-diabetics with mean age of 56.60 11.68 years versus 51.84 15.57 years respectively. Male: Female ratio was 3.8:1 in diabetics versus 8.9:1 non-diabetics. Acute myocardial infarction peaks in the period between April and June. Silent events were noticed in 18.6% diabetics and 3.8% non-diabetics (p 0.003). Complicating heart failure was noticed in 26.7% of diabetics versus 10% in non-diabetics (p 0.006). Thrombolytic therapy was used less in diabetics 44.2% versus 60%(p 0.04). Hospital stay was 11.64 7.27days in diabetics and 9.98 3.97days in non-diabetics (p 0.06). Mortality was high in the diabetic group, with female predominance, 8.1% versus 1.3%(p 0.03). Our results were comparable with those reported in the literature.

Keywords: Myocardial infarction. diabetes mellitus. Saudi Arabia.

* Associate Professor/Consultant Physician
King Abdulaziz University Hospital, Jeddah, Saudi Arabia

Introduction

Diabetes mellitus (D.M) is one of the most important risk factors for the development of coronary heart diseases. A number of prospective studies indicated that cardiovascular morbidity and mortality was significantly higher in type II diabetics compared with non-diabetic control subjects (1,2). Diabetic patients with acute myocardial infarction (M.I) present with silent events more often than non-diabetics (3) and this could be responsible for their poor prognosis. The prevalence of D.M is variable and it is increasing world wide (4,5,6). In Saudi Arabia it has increased from 4.95 % in 1985 (7) to 7.4% in 1995 (8).

The aim of our study was to describe the clinical presentation, seasonal variations, treatment, complications and outcome of diabetic patients, admitted to King Abdulaziz University Hospital in Jeddah, Saudi Arabia (K.A.U.H) over a period of 4 years, with a diagnosis of M.I., and to compare them with non-diabetics. To our knowledge this is the first published report that compares the clinical characteristics of diabetics and non-diabetics presenting with acute M.I. in Saudi Arabia.

Patients and Methods

All patients admitted to K.A.U.H with a diagnosis of M.I during the period from January 1995 to May 1999 were included in the study.

Definitive diagnosis of M.I was confirmed by the presence of at least two of the following criteria: 1) a history of prolonged chest discomfort. 2) electrocardiographic changes consistent with ischemia or necrosis. 3) Elevated cardiac enzymes (9). Detailed information for every patient was obtained regarding the presence or absence of diabetes, age and month at presentation, sex, body mass index BMI (defined as weight in kilogram divided by height in square meters), duration of symptoms before coming to the hospital, clinical features on presentation, localization of M.I,

use of thrombolytic therapy, cardiac catheterization, angioplasty, duration of hospital stay, complications and outcome.

Statistical analysis was conducted using the Statistical Package for Social Sciences (SPSS7.5). A two-tailed student's test and Chi-square were used when appropriate.

Results

The number of patients who were diagnosed with confirmed MI according to the preset criteria was 166. Of these, 86 (51.8%) were diabetics, with mean duration of D.M 8.60 6.47 years, and 80(48.2% non-diabetics. April to June was the period during which the highest admissions were found. Table 1 shows that diabetics were older, with more females to males, late hospital arrival and they tend to stay longer in the hospital compared to non-diabetics. Diabetics were less likely to present with typical chest pain and more likely to present with silent M.I (table 2). Non-Q- M.I was diagnosed in a total of 6 patients, 3 (3.5%) diabetics and 3 (3.8%) non-diabetics (p 0.92) and there was no significant difference in the localization of M.I. (p 0.50).

Thrombolytic therapy was used more in non-diabetics while complicating heart failure and mortality were higher in diabetics as shown in table 3. Mortality was more in females in diabetics, 2:5 in diabetics versus 1:0 in non-diabetics (p 0.001). Table 4 shows no significant difference in the history of smoking, hyperlipidemia, hypertension or BMI between the two groups.

Discussion

The number of diabetic patients in the study group was higher than non-diabetics 51.8% versus 48.2%. Diabetic patients were older at the time of presentation, more likely to be females a finding comparable with several other reports (10-12). Some reports have noticed seasonal variations in the incidence of acute M.I, with reported peaks in winter, summer and

Table 1 : Comparison between diabetics and non-diabetics according to some variables

Variable	Diabetics N = 86	Non-diabetics N =80	Pvalue
Age (mean SD)	56.6±11.68	51.84 ± 15.57	0.05
Sex (M:F)	3.8:1	8.9:1	0.09
Duration of symptoms before hospital arrival in hours. Mean (range)	24(0.5-168)	12.6(0.5-100)	0.03
History of previous MI. N(%)	11 (12.8)	1(10)	0.37
Duration of hospital stay in days (mean+/-SD)	11.64 ± 7.27	9.98±3.97	0.06

M.I= myocardial infarction

Table 2 : Comparison between diabetic and non-diabetic patients on presentation:

Variables	Diabetics N=86 Caut	Non-diabetics N=80	P value
Chest pain	70(81.4%)	77(96.3%)	0.003
Silent M.I	16 (18.6%)	3 (3.8%)	0.003
Epigastric pain	11(12.8%)	10(12.5%)	0.95
Dyspnea	38(44.2%)	27(33.8%)	0.17
Palpitation	11(12.8%)	14 (17.5%)	0.39
Dizziness	6(7.0%)	9(11.3%)	0.34
Arrythmia	14(16.3%)	8 (10%)	0.23
Syncope	3(3.4%)	None	
Heart failure	29 (33.7%)	25(31.3%)	0.73

M.I = myocardial infarction

spring⁽¹³⁻¹⁸⁾, while others have reported no seasonal variations⁽¹⁹⁾. In our patients we observed higher incidence in spring. We found no significant difference in the localization of MI among diabetics and non-diabetics. Our finding was similar to that of Lerman et al⁽¹⁾ and Kunstmann et al⁽²⁰⁾.

Diabetic patients presented with silent M.I more than non-diabetics did. This finding was comparable to

findings of other studies^(2,3,21,22). This could be attributed to the presence of autonomic neuropathy which could be detected in more than 20% of diabetic patients⁽²³⁾.

History of previous M.I was noticed in both groups with no significant difference, a finding that was different from other reported studies^(11,21).

We observed that the use of thrombolytic therapy was

Table 3: complications, type of treatment and mortality in diabetics and non-diabetics

Complications	Diabetics N=86	Non-diabetics N=80	P value
Heart failure	23(26.7%)	8 (10%)	0.006
Arrythmia	5(5.8%)	6(7.5%)	0.66
Post M.I. angina	2(2.3%)	2(2.5%)	0.92
Thrombolytic therapy	38(44.2%)	48(60%)	0.04
Cardiac catheterization	7(8)	9(11)	0.75
Angioplasty	3 (3.5)	2(2.5)	0.75
Mortality	7 (8.1%)	1 (1.3%)	0.03

M.I. = Myocardial infarction.

Table 4: Risk factors in diabetics and non-diabetics

Riskfactor	Diabetics N(%) N=86	Non-diabetics N(%) N=80	P value
Smoking	45 (52.3)	50 (62.5)	0.18
Hyperlipidemia	11 (12.8)	13 (16.3)	0.52
Hypertension	30(34.9)	20(25)	0.16
Body Mass Index (Mean \pm SD)	26.27 3.51	26.17 4.18	0.86

lower in diabetics compared to non-diabetics, a finding similar to what has been reported in other series (26,27). This could be explained by the late hospital arrival, which was observed in our study and was similar to the findings of Newby et al (28). This delay in hospital arrival could add to the substantial risk already present in diabetic patients.

The incidence of heart failure in diabetic patients presenting with acute M.I was reported higher than non-diabetic, as they lack recovery in wall motion score index (3,21,26,29)

an observation that was confirmed in our study. The presence of post infarction complications, in particular heart failure, could be responsible for the prolonged hospital stay that was observed in our diabetic patients compared to non-diabetics.

It has been reported that the presence of D.M worsens the prognosis of coronary disease and thus post infarction mortality was higher in diabetic patients compared to non-diabetics (3,22). We found that the mortality in our series was 8.1% in diabetics compared to 1.3% in non-diabetics. Also, there was higher female:male mortality ratio in diabetics, a finding described by Lerman et al (1).

The presence of other risk factors like hypertension, hyperlipidemia and obesity was reported to be higher in diabetic patients admitted with acute M.I (30,20). However, this was not observed in our patients where diabetic and non-diabetics had the same prevalence of these risk factors. However, our diabetic patients had a higher morbidity and mortality compared to non-diabetics. It is possible that D.M could have been responsible for the poor prognosis, as observed by Scherthaner (2).

In conclusion, acute M.I in diabetic patients admitted to KAUH peaked in the period between April and June. Diabetic patients were older, with more females, with higher rate of silent events and complicating heart failure. The use of thrombolytic therapy was

lower, probably because of their late arrival at the hospital. Diabetic patients had longer hospital stay, probably due to the development of post M.I complications and they had a higher mortality. Our results were comparable with those reported in the literature.

References

1. Lerman-Garber-I, Ramirez-Ruvalcaba-JC, Garcia-Rubi-E, Luna-Ortiz-K, Posadas-Romero-C. Non-insulin dependent diabetes mellitus increases early mortality due to acute myocardial infarction. Arch Inst Cardiol Mex 1993Jul-Aug;63(4):317-23
2. Scherthaner - G. Cardiovascular mortality and morbidity in type -2 diabetes mellitus. Diabetes Res Clin Pract 1996Jul;31 suppl. S3-13
3. Tong-N, Li-H, Liang-J. Comparative analysis of clinical features of acute myocardial infarction in diabetics and non-diabetic patients. Hua Hsi I Ko Ta Hsueh Hsueh Pao 1996Sep;27(3):314-6
4. Gatling-W, Budd-S, Walters-D, Mullee-MA, Goddard-JR, Hill-RD. Evidence of increasing prevalence of diagnosed diabetes mellitus in the Poole area from 1983-1996. Diabet Med 1998Dec;15 (12):1015-21
5. Shi-HL, Fang-JC, Zhu-xx. Prevalence of diabetes mellitus and associated risk factors in an adult urban population in Shanghai. Diabetes Metab 1998Dec;24(6):539-42
6. Zimmet-P, Dowse-G, La-Porte-R, Finch-C, Moy-C. Epidemiology - It's contribution to understanding of the etiology, pathogenesis and prevention of diabetes mellitus. In: Creutzfeldt W, Lefebvre P, eds. Diabetes mellitus- pathogenesis and therapy. New York:Springer Verlag 1989:5-26
7. Fatani-H, Mira-S, Elzuber-A. Prevalence of diabetes mellitus in rural Saudi Arabia. Diabetes care 1987March-April;10(2):180-83

- 8 . Alhasmi-MAF,Alswailem-A, Wasry-AS, Sulimani-R. Prevalence of diabetes mellitus in Saudi Arabia. *Saudi Med J* 1995Jul;16(4):294-9
- 9 . Winters-KJ,Eisenberg-PR. Ischemic heart disease.In: Ewald-GA,McKenzie-CR. *The Washington manual* ,28th edn.Little Brown1995:94-7
- 10 . Mak-KH, Moliterno-DJ, Granger-CB,Miller-DP, White-HD, Wilcox-RG. Influence of D.M on the clinical outcome in the thrombolytic era of acute M.I GUSTO-1 investigations. Global utilization of streptokinase and tissue plasminogen activator for occluded coronary arteries. *J Am Coll Cardiol* 1997Jul;30(1):171-9
- 11 . Woodfield-SL,Lundergan-CF, Reiner -JS, Greenhouse- SW ,Thompson-MA,Rohrbeck - SC. Angiographic finding and outcome in diabetic patients treated with thrombolytic therapy for acute M.I:the GUSTO-1 experience. *J Am Coll Cardiol* 1996Dec;28(7):1661-9
- 12 . Kip-KE, Faxon-DP, Detre-KM, Yeh-W, Kelsey-SF, Currier-JW. Coronary angioplasty in diabetic patients. The National Heart,Lung,and Blood institute Percutaneous Transluminal Coronary Angioplasty Registry. *Circulation* 1996Oct15;94(8):1818-25
- 13 . Spencer-FA, Golderg-RJ, Becker-RC, Gore-JM. Seasonal distribution of acute myocardial infarction in the second national registry of M.I. *J Am Coll Cardiol* 1998May;31(6):1226-33
- 14 . Sayer-JW, Winkinson-P, Rajadayan-K, Ray-S, Marchant-B, Timmis-AD. Attenuation or absence of circadian and seasonal rhythms of acute myocardial infarction. *Heart* 1997April;77(4):325-9.
- 15 . Marchant-B, Rajadayan-K, Stevenson-R, Winkinson-P, Timmis-AD. Circadian and seasonal factors in the pathogenesis of acute myocardial infarction: the influence of environmental temperature. *Br Heart J* 1993May;69(5):385-7.
- 16 . Douglas-AS, Dunnigan-MG, Allan-TM, Rawles-JM. Seasonal variation in coronary heart disease in Scotland. *J Epidemiol Community Health* 1995Dec;49(6):575-82.
- 17 . Enquessassie-F, Dobson -AJ, Alexander -HM, Steele-PL. Seasons, temperature and coronary disease. *Int J Epidemiol* 1993Aug;22(4):632-6 .
- 18 . Li-QB, Sheng-L, He-Y. The effect of climatic factors on the onset of acute myocardial infarction. *Chung Hua Hu Li Tsa Chin* 1997Nov;32(11):621-4.
- 19 . Ku- CS, Yang-CY, Lee-WJ, Chiang- HT, Liu-CP,Lin-SL . Absence of seasonal variation in myocardial infarction onset in a region without temperature extremes. *Cardiology* 1998May;89(4):277-82.
- 20 . Kunstmann-S, Corbalan-R, Rodriguez-JA, Casanegra-P, Varela-ML. Characteristics of acute myocardial infarction in patients with diabetes mellitus. *Rev Med Chil* 1993Jun;121(6):645-51.
- 21 . Mahagoub- MA, Abd-Elfattah-AS. Diabetes mellitus and cardiac function. *Mol Cell Biochem* 1998Mar;180(1-2):59-64.
- 22 . Esmatjes- E, Vidal-J. Heart pathology of extra cardiac origin. XI. cardiac repercussion of diabetes mellitus. *Rev Esp Cardiol* 1998Aug;51(8):661-70.
- 23 . Ziegler-D. Clinical aspects, diagnosis and therapy of diabetic neuropathy. *Ther Umsch* 1996 Dec; 53 (12):948-57.
- 24 . Barbash-GI, Write-HD, Modan-M, Van-de-werf-F. Significance of diabetes mellitus in patients with acute myocardial infarction receiving thrombolytic therapy. Investigator of the International Tissue Plasminogen Activator/Streptokinase mortality trial. *J Am Coll Cardiol* 1993 Sep.;22(3):707-13.
- 25 . Lynch-M, Gammage-MD, Lamb-P, Nattrass-M, Pentecost-BL . Acute myocardial infarction in diabetic patients in the thrombolytic era. *Diabet Med* 1994Mar;11(2):162-5.
- 26 . Cantrill-JA, D'Emanuele-A, Dorman-TL, Garcia-S. A survey of drug treatment and outcome in diabetic patients with acute myocardial infarction. *J Clin Pharm Ther* 1995Aug;20(4):207-13.
- 27 . Hansen-HH, Kjaergaard-SC, Bulow-I, Fog-L, Christensen-PD. Thrombolytic therapy in diabetic patients with acute myocardial infarction. *Diabetes Care* 1996Oct;91(10):1135-7.
- 28 . Newby- LK, Rutsch-WR, Califf-RM, Simoons-ML, Aylward-PE, Armstrong-PW et al. Time from symptoms onset to treatment and outcome after thrombolytic therapy.GUSTO-1 investigation. *J Am Coll Cardiol* 1996 June;27(7):1646-55.
- 29 . Azzarelli -A, Dini-FL , Cristofani -R, Giaconi A, Rossi-AM,Volterrani-C,et al.Ventricular function in the elderly: echocardiography study. *Coron Artery Dis* 1995Aug;6(8):629-34.
- 30 . Milani -RV, Lavie-CJ. Behavioral differences and effect of cardiac rehabilitation in diabetic patients following cardiac events. *Am J Med* 1996May;100(5):517-23.